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ABSTRACT

This volume surveys major sources of published data on the academic performance of California public secondary school students and compares current performance levels to those attained in the State in the recent past, as well as to national trends. Chapter I is an introduction. Chapter II, "General Measures of Student Preparation," includes discussion of high school graduation rates, student performance in high schools, postsecondary enrollment, student preparation for college, and youth preparation for employment. In Chapter III, college- and work-related verbal performance is assessed, with data on reading and writing skills presented separately. Chapter IV, similarly, provides data on college- and work-related performance in the areas of mathematics and the sciences. In Chapter V, information is presented about the mastery of other "intellectual and life skills," including social studies/civic knowledge; art, music, and aesthetic appreciation; critical thinking; and health, recreation, and consumer skills. Finally, Chapter VI considers achievement data for different subgroups (males versus females, and students of different racial, ethnic, and socioeconomic backgrounds). Appended are (A) a description of data and information sources, and (B) a comparison of California and national Scholastic Aptitude Test data. Also attached are a glossary of acronyms and an eight-page bibliography on student achievement and performance. (GC)

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IMPROVING STUDENT PERFORMANCE IN CALIFORNIA

Recommendations for the California Roundtable

APPENDIX

A REVIEW OF STUDENT PERFORMANCE DATA

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APPENDIX

A REVIEW OF STUDENT PERFORMANCE DATA

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November 1982

R-101/3

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PREFACE

This report on the preparation of California high school students for college and work has been prepared for the California Business Roundtable. The Roundtable sought a comprehensive and accurate statement of what available data show about student performance. To assure the objectivity of the information, the Roundtable held a competition among four major educational research firms, and awarded a six-month contract in March 1982 to Berman, Weiler Associates. The Roundtable maintained an "arms-length relationship" to the research process itself, and carefully avoided giving any indication of its own views. In accordance with that charter, this report lets the facts speak for themselves; it keeps interpretation of the data to a minimum, and does not speculate on the possible causes of the student performance picture that clearly emerges from the mass of data presented.

The contract stipulated that only available data be used. Since no original analysis was conducted, the report does not explore some important issues in the detail they would otherwise merit. For example, the report does not include an analysis of the effects of student performance on employment opportunities; nor does it provide a full analysis of how changes in the class and racial composition of high school students in California might have affected the state's test scores in the past decade. Though such analyses would be useful, the report's findings are valid for the study's main purpose, which is to determine whether steps should be taken to improve secondary education in California.

OVERVIEW OF FINDINGS

Despite the vast amount of available data, it is hard to develop an accurate picture of student performance in California. The data are often incomplete, and data from different sources sometimes disagree. Nonetheless, confident conclusions can be reached in some areas. The following conclusions are clear inferences from the available data:

1. In California and in the nation as a whole, the average level of verbal and mathematics skills attained by graduating high school seniors is significantly lower today than during the late sixties and early seventies.

2. The average level of attainment of "rudimentary" skills has remained relatively stable during the past decade and a half, whereas the level of mastery of more complex skills has declined considerably. Fewer students today reach high levels of attainment of complex skills, in California and across the nation.

3. The average high school senior in California performs below the national average in reading, writing, and mathematics, though the relative position of California students has improved slightly in recent years. American students attain lower achievement levels in mathematics and science than comparable students in other developed nations.

4. The average California college-bound student is somewhat better prepared for college than similar students nationally; however, California students are significantly less well prepared than their counterparts were some years ago, especially in complex skill areas.

5. Many young people in California and in the nation are not well-prepared for the world of work, a problem which is likely to intensify as employment opportunities become increasingly technical.

In assessing the meaning of these results, demographic and social changes in California over the past few decades should be weighed. Many more students are enrolled today in California high schools than were enrolled 30 years ago, and the current senior high school population is

considerably more racially diverse than it was 10 years ago. These changes explain some of the student performance decline in California. But experts agree that the decline is more than a statistical anomaly. The downward trend in complex skills, in particular, affects all students and cannot be attributed to demographic changes.

SUMMARY

To reach a sound assessment of how well prepared California students are for college and work, several dimensions of student performance should be considered, and current performance should be compared to earlier time periods. Moreover, to place the performance of California students in a broader perspective, trends in California should be compared to national trends. The body of this report uses available data to present these comparisons, but the data are voluminous. To help the reader grasp the key conclusions, this section summarizes findings from each chapter, without elaboration.

CHAPTER I: INTRODUCTION

The information presented in this report has been drawn from many diverse data sources. Since original analysis was beyond the scope of the report, the available data had to be treated with caution and inferences kept to a minimum. Wherever possible, multiple sources were used to establish the findings presented here.

CHAPTER II: GENERAL MEASURES OF STUDENT PREPARATION

High School Graduation

Secondary schools in the United States enroll a much larger proportion of the youth population than do schools in other countries, and a much larger percentage of students remain in school into their late teens. The proportion of the California and national youth population that entered and completed secondary education grew steadily in the 20th

century, but has recently leveled off and begun to decline gradually. The graduation rate for California youth (i.e., the proportion of 18-year-olds who receive high school diplomas) is estimated to be 65 percent, which is below the national estimate of 72 percent.

High School Performance

The average coursework grades of secondary students in California and across the nation increased slightly over the past decade, while their scores on standardized tests dropped. This grade inflation seems to have peaked, and may be declining. The average grades reported by the California and national high school senior populations are approximately equal, though college-bound Californians average more A's and B's than college-bound students nationally.

Postsecondary Enrollment

A much greater proportion of the youth population enters postsecondary institutions (i.e., four year colleges, universities, two year colleges, and vocational schools) in the United States than in any other country. The proportion of California youth enrolling in postsecondary institutions is slightly higher than the national average, but about 70 percent of the California students attending school after high school go to two year institutions.

Student Preparation for College

In California and across the country, more high school seniors have difficulty doing college-level work today than was the case ten years ago. Postsecondary institutions have added more basic skills classes, enrollment in remedial courses has increased, and more students utilize

tutoring and other academic services. Many entering freshmen in California appear to have serious deficiencies in basic writing and quantitative skills.

Youth Preparation for Employment

The higher the level of schooling completed, the more likely a person is able to find and keep a job. Generally, the unemployment rate of young people is higher than that of the general population, and minority youth have twice the unemployment rate of majority youth. Recent reports of employer dissatisfaction with new employees appear to reflect a combination of inadequate preparation of young people in basic skills, poor work attitudes among youth, and some mismatch between the training of young people and the technical needs of business and industry. Though there is some anecdotal evidence that the skills of young workers have declined, there are no available quantitative data to confirm this widely held belief.

CHAPTER III: COLLEGE AND WORK-RELATED VERBAL PERFORMANCE

Reading

Comparisons among top students in reading and literature place American students ahead of students in other developed nations. Within the United States, there was a significant decline during the seventies in average student performance on measures testing advanced reading skills, with a lesser decline in fundamental skills. California students perform below the national average in reading. Average reading scores for California students declined markedly during the early seventies, but have not changed much recently.

Writing

The average level of attainment of basic writing skills has declined slightly in the United States and California during the past decade, but the average level of attainment of more advanced writing skills--including explanatory and interpretive writing--is down markedly. Though writing scores have improved recently in California, the state's high school seniors still score well below the national average. The scores of college-bound Californians have not changed much recently in basic writing skills, whereas there has been a large decline in their scores on tests of more advanced writing skills.

Overall Verbal

The scores in California and across the nation on college aptitude tests of verbal abilities have dropped markedly since the mid-sixties. Though college-bound California students historically performed above the national average on these tests, their scores dropped significantly during the early seventies--below the national norms between 1976 and 1978. The scores of California students have recently improved, and the most recent available scores (1982) place California one point below the national average.

CHAPTER IV: COLLEGE AND WORK-RELATED QUANTITATIVE PERFORMANCE

Mathematics

The mathematics performance of American high school seniors is poor by international standards. Within the United States, the average level of mathematics skills declined during the seventies, particularly in advanced computation and problem solving, and the scores of college-bound

students dropped sharply. Mathematics scores in California declined through 1977, but have turned generally upward since that time. The scores of college-bound students from California are slightly above the national average in mathematics, whereas the scores of the general high school senior population in California are at or slightly below the national average. Student performance in California in basic mathematics skills has probably remained about the same over the last five years, while competence in somewhat more advanced areas has declined and may account for overall test score decreases.

Science

In international testing, top American high school seniors performed below top students from other countries in science achievement. Within the United States, the average level of attainment of science skills may be decreasing, particularly in the physical sciences.

CHAPTER V: MASTERY OF OTHER INTELLECTUAL AND LIFE SKILLS

The available data point to a considerable decline in critical thinking abilities among high school graduates over the past decade, and the average high school senior seems to know little about health, energy, and consumer matters.

CHAPTER VI: SOME SUBGROUP DATA

Changes in Student Population

A significant part of the decline in test scores during the seventies may be due to changes in the composition (e.g., ethnic, linguistic,

family size, economic) of the twelfth grade class in California schools. Though it is certain that demographic changes have contributed to declining test scores, it is also evident that such changes cannot account for the magnitude of the decline nor for the extent of the decline across higher levels of student achievement.

Minority and Low Income Students

On the average, minority and low income students score considerably below the average in most subject areas, but their scores have recently improved slightly.

Low vs. High Achievers

Test scores improved during the seventies at the low end of the achievement scale, but they declined sharply, especially in California, at the high end of the achievement scale.

Male/Female Differences

Test scores have generally declined more for women than for men. In verbal skills, where women traditionally score higher than men, the decline of scores among college-bound women has been great. In mathematics, where women traditionally score lower than men, the gap between college-bound women and men is widening.

APPENDIX A: A DESCRIPTION OF DATA AND INFORMATION SOURCES

The data are not fully available in California to describe student performance as completely and accurately as would be desirable. The variety of available data sources, and their limitations, are discussed.

APPENDIX B: A COMPARISON OF CALIFORNIA AND NATIONAL SAT/ATP DATA

The number of test takers on the Scholastic Aptitude Tests and on the Admissions Testing Program has varied considerably during the past decade. This variation, along with coincident changes in the composition of the test-taking population, helps to explain some of the decline in test scores in California.

ACKNOWLEDGEMENTS

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Larry Cuban, Associate Professor, Stanford University

John Evans, Director, Western Regional Office, Educational Testing Service

Roy Forbes, Director, National Assessment for Educational Progress

Barbara Heyns, Director, Center for Applied Social Science Research, Faculty of Arts and Sciences, New York University

Richard Snow, Professor, Stanford University

We are indebted to these reviewers for their advice and assistance. Though many of their comments have been incorporated into this document, they cannot be held accountable for the report's contents or conclusions.

Kati Haycock directed the data collection activities and wrote the draft of this report. Beryl Nelson, Katherine Poss, and Alan Weisberg gathered data. Professor Charles Benson, University of California, Berkeley, reviewed an early draft and offered helpful comments. Joanne Cuthbertson, Carole Baume, and Angie DeFinis helped edit and prepare the final manuscript. We appreciate the dedicated efforts of Marilyn Pekasky, who typed the manuscript and made sure all the figures and tables found their rightful places.

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CHAPTER I

INTRODUCTION

Friends as well as critics of public education have expressed deep concern about poor student performance in California public high schools. Achievement on standardized tests is said to have decreased steadily since the mid-sixties, scores on college aptitude tests are thought to have dropped dramatically, and high school graduates are widely believed to be ill-prepared for college or work. Is such pessimism warranted? What do the data show?

To answer these questions, this report surveys major sources of published data on student performance in California, and compares the current student performance levels in California public high schools to levels attained in the recent past. California trends are also compared to national trends.

The report compiles considerable data from many sources. It cannot, however, provide a definitive picture of student performance during the seventies and early eighties, for several reasons. First, "outcome" data are not available to measure many legitimate purposes of education. Most would agree, for example, that schools are responsible for ensuring the physical and psychological well-being of their students and for fostering creativity. But experts in the field do not agree on appropriate ways to assess how successful secondary institutions are in meeting such goals. Second, the testing instruments that serve as the basis for most available performance data were designed to differentiate among students in terms of their relative achievement, not to assess individual learning or cognitive growth (Heyns, 1978). Yet many kinds of life events in

addition to schooling affect relative achievement (Snow, 1981). Consequently, inferences about the meaning of changes in test scores must be drawn with due caution. Third, most data sources on student performance are cross-sectional rather than longitudinal--i.e., they are not collected so that the same student can be compared from year to year. Because of this problem, declining scores may, for example, reflect changes in the composition of the test population from year to year instead of changes in the quality of schooling. Finally, performance data are generally not thoroughly reported. Many data sources, for example, restrict their reports to changes in average values, but do not provide information about variations around the averages, or provide statistics for important subgroups of the population.

Despite these problems, available data do provide valid indications of large-scale trends in student performance. The inferences drawn from these data are most valid when several independent data sources consistently provide evidence of major changes in average student performance or point to large gaps between the performance of California students and those elsewhere.

The first problem in assessing student performance is to decide which of the many goals of education should be evaluated. This is no easy task.

The goals of secondary education are discussed in a multitude of publications, some recent and some dating back well into the 19th century. Most discussions are cast broadly and philosophically. For example, some writers believe secondary schools should "enrich human life," serve as "the prime instrument of individual self-realization" (Husen, 1979), or transmit a "concern for heritage,. . .for the dignity of man" (Conant, 1945). For others, education is viewed as a vehicle for

"maximum possible utilization of human beings in productive activity" and for "fullest possible development of the skills, knowledge and capacities of the labor force" (Harbison, 1974).

The goals of education are not only diverse, they are constantly changing. As Americans have faced new problems, they have charged their schools with new tasks: "socialize immigrants," "keep young people out of the labor market," "foster patriotism," and "free mothers from the chores of child-rearing" (Goodlad, 1979). And the list of tasks has steadily grown, particularly in the last two decades. Schools have been asked to alleviate racial and ethnic segregation, to acculturate thousands of individuals who have limited proficiency in English, to address the needs of special categories of young people such as the handicapped, and "to attend to the legitimate and difficult needs of those at the bottom of the achievement scale" (University of California, 1981).

Though it would be useful to assess student performance for each of these many goals, the data simply are not available to examine more than the most basic goals involving the student's acquisition of information, knowledge and skills--the so-called cognitive purpose of schooling. This report particularly focuses on three aspects of the cognitive purpose of secondary schooling:

1. The preparation of young people for college;
2. The preparation of young people for work; and
3. The preparation of young people for adult responsibility.

Data are available to examine the first of these purposes of high schools. Assessments of how well-prepared students are for college have generally relied on grades in high school level academic courses and

scores on scholastic aptitude tests. Though the relative importance of these factors has varied over the years and from institution to institution, these two indices remain the key measures.

The criteria for judging how well prepared students are for work have shifted over time. At times, emphasis has been placed on possession of actual work skills; at other times, youth's socialization toward work has been stressed. At still other times--including today--the emphasis is on preparation for work via a solid academic background in verbal and computational skills. Most employers are currently said to prefer hiring easily trainable youth--i.e., youth who can read, write and compute accurately and efficiently, but who are not necessarily skilled in a particular line of work.

The literature pays scant attention to the last cognitive goal--the broad matter of how well prepared young people are for the responsibilities of adulthood. Of all the testing programs, only one--the National Assessment of Educational Progress (NAEP)--has set forth objectives for education that include skills outside of academic and work areas. Other testing programs rarely include items more specific than general statements about civic responsibilities or moral education.[1]

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[1]Because high school seniors are a heavily-studied population, there are numerous sources of information on their activities and attitudes. However, these data have limited value to the present study because they focus on activities other than educational outcomes (e.g., drug and alcohol use) or they emphasize input (e.g., courses taken, quality of teachers) rather than output measures. In general, information on the students who enter four-year colleges is collected frequently; it is readily available and relatively comprehensive. Information on those who enroll in community colleges or seek employment is much less common.

Due to these limitations in the availability of work-specific and "adult responsibility" data, this report assumes:

1. The verbal and quantitative skills taught in California high schools and tested by the various achievement examinations are applicable not only to college preparation but also to preparation for work.

2. NAEP and The College Board assessments of academic and non-academic skills outside of reading, writing, science, and math, provide a reasonable--if limited--substitute for direct measures of the performance of adult responsibilities.

Appendix A contains descriptive information about the primary sources of data used in this report, including data-gathering techniques, sample sizes and possible areas of weakness. Appendix B provides an additional analysis of score information from the Scholastic Aptitude Test (SAT) and College Board achievement tests.

The contents of the report are divided primarily into chapters that describe student performance for the different types of cognitive outcomes described above. Student performance can be evaluated in a number of individual content areas and on a number of levels. Chapter II examines school outcomes on a macro-level, looking at graduation, postsecondary entry, and employment rates. Within each of these general outcome areas, the report presents information on California students and, for comparison purposes, on students elsewhere in the country and the world.

Once this general picture is presented, the report provides information in several content areas. Chapters III and IV respectively treat verbal and quantitative performance related to college and work. Chapter V discusses students' mastery of other intellectual and life skills. The last chapter, Chapter VI, examines student performance data for several types of students.

CHAPTER II

GENERAL MEASURES OF STUDENT PREPARATION

How well prepared are California students for college or work, and how has their preparation changed over the past several decades? No single statistic will provide a simple answer to these questions; several different statistics must be used to describe this complex problem. This chapter uses a number of general statistics to measure student preparation, including the rate of graduation from high school, grades received in school, enrollment in postsecondary institutions, and early performance in postsecondary institutions.

1. High School Graduation Rates

A school's graduation rate is the proportion of students who enter the school and go on to obtain a diploma. At the state level, the graduation rate is the proportion of all students who receive a diploma in high schools throughout the state, compared to all students who enroll in high schools.

Though the graduation rate is a useful statistic, it is almost impossible to measure accurately for a state like California. Individual schools do not keep complete, accurate, or even comparable data on the flow of students through the school because of the high cost of recordkeeping, particularly in locations where families move frequently or where immigration is heavy. Instead of using the exact graduation rate, analysts must therefore piece together several alternative measures

that closely approximate the graduation rate. The measures included in the following discussion are:

1. The percentage of youths of a relevant age group who are enrolled in school at a given time;

2. The percentage of youths of a relevant age group who are high school graduates in a given year;

3. Self- or family-reported survey data on the educational attainment of the 18-year-old population; and

4. School attrition data (i.e., the number of high school freshmen one year contrasted with the number of high school seniors three years later).

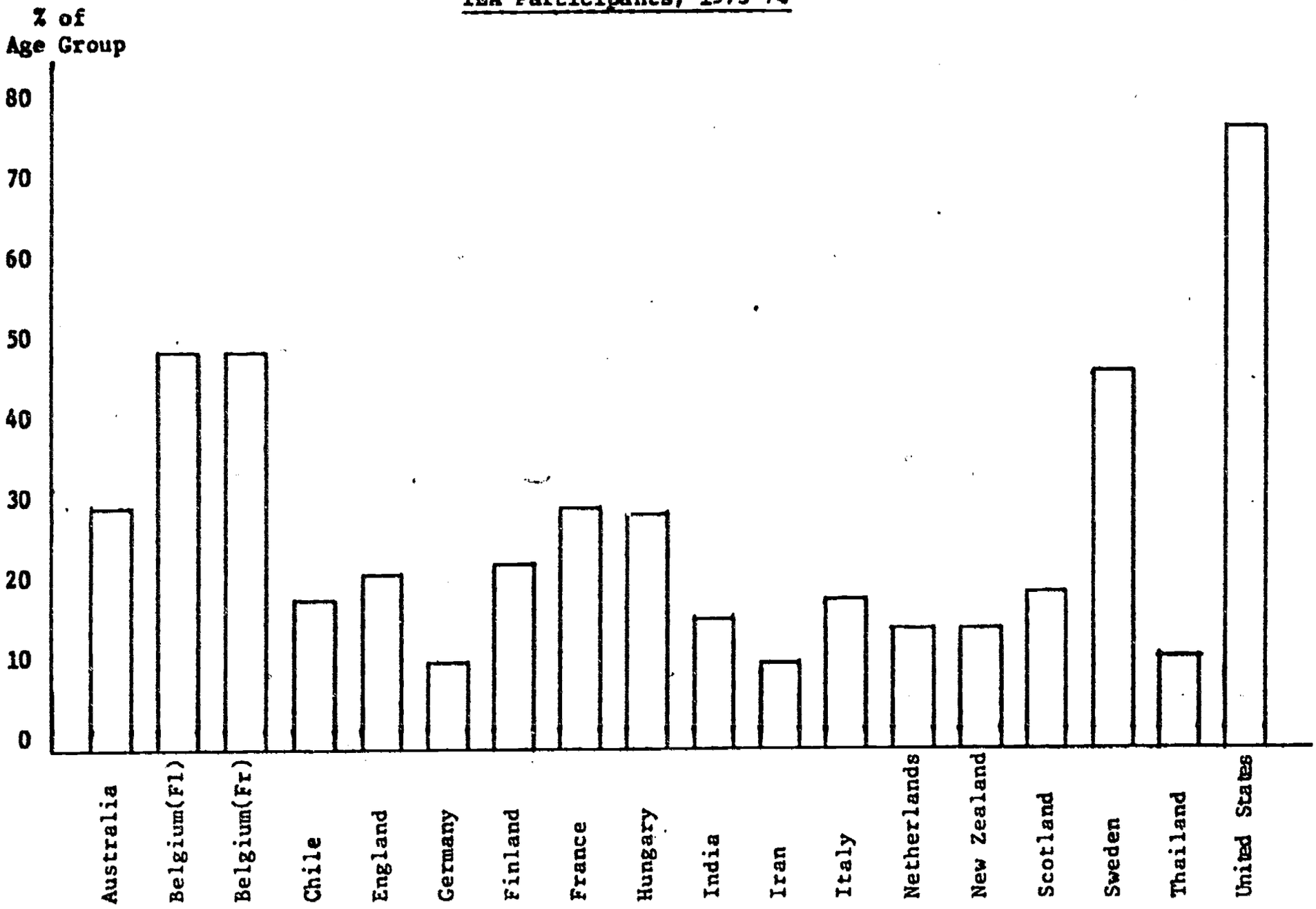
a. The National Setting

By international standards, American youths remain enrolled in high school at a very high rate. School enrollment of 16-year-olds in the United States surpasses that of 16-year-olds in any other country, and this gap widens with each subsequent year (Organisation for Economic Cooperation and Development, 1977).

Table II-1 presents estimates of the percentages of the relevant age group who are enrolled full-time in the final year of secondary schooling (measure 1 above) from countries that participated in the International Association for the Evaluation of Educational Achievement (IEA) examinations. These data show that half again as many students are enrolled in the final year of high school in the United States as in Belgium and Sweden, the two countries with the highest graduation rates in Europe. Proportionately, almost four times as many young people enroll in the final year of high school in the United States as do so in England.

TABLE II-1

PERCENTAGE OF THE RELEVANT AGE GROUP ENROLLED IN FULL TIME SCHOOLING
IN THE FINAL YEAR OF SECONDARY SCHOOL
IEA Participants, 1973-74[1]



[1]These numbers are estimates submitted by countries participating in the IEA examinations.

SOURCE: Abstracted from Wolf, Richard. Achievement in America. New York: Teachers College Press, 1977.

Although still high by international standards, graduation rates within the United States appear to have declined slightly during the past decade. Table II-2 shows that the sharpest increases in the percentage of the 17-year-old population with a high school diploma (measure 2 above) occurred between 1930 and 1940 and several times during the years following World War II. The rate peaked in 1967-1968 at 76.7 graduates per 100 17-year-olds, but dropped to 74 per 100 by 1978-1979. Newly available data from the National Center for Education Statistics (NCES) indicate that 72.1 percent of the 18-year-old American population received a high school diploma in 1979-80 (Snyder, 1982).[1]

b. California

The new NCES data indicate that the high school graduation rate for 18-year-old Californians (using measure 2 above) is lower than the national average. According to NCES, approximately 65 percent of 18-year-old Californians receive a diploma; the comparable figure for the entire United States is about 72 percent (Snyder, 1982). It is possible that the NCES estimate does not include certain high school equivalency certificates in California and that the large recent immigrant population in California is responsible for part of the difference between the state and the nation. However, neither factor can explain more than one or two percentage points of the difference between the California and national dropout rates. Table II-3 provides comparative data.

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[1]These figures were calculated using 1980 census data. It is not entirely clear whether the apparent decline in the graduation rate between 1978 and 1980 is a reflection of an improved data base or of an increase in the dropout rate.

TABLE II-2

NUMBER OF HIGH SCHOOL GRADUATES COMPARED WITH POPULATION 17 YEARS OF AGE

United States, 1869-70 to 1978-79

SCHOOL YEAR	POPULATION 17 YEARS OLD[1]	HIGH SCHOOL GRADUATES[2]			NO. GRADUATED PER 100 PERSONS 17 YRS. OLD
		Total	Boys	Girls	
1869-70	815,000	16,000	7,064	8,936	2.0
1879-80	946,026	23,634	10,605	13,029	2.5
1889-90	1,259,177	43,731	18,549	25,182	3.5
1899-1900	1,489,146	94,883	38,075	56,808	6.4
1909-10	1,786,240	156,429	63,676	92,753	8.8
1919-20	1,855,173	311,266	123,684	187,582	16.8
1929-30	2,295,822	666,904	300,376	366,528	29.0
1939-40	2,403,074	1,221,475	578,718	642,757	50.8
1941-42	2,425,574	1,242,375	576,717	665,658	56.2
1943-44	2,410,389	1,019,233	423,971	595,262	42.3
1945-46	2,254,738	1,080,033	466,926	613,107	47.9
1947-48	2,202,927	1,189,909	562,863	627,046	54.0
1949-50	2,034,450	1,199,700	570,700	629,000	59.0
1951-52	2,040,800	1,196,500	569,200	627,300	58.6
1953-54	2,128,600	1,276,100	612,500	663,600	60.0
1955-56	2,270,000	1,414,800	679,500	735,300	62.3
1957-58	2,324,000	1,505,900	725,500	780,400	64.8
1959-60	2,862,005	1,864,000	898,000	966,000	65.1
1961-62	2,768,000	1,925,000	941,000	984,000	69.5
1963-64	3,001,000	2,290,000	1,121,000	1,169,000	76.3
1965-66	3,515,000	2,632,000	1,308,000	1,324,000	74.9
1967-68	3,521,000	2,702,000	1,341,000	1,361,000	76.7
1969-70	3,825,343	2,896,000	1,433,000	1,463,000	75.7
1971-72	3,957,000	3,008,000	1,490,000	1,518,000	76.0
1973-74	4,096,000	3,080,000	1,515,000	1,565,000	75.2
1975-76	4,215,000	3,155,000	1,554,000	1,601,000	74.9
1977-78	4,208,000	3,134,000	1,535,000	1,599,000	74.5
1978-79[3]	4,238,000	3,134,200	1,531,800	1,602,400	74.0

[1]Data from Bureau of the Census.
[2]Includes graduates of public and nonpublic schools.
[3]Preliminary data.

SOURCE: National Center for Education Statistics. Digest of Educational Statistics. Washington, DC: U.S. Government Printing Office, 1981.

TABLE II-3

HIGH SCHOOL GRADUATES AS A PERCENTAGE OF 18-YEAR-OLDS

California vs. National, 1980

California

Number of 1979-80 Public High School Graduates:	257,996
Number of 1979-80 Private High School Graduates:	23,323
Total Number of 1979-80 High School Graduates:	281,319
Number of 18-Year-Olds in the Population:	432,864
Percentage of 18-Year-Olds Receiving Diploma:	65.3

National

Percentage of 18-Year-Olds Receiving Diploma:	72.1

SOURCE: Snyder, William. Unpublished state and national graduation statistics, personal communication. Washington, DC: National Center for Education Statistics, November 1982.

There are several other methods of approximating the graduation rate for California, each of which produces a slightly different picture. A comparison of 1978 school enrollment figures with pre-1980 census population estimates (measure 1 above) suggests that some 76.1 percent of the 17 year-old Californians were enrolled in school (Camp, 1980). Because this figure is based on district fall enrollment reports, it does not take into account absentee rates. A 1976 government survey, on the other hand, concluded that only 69.3 percent of the 17-year-olds in California were enrolled in school (Camp, 1980). Because both of these studies concern themselves with enrollment rather than with the acquisition of a diploma, it is likely that both estimates exceed the actual graduation rate.

Some data sources suggest that the graduation rate is declining in California, and at a rate greater than the apparent national declines. One of those sources is attrition data for the public schools, calculated by comparing the total number of students entering one grade with the number entering the next grade the following year (measure 4 above). Table II-4 provides attrition data for California public schools between 1970 and 1979. Over this period, attrition between the beginning of grade 9 and the beginning of grade 12 nearly doubled, from 12 percent for the class entering grade 9 in 1967 to 22 percent for the class entering grade 9 in 1976. This method does not, of course, account for further attrition during the twelfth grade, nor does it identify changes due to in- or out-migration.

Though comparable data are not available for public schools nationally, Table II-5 provides relevant data on combined public and private school enrollments. These data show that the percentage decrease

TABLE II-4

CALIFORNIA PUBLIC SCHOOL ENROLLMENT ATTRITION
BETWEEN THE NINTH AND TWELFTH GRADES

1970 Through 1979

ENTERING 9TH GRADE		ENTERING 12TH GRADE[1]		% DECREASE BETWEEN 9TH AND 12TH GRADES
Year	Number Enrolled	Year	Number Enrolled	
1967	316,761	1970	278,452	12
1968	326,803	1971	279,046	15
1969	337,640	1972	288,319	15
1970	339,470	1973	283,157	17
1971	349,900	1974	286,095	18
1972	359,227	1975	289,293	20
1973	356,537	1976	288,319	19
1974	357,817	1977	285,868	20
1975	364,701	1978	288,117	21
1976	368,831	1979	286,679	22

[1]Because enrollment data are based on counts made at the beginning of each school year (October), they fail to include students who drop out during their twelfth year (i.e., between the period October through May) and therefore underestimate the actual number of dropouts.

SOURCE: Camp, Catherine. School Drop-outs in California. Sacramento: 1980. (Data provided by the California State Department of Education, Personal and Career Development Services Unit.)

between ninth and twelfth grades in California was lower than the national percentage decrease until 1972, and has been approximately equal to the national percentage decrease since then.

In sum, high school graduation rates in the United States are high by international standards, but have declined slightly over the past decade. The graduation rate in California is currently lower than the national average.

2. Student Performance in High School

Using grades as the only criterion, high school students in the late seventies outperformed their predecessors of the early seventies. In 1980, some 33 percent of high school seniors responding to the National Center for Education Statistics' High School & Beyond Survey (HS & B) reported receiving "mostly A's" or "half A's and half B's"; the comparable figure for the 1972 graduating class is 29 percent. There was no change between 1972 and 1980 in the number of students reporting receiving "mostly D or below" (1.2 percent), but the percentages reporting "B and C" or "C and D" grades declined by 2 points per category (National Center for Education Statistics, 1981).

As shown in Table II-6, California students who take the SAT receive higher grades than their counterparts nationally.[1] As was true with

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[1]The College Board data summaries also provide self-reports on the type of courses taken, and these suggest that California students take fewer academic courses than their peers nationally.

TABLE 11-5

ESTIMATED RETENTION RATES, FIFTH GRADE THROUGH COLLEGE ENTRANCE, IN PUBLIC AND NONPUBLIC SCHOOLS[1]
United States, 1924-32 to 1971-79

SCHOOL YEAR PUPILS ENTERED FIFTH GRADE	RETENTION PER 1,000 PUPILS WHO ENTERED FIFTH GRADE								HIGH SCHOOL GRADUATION		FIRST-TIME COLLEGE STUDENTS
	5th Grade	6th Grade	7th Grade	8th Grade	9th Grade	10th Grade	11th Grade	12th Grade	Number	Year of Graduation	
1924-25	1,000	911	798	741	612	470	384	344	302	1932	118
1926-27	1,000	919	824	754	677	552	453	400	333	1934	129
1928-29	1,000	939	847	805	736	624	498	432	378	1936	137
1930-31	1,000	943	872	824	770	652	529	463	417	1938	148
1932-33	1,000	935	889	831	786	664	570	510	455	1940	160
1934-35	1,000	953	892	842	803	711	610	512	467	1942	129
1936-37	1,000	954	895	849	839	704	554	425	393	1944	121
1938-39	1,000	955	908	853	796	655	532	444	419	1946	—
1940-41	1,000	968	910	836	781	697	566	507	481	1948	--
1942-43	1,000	954	909	847	807	713	604	539	505	1950	205
1944-45	1,000	952	929	858	848	748	650	549	522	1952	234
1946-47	1,000	954	945	919	872	775	641	583	553	1954	283
1948-49	1,000	984	956	929	863	795	706	619	581	1956	301
1950-51	1,000	981	968	921	886	809	709	632	582	1958	308
1952-53	1,000	974	965	936	904	835	746	667	621	1960	328
1954-55	1,000	980	979	948	915	855	759	684	642	1962	343
1956-57	1,000	985	984	948	930	871	790	728	676	1964	362
Fall 1958[2]	1,000	983	979	961	946	908	842	761	732	1966	384
Fall 1960	1,000	980	973	967	952	913	858	787	749	1968	452
Fall 1962	1,000	987	977	967	959	928	860	790	750	1970	461
Fall 1964	1,000	988	985	976	975	942	865	791	748	1972	433
Fall 1966	1,000	989	986	985	985	959	871	783	744	1974	448
Fall 1968	1,000	992	992	991	983	958	869	786	749	1976	435
Fall 1970[3]	1,000	990	990	988	982	965	881	797	744	1978	440
Fall 1971	1,000	991	989	989	985	976	874	794	743	1979	451

[1]Rates for the fifth grade through high school graduation are based on enrollments in successive grades in successive years in public elementary and secondary schools and are adjusted to include estimates for nonpublic schools. Rates for first-time college enrollment include full-time and part-time students enrolled in programs creditable toward a bachelor's degree.

[2]Beginning with the class in the fifth grade in 1958, data are based on fall enrollment and exclude upgraded pupils. The net effect of these changes is to increase high school graduation and college entrance rates slightly.

[3]Some figures have been revised slightly since originally published.

SOURCES: National Center for Education Statistics. Digest of Educational Statistics. Washington, DC: U.S. Government Printing Office, 1981.

TABLE II-6

DISTRIBUTION OF HIGH SCHOOL GRADE POINT AVERAGES

Self-Reports of SAT Test Takers, National and California, 1975-1981

GRADE POINT AVERAGE	PERCENT OF STUDENTS							
	%-1975		%-1977		%-1979		%-1981	
	Nat.	Cal.	Nat.	Cal.	Nat.	Cal.	Nat.	Cal.
3.75 - 4.00	16	18	17	17	15.9	16.3	15.2	15.9
3.50 - 3.74	13	15	13	15	12.4	14.4	12.0	14.0
3.25 - 3.49	14	15	14	15	13.3	15.3	13.0	14.7
3.00 - 3.24	18	18	18	18	17.5	18.1	17.4	18.1
2.75 - 2.99	12	11	12	12	12.2	12.1	12.2	12.4
2.50 - 2.74	12	10	11	11	12.0	11.0	12.3	11.5
2.25 - 2.49	7	6	7	6	7.7	6.4	8.1	6.6
2.00 - 2.24	5	4	5	4	5.6	4.3	6.0	4.4
1.75 - 1.99	2	1	3	2	3.5	2.2	3.8	2.3
1.50 - 1.74	1	1	3					
Under 1.5	1		3					
Mean	3.09	3.17	3.11	3.16	3.08	3.14	3.06	3.13
Std. Dev.	.59	.56	.59	.56	.60	.56	.60	.56

SOURCES: The College Board. Admissions Testing Program Reports. New York: 1981; The College Board. Admissions Testing Program Reports. New York: 1979; The College Board. Admissions Testing Program Reports. New York: 1977; The College Board. Admissions Testing Program Reports. New York: 1975.

the general high school population, the college-bound population in California receives fewer "D" and "F" grades; they also receive more "A" and "B" grades. The higher average grade point average (GPA) among California SAT takers is particularly interesting because a larger percentage of the graduating class in California takes the SAT, a situation that would be expected to negatively affect the GPA (see Appendix B). Since 1975, however, the grades earned by college-bound Californians have declined slightly each year. The number of "A's" and "B's" has decreased, while the number of "D's" and "F's" has increased.

Two other sources of data corroborate these trends. First, based on a review of some 10,000 high school transcripts, the California Postsecondary Education Commission's 1975 eligibility study concluded that, while the proportion of high school seniors eligible (on the basis of grades and test scores) to enter the University of California (UC) or the California State University (CSU) system increased between 1967 and 1975, the increases were not substantial (those eligible to enter the University of California increased from 12.5 to 14.8 percent of the high school graduating class; those eligible to enter the California State University system from 33-1/3 percent to 35 percent). Second, a review of UC scholarship report data on the mean high school grade point averages of entering freshmen suggests that grade point averages in academic coursework increased slightly between 1967 (3.41) and 1975 (3.60), then declined thereafter (to 3.56 in 1978 and 3.53 in 1979). Though California college-bound high school seniors may report higher grades than the national norm, grade inflation may be less substantial now than previously.

3. Postsecondary Enrollment

The preparation of students for college is an important function of secondary schools. By some estimates, over three-quarters of the high school graduate population will obtain some type of postsecondary education within a decade of graduation (Haycock, 1978). Thus, preparation for college is important not merely to a small group of the highest achieving students, but to most students.

a. The National Setting

As was true at the secondary school level, the United States led the international community in 1970 in higher education enrollments as a percentage of the relevant age group. Table II-7 provides 1970 postsecondary enrollment data for certain countries which are members of the Organisation for Economic Cooperation and Development (OECD). Nearly one-half of the 18-year-olds in the United States were enrolled in higher education in 1970. In Sweden, some 44.7 percent of the relevant age group were enrolled in higher education, as were approximately one-third of the Canadian age group.

Two phenomena are noteworthy here. First, there is considerable variation among countries in the proportion of the postsecondary population enrolled in "university" versus "other higher education." Second, the meaning of these numbers becomes somewhat less clear when they are reviewed in comparison with the secondary school completion data. In several cases, a higher percentage of high school students than those who complete the final year subsequently enroll in higher

TABLE II-7

ENTRY TO HIGHER EDUCATION AS A PERCENTAGE OF THE RELEVANT AGE GROUP

By Type of Institution: Selected Countries, 1970

COUNTRY	Percent of Relevant Age Group Entering Higher Education	
	1970	1978
Australia		22.9
Canada	33.6	36.8
Finland		22.9
France	22.4	24.0
Germany(F.R.)	15.8	21.0
Italy	24.1	27.0
Japan	23.8	30.0
Netherlands	18.3	28.5
New Zealand		28.7
Norway	27.5	22.7
Sweden	44.7	36.5
United Kingdom	20.3	19.5
United States	46.5	46.5

SOURCE: Compiled using data in United Nations Educational, Scientific, and Cultural Organization (UNESCO). Statistical Yearbook, Section III-28. Paris: 1931.

education.[1] The differences revealed in these data between the United States and Britain, France, and Germany is not as large as one might surmise from the differences in secondary school completion rates. Table II-8 provides comparative educational attainment information for OECD member countries.

Postsecondary education within the United States has expanded rather dramatically during the past two decades, particularly in public institutions. In 1960, total postsecondary enrollment was 3,789,000; by 1980 it had exceeded 11 million students (National Center for Education Statistics, 1976 and 1980). The postsecondary enrollment rate of high school graduates (calculated by comparing the total number of high school graduates during one academic year with the number of first-time freshmen age 19 or under in postsecondary institutions the following academic year) has remained essentially unchanged since 1968, when it reached the current level of approximately 60 percent (National Center for Education Statistics, 1976).

b. California

Enrollment in California postsecondary institutions has also grown during the past two decades, primarily as a result of two factors: The increasing size of the high school graduate population through 1975 and

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[1]There are some discrepancies between the IEA and OECD data, which may be explained by characteristics of the educational systems in certain countries. Germany, for example, is said to graduate only 9 percent of the relevant age group from secondary schools; it is then reported to send 15.8 percent of this group to college--including 10.4 percent to a university. Comparable data for 1980 are not available, and the 1970 data discussed above may no longer be accurate.

TABLE II-8

AVERAGE YEARS OF SCHOOLING COMPLETED BY ADULTS, AGES 25-64

Selected Countries, 1970[1]

COUNTRY	Total regular education received (excluding preccompulsory education)	Compulsory education received before age 15	Education received at ages 15-18 inclusive	Education received after age 18
Canada[2]	9.7	7.4	1.9	.47
France[3]	9.1	7.7	1.0	.35
Germany(F.R.)	9.2	7.8	1.2	.29
Italy[2,5]	6.4	5.4	.5	.40
Japan	10.0	7.8	1.8	.35
Netherlands[4,5]	8.5	7.1	1.1	.38
Norway[5,6]	8.8	7.0	1.3	.49
Sweden[6]	8.7	6.7	1.6	.44
United Kingdom[5]	10.2	9.0	1.0	.25
United States	11.1	7.6	2.7	.76

[1]Data are for adults who have left the educational system.
[2]Data are for 1971.
[3]Data are for 1968.
[4]Active population.
[5]Estimates derived by projections from censuses taken in or near 1960 with the help of enrollment data.
[6]Includes age group 25-59.

SOURCE: National Center for Education Statistics. The Condition of Education: 1976. Washington, DC: U.S. Government Printing Office, 1976.

the increasing rate at which high school graduates continue on to college. In 1960, enrollment in public postsecondary educational institutions included some 434,148 students; by 1980, more than 1,639,647 students were enrolled. As shown in Table II-9, much of the growth occured within the two-year community college system.

The current rate at which California high school graduates enter college does not appear to differ significantly from the national average. According to a recent report from the California Postsecondary Education Commission, the first-time freshman enrollment count in the fall of 1980 represented 61.5 percent of the number of high school graduates during the previous academic year. Table II-10 provides college-going information for California students between 1974 and 1980.

A second source of data on college-entry rates is the Beyond High School Graduation Survey of 1975 high school graduates, conducted by the University of California in conjunction with the 1975 Postsecondary Eligibility Study. This study indicated that some 75 percent of the respondents reported pursuing some kind of postsecondary schooling within two and one-half years of high school graduation (Haycock, 1978). While this estimate may be high, it is the only source of information on students who enter college after a brief delay, and thus complements more official data.

4. Student Preparation for College

a. The National Setting

Today's average college student appears to have more difficulty with college level work than did his or her predecessor in the sixties. The increased number of remedial courses being offered by colleges and

TABLE 11-9

ENROLLMENT IN CALIFORNIA PUBLIC POSTSECONDARY EDUCATION

1969-1980

YEAR	CALIFORNIA COMMUNITY COLLEGES		CALIFORNIA STATE UNIVERSITY		UNIVERSITY OF CALIFORINIA		TOTAL PUBLIC	
	Student Enrollment	% of Total	Student Enrollment	% of Total	Student Enrollment	% of Total	Student Enrollment	% of Total
1960	289,898	66.8	95,081	21.9	49,169	11.3	434,148	100.0
1965	459,445	66.2	154,927	22.3	79,437	11.5	693,809	100.0
1970	652,133	65.0	241,559	24.1	109,033	10.9	1,002,725	100.0
1975	1,101,548	71.5	310,891	20.2	128,486	8.3	1,540,925	100.0
1980	1,189,976	72.6	313,850	19.1	135,821	8.3	1,639,647	100.0

SOURCE: California Postsecondary Education Commission. Telephone communication of unpublished data. Sacramento: State of California, November 1982.

TABLE II-10

STATEWIDE COLLEGE-GOING RATES FOR RECENT HIGH SCHOOL GRADUATES

Public and Private Schools, 1974-1980

YEAR	NUMBER OF HIGH SCHOOL GRADUATES	PERCENTAGE ENROLLING AS FRESHMEN					
		UC	CSU	Community College	Total Public	Inde-pendent	GRAND TOTAL
1974	289,714	5.1	7.6	41.3	54.0	-	-
1975	293,941	5.3	7.5	43.1	55.9	-	-
1976	289,454	5.1	7.8	41.7	54.6	-	-
1977	285,360	5.2	8.0	43.3	56.5	3.6	60.1
1978	283,841	5.5	8.4	41.4	55.3	3.4	58.7
1979	278,548	5.8	8.7	42.1	56.6	3.4	60.0
1980	270,971	6.0	9.0	43.0	58.0	3.5	61.5

Notes: Numbers of high school graduates were obtained from annual reports prepared by the California State Department of Education for both public and private secondary schools. Data on first-time freshmen were obtained from tapes provided by the public systems and from a special survey conducted by the independent institutes. Percentages were calculated comparing the graduates of day high schools with first-time freshman under the age of 20; both part- and full-time students are included. Students who leave California for colleges outside the state are not included here, nor are students in vocational institutions.

SOURCE: California Postsecondary Education Commission. California College-Going Rates and Community College Transfers. Sacramento: State of California, 1981.

universities provides evidence of the problem. In 1980-81, the number of remedial courses offered by postsecondary institutions across the country rose by 22 percent--25 percent in private institutions and 19 percent in public. "Even the more selective private liberals arts colleges. . .offered twice as many remedial courses in the fall of 1980 as in the fall of 1979" (Trow, 1982, p. 19). A survey conducted by the Conference Board of the Mathematical Sciences indicates that remedial mathematics course enrollments at the postsecondary level increased by 72 percent between 1975 and 1980, compared with an increase of only 7 percent in undergraduate enrollments. At the community college level, some 42 percent of all mathematics courses are now remedial in nature (Alder, 1982).[1]

Data from The College Board's Admissions Testing Program suggests that many prospective college students may be unaware of their skill deficiencies. In 1981, for example, 40 percent fewer SAT takers expressed an intent to seek assistance with mathematics than in 1972; over the same time, the number of SAT takers dropped by only 2.8 percent (see Table II-11). In spite of data suggesting major increases in remedial course work in all skills areas, students taking the SAT in 1981 were far less inclined to express a lack of confidence in their academic skills than students in 1972 (The College Board, 1972 and 1981).

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[1]Many experts believe that the required level of mathematics for college work has increased, and that the definition of remedial has consequently changed during the past decade.

TABLE II-11

NUMBER OF SAT-TAKERS PLANNING TO ASK COLLEGE FOR SPECIAL ASSISTANCE

National, 1972 and 1981

AREA	1972	1981	PERCENTAGE CHANGE
MATHEMATICAL SKILLS	261,729	156,400	-40.3
READING SKILLS	311,963	104,266	-66.6
WRITING SKILLS	292,115	128,911	-55.9
STUDY SKILLS	314,566	212,324	-32.6

SOURCE: The College Board. Admissions Testing Program Reports. New York: 1981; The College Board. Admissions Testing Program Reports. New York: 1972.

b. California

Available evidence suggests that increasing numbers of college-bound students in California, like their national counterparts, are experiencing difficulty with college-level work. For example, the University of California, which draws most of its students from the upper 12.5 percent of high school graduates, reports that 48.7 percent of its entering freshmen in 1975 were required to take "Subject A," a course designed to bring students' writing skills up to the minimum level acceptable for college work. By 1979-80, this rate had increased to 55.8 percent. In addition, the number of entering students whose writing skills were insufficient even for "Subject A" necessitated the creation of "pre-Subject A" courses. Classes in the latter category (which do not include English as a Second Language) enrolled some 300 students in 1975 but had grown to 1500 students by 1979-80 (University of California, 1981). The state university system, which draws most of its students from the upper one-third of the graduating class, also reports that over one-half of its entering students require additional assistance with writing (Roberts, 1982).

Course enrollments in pre-calculus mathematics (considered below college level) have increased even more than "Subject A" enrollments. Between 1975 and 1979, the proportion of UC freshmen enrolled in pre-calculus coursework increased from 36.2 percent to 48.7 percent (University of California, 1981). However, this trend may be due partly to increasing interest in fields for which mathematics preparation is essential.

The actual grades received by college freshmen (at least at UC) did not decline during the seventies, suggesting either that the University of California's standards are not absolute or that student deficiences are remediated almost overnight. In fact, the mean UC grade point average for freshmen increased from 2.59 in 1967 to 2.87 in 1976 and then declined slightly to 2.83 and 2.84 in 1978 and 1979, respectively. Interestingly, this pattern is nearly identical to the changes in entering GPA described above.

5. Youth Preparation for Employment

Many young people do not attend college after graduation from high school. Instead, they seek work directly, or choose some other non-school activity. These students comprise about one-third of the high school graduating class, and approximately one-half of the 18- to 19-year-old population. See Figure II-1 for California estimates.

a. The National Setting

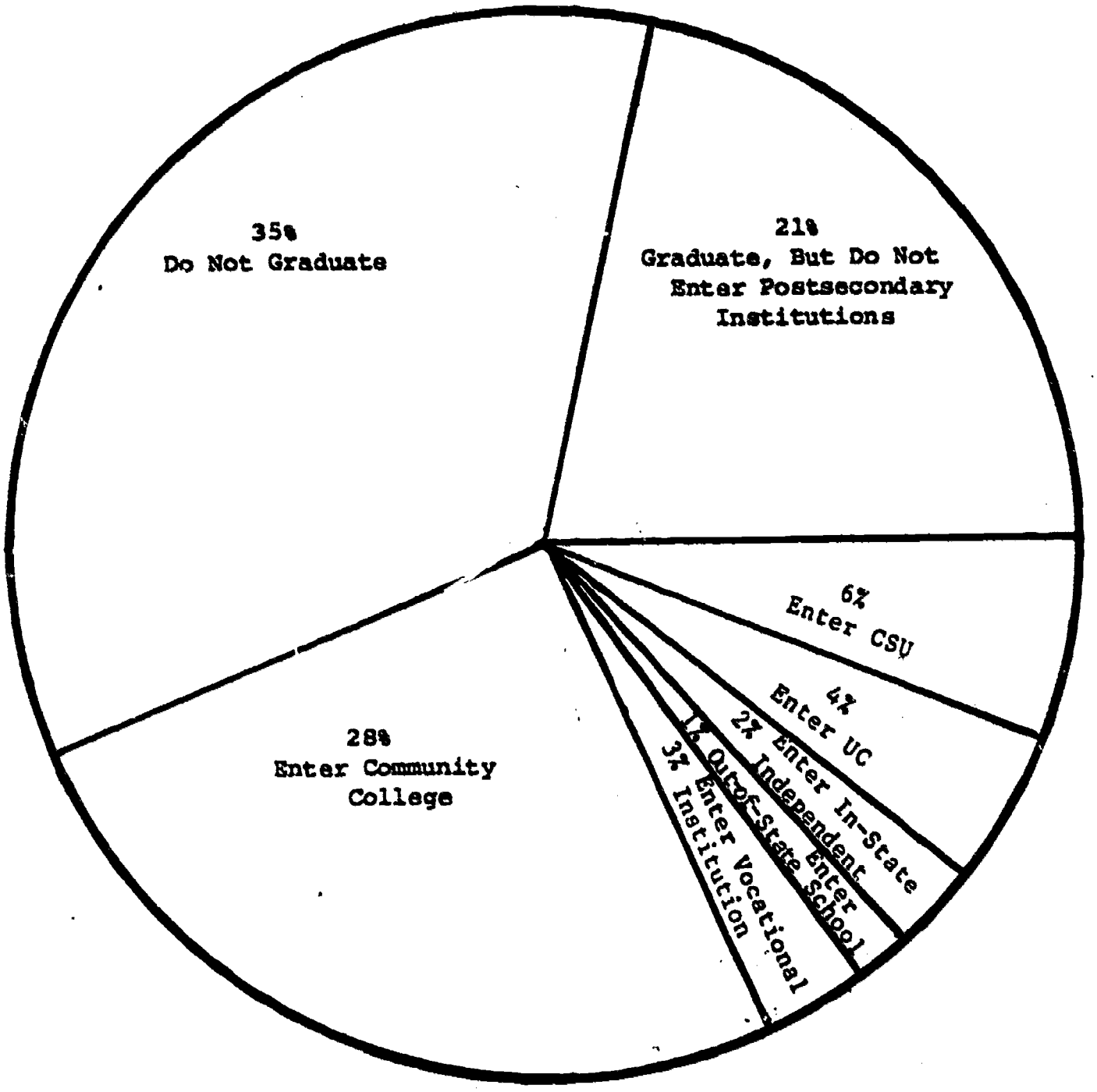
It is difficult to obtain data that are specific to trends in the work-preparedness of American students. Due to national variations in educational and economic systems, the level at which American high school students are prepared for work cannot be compared directly with that of students elsewhere. However, a 1977 report from the Organisation for Economic Cooperation and Development described the international situation in the mid-seventies as follows:

> "Those who have acquired specialized vocational training related to job openings experience little difficulty in finding a job which corresponds to their abilities. . .The links between school and work are virtually non-existent for young people who have not acquired a usable occupational skill at school. . .For all these. . .the search for the right job may be difficult."

FIGURE II-1

FIRST YEAR POST HIGH SCHOOL ACTIVITIES

California 18- and 19-Year-Olds, Estimates



SOURCE: Extrapolations from data contained in California Postsecondary Education Commission. California College-Going Rates and Community College Transfers. Sacramento: State of California, 1981; Haycock, Kati. Beyond High School Graduation: Who Goes to College? Berkeley, CA: University of California, 1978; and Snyder, William. Unpublished state and national graduation statistics, personal communication. Washington, DC: National Center for Education Statistics, November 1982.

The report cited values held by young people as a factor contributing to the "youth employment problem." Specifically, while "most young people have a fairly positive attitude towards work," it appears that negative attitudes toward work were "on the increase" in the seventies. Young people were "becoming increasingly reluctant to accept authoritive supervision," rebelling against a work organization "which imposes constraints and deprives them of initiative and responsibility. . .They often criticize the boredom of jobs they are offered" and were frequently "apathetic" in the face of adverse working conditions (Organisation for Economic Cooperation and Development, 1977).

According to the OECD report, employer attitudes in other countries are similar to those reported in the United States:

> "On the one hand, they demand increasingly higher educational qualifications, even when these do not reflect useable vocational skills or do not correspond to job requirements. On the other hand, they complain that young people are inadequately prepared for the jobs available to them."

The report also notes a general reluctance among employers to hire people under the age of 25 (Organisation for Economic Cooperation and Development, 1977).

Employment figures for the United States show that unemployment rates are significantly higher for people under the age of 25 than for any other age group, as Table II-12 shows. In particular, the 1980 unemployment rate among males between the ages of 20 and 24 was more than 50 percent higher than the rate of unemployment for males between the ages of 25 and 29. Similarly, the percentage of females from 20 to 24 who were unemployed was over twice the rate for females between 25 and 54 years of age. Table II-13 indicates that the unemployment rate for

TABLE II-12

PERCENTAGE OF UNEMPLOYMENT OF THE NONINSTITUTIONAL POPULATION

By Age and Sex, 1980

AGE	PERCENTAGE UNEMPLOYED	
	Male	Female
16 years and over	6.9	7.2
16 to 21 years	16.6	16.5
16 to 19 years	17.5	18.2
16 to 17 years	19.1	21.2
18 to 19 years	16.3	16.3
20 to 64 years	6.1	6.1
20 to 24 years	12.7	10.9
25 to 54 years	5.2	5.4
25 to 29 years	8.0	7.5
30 to 34 years	5.6	5.6
35 to 39 years	4.6	4.8
40 to 44 years	4.0	4.7
45 to 49 years	3.7	3.9
50 to 54 years	3.3	4.3
55 to 64 years	3.4	3.2
55 to 59 years	3.4	3.4
60 to 64 years	3.5	2.9
65 years and over	3.1	3.0
65 to 69 years	3.5	3.8
70 years and over	2.5	1.5

SOURCE: Bureau of Labor Statistics. Employment and Earnings. Washington, DC: U.S. Government Printing Office, 1980.

TABLE II-13

UNEMPLOYMENT RATES FOR RECENT HIGH SCHOOL GRADUATES (NOT IN COLLEGE) AND DROPOUTS

By Race, October 1977

UNEMPLOYED	HIGH SCHOOL GRADUATES		DROPOUTS	
	1976	1977	1976	1977
White	11.0%	13.1%	18.5%	(31.2% Total)
Black	28.8%	41.8%	56.0%	

SOURCE: Data drawn from Carnegie Council for Policy Studies in Higher Education. Giving Youth a Better Chance. San Francisco: Jossey-Bass, 1979.

dropouts is generally higher than that for high school graduates, as is the unemployment rate for minority young people compared to majority young people.

The National Assessment of Educational Progress examined the work-related skills of young Americans during the 1973-74 school year. The examination covered three areas: command of basic skills, knowledge about jobs, and career decision-making skills and knowledge. The data suggest problems among 17-year-olds in all three areas. In the first area, basic skills, the NAEP examiners found that only half of the 17-year-olds could successfully compute the amount of a finance charge when given the total price of the object and the number and amount of the monthly payments; that only slightly over one-third of the 17-year-olds drafted a sample job application letter with enough information to enable the employer to contact them; and that nearly four out of ten 17-year-olds questioned could not correctly draw an object to show three dimensions. In the area of job knowledge, the examiners found, among other things, that only fifty-four percent of the 17-year-olds could correctly answer five questions about training needed for various occupations. In the decision-making area, the examiners found that most 17-year-olds had decidedly unrealistic job aspirations.

Another review of the competencies required for successful occupational performance was conducted in the early seventies by the Adult Performance Level (APL) Project at the University of Texas. APL researchers constructed ten objectives for functional competency in the area of occupational knowledge, including "building an oral and written vocabulary related to occupational knowledge," the ability to "identify sources of information that may lead to employment" and "define

occupational categories in terms of the education and job experience required," and the ability "to know attributes and skills which may lead to promotion." For the total national sample, approximately one of five employed adults had difficulty with occupational knowledge.

Data available from the Department of Defense on the results of the Armed Services Vocational Aptitude Battery (ASVAB)[1] also identify significant deficiencies in functional capabilities for military personnel. However, though the scores of military personnel as measured by the ASVAB have generally declined since World War II, the performance of American youth in these skill areas has not declined. In fact, the mean ASVAB score for World War II recruits was 50; when the test was administered to a representative sample of American youth in 1980, the mean was 53 (Secretary of Defense, 1982).

The APL and ASVAB analyses demonstrate a link between years of formal schooling and functional competency. Among adults with less than 7 years of education, more than 50 percent "function only with difficulty" in an occupational setting. In contrast, only 11 percent of high school graduates fall into this category. Over one-half of the high school graduates and 80 percent of the college graduates were classified as "proficient adults" (Tyler, 1976).

Data from the NAEP Assessment of Career and Occupational Development also show a close relationship between amount of education and work-related skills. Figures II-2 through II-6 provide performance

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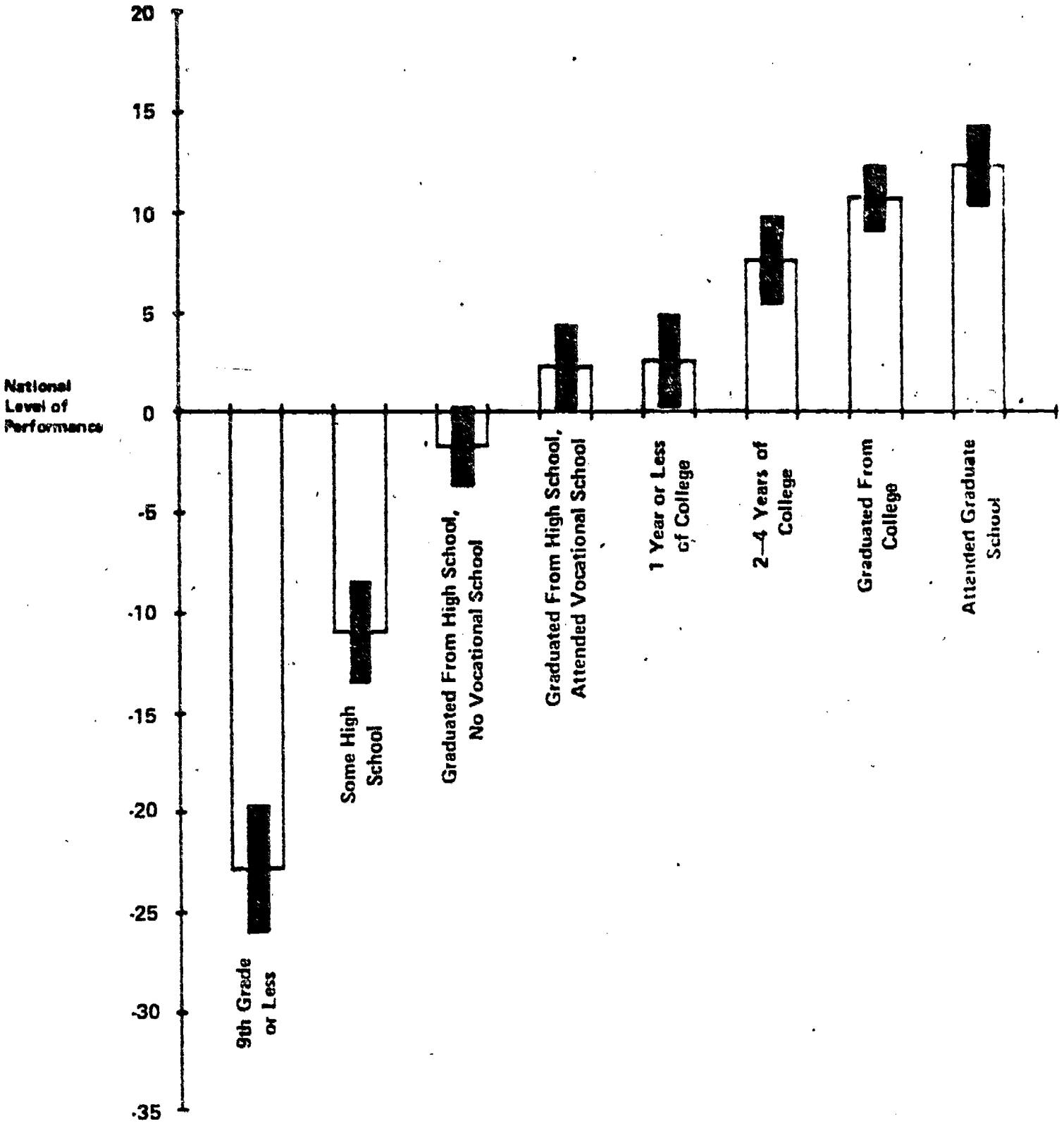
[1]This is a test of skills in ten areas, including arithmatic reasoning, paragraph comprehension, general science and mechanical comprehension. These are combined in different ways to suggest work aptitudes.

FIGURE II-2

COMPUTATION AND MEASUREMENT SKILLS

National Performance vs. Years of Education

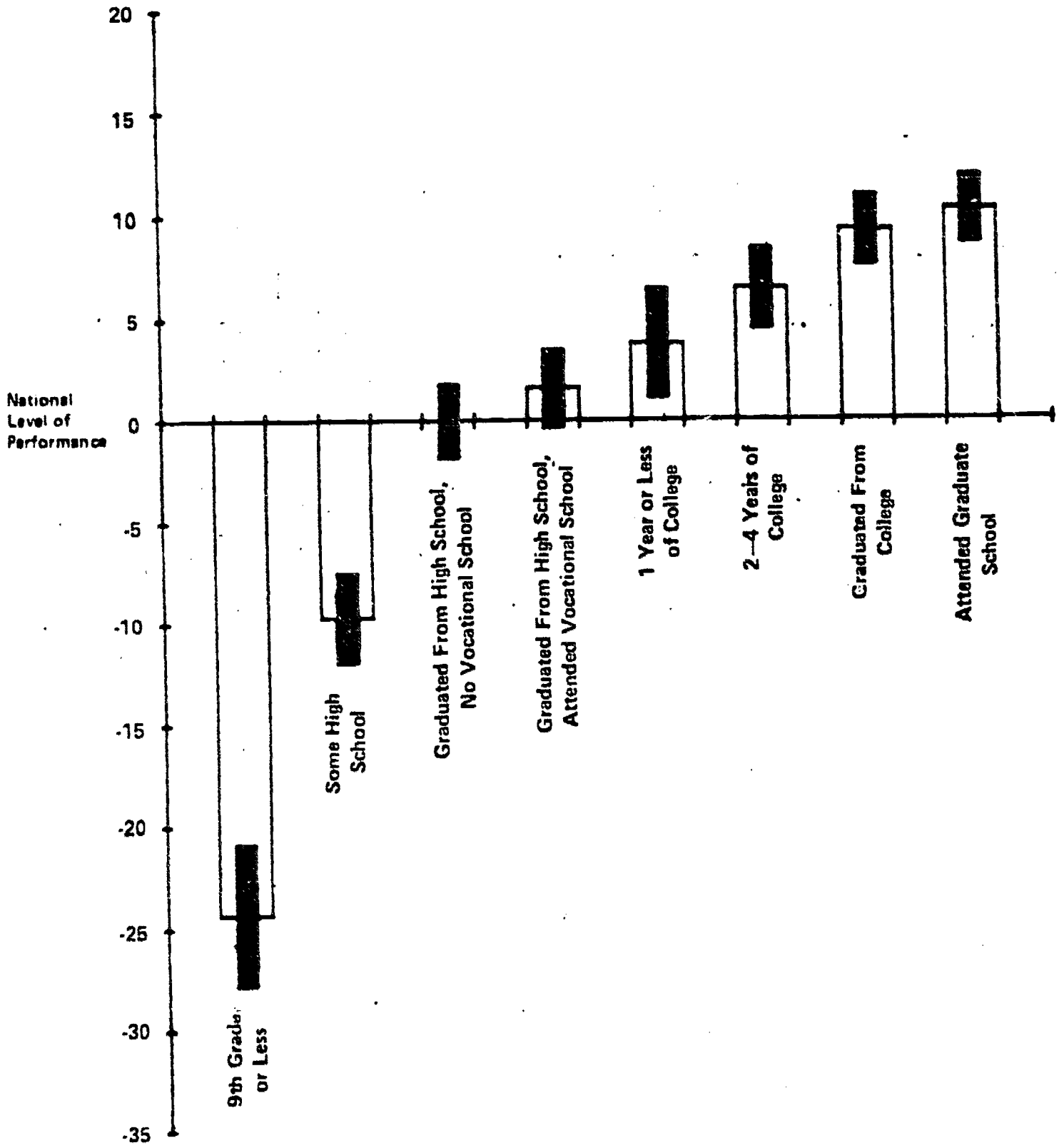


SOURCE: National Assessment of Educational Progress. An Assessment of Career Development: Basic Work Skills. Denver: Education Commission of the States, January 1977.

FIGURE II-3

GRAPHIC AND REFERENCE MATERIALS SKILLS

National Performance vs. Years of Education

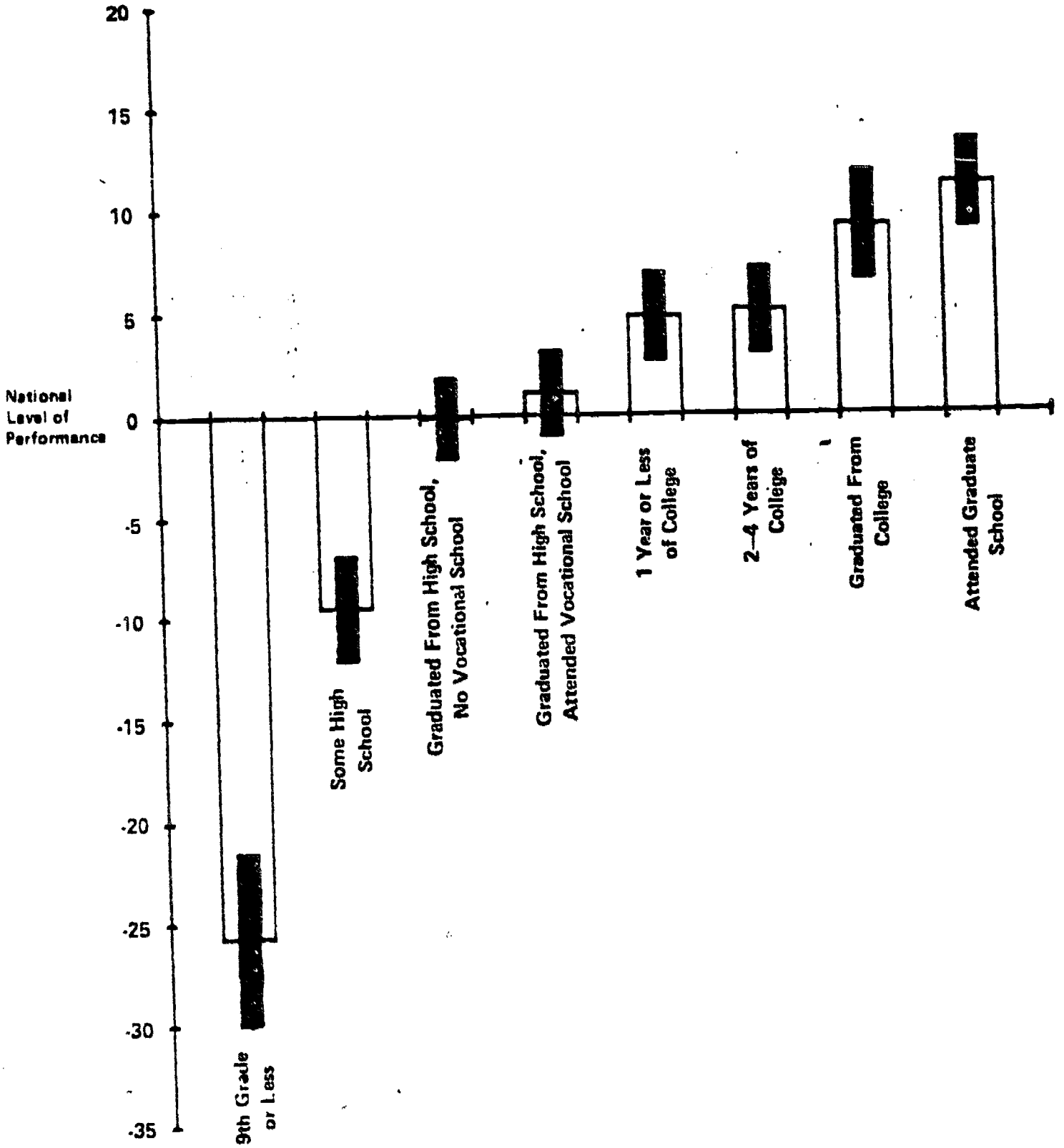


SOURCE: National Assessment of Educational Progress. An Assessment of Career Development: Basic Work Skills. Denver: Education Commission of the States, January 1977.

FIGURE II-4

WRITTEN COMMUNICATION SKILLS

National Performance vs. Years of Education

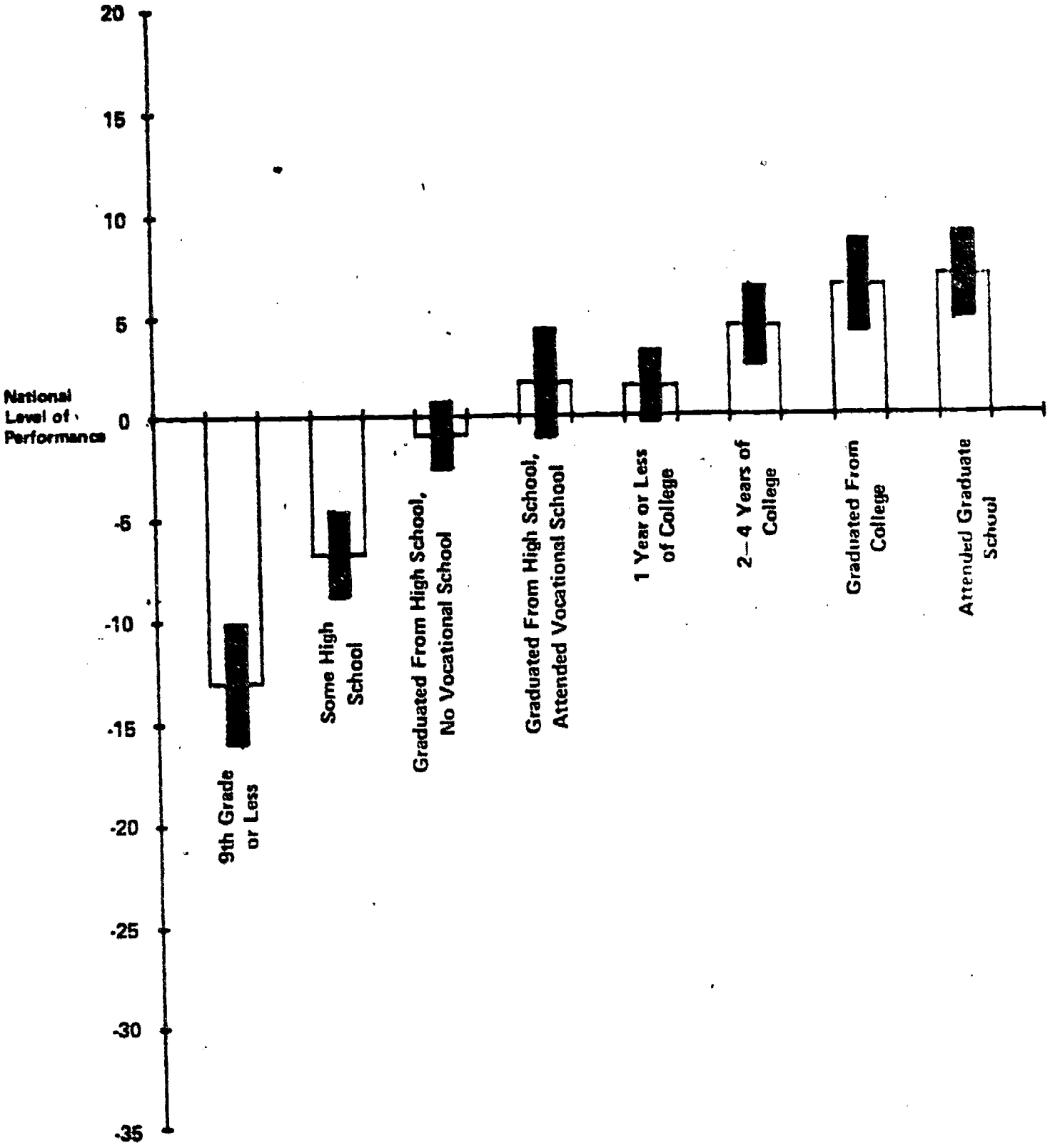


SOURCE: National Assessment of Educational Progress. An Assessment of Career Development: Basic Work Skills. Denver: Education Commission of the States, January 1977.

FIGURE II-5

MANUAL AND PERCEPTUAL SKILLS

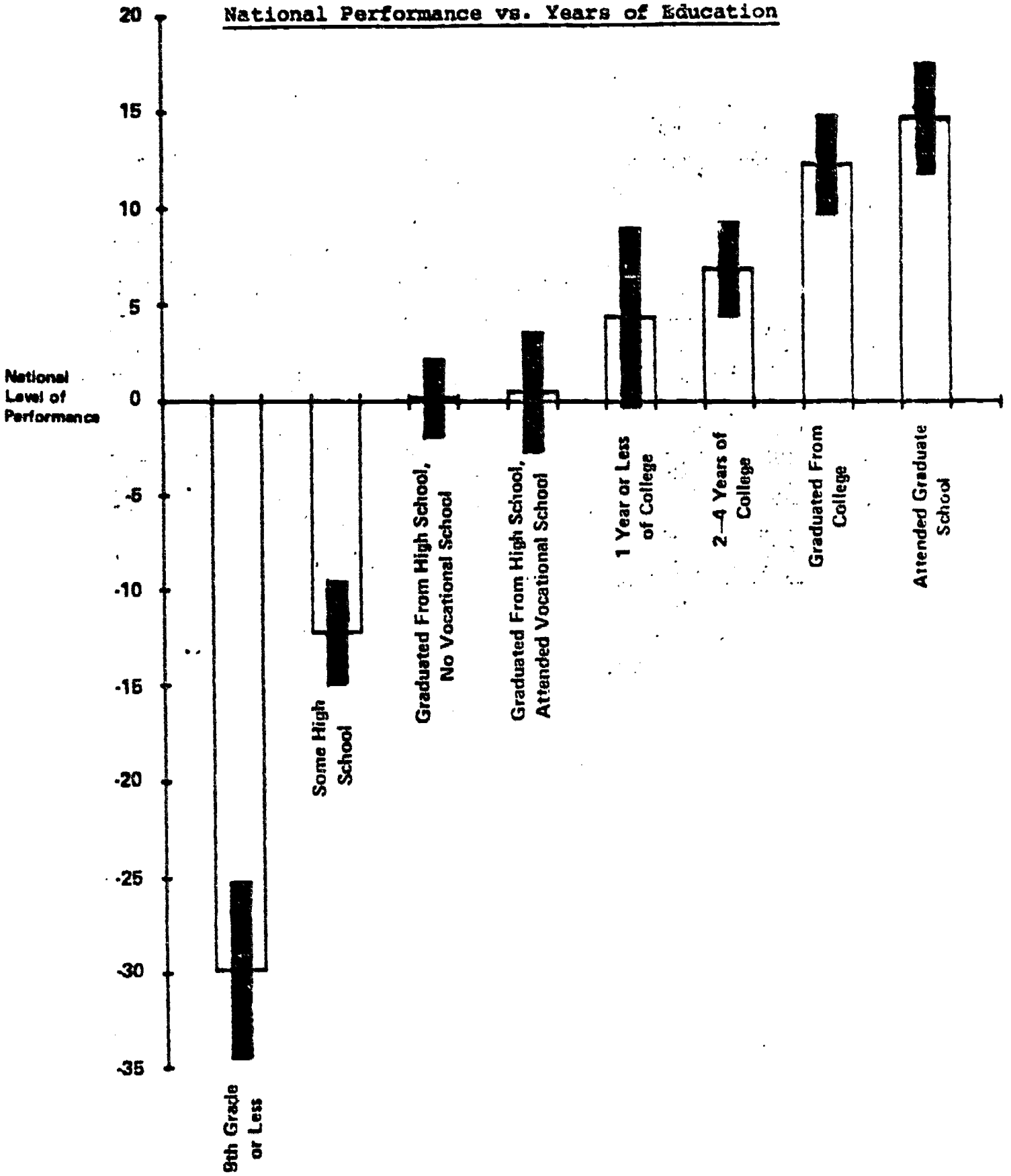
National Performance vs. Years of Education



SOURCE: National Assessment of Educational Progress. An Assessment of Career Development: Basic Work Skills. Denver: Education Commission of the States, January 1977.

FIGURE II-6

GENERAL JOB KNOWLEDGE



SOURCE: National Assessment of Educational Progress. An Assessment of Career Development: Basic Work Skills. Denver: Education Commission of the States, January 1977.

information for the adult sample tested. With the exception of manual/perceptual skills, there is a direct correlation between each additional year of education completed and enhanced work skills. The significant differences between the "some high school" and "high school graduate" populations are noteworthy.

These skill differences may account for the differences in employment between recent high school graduates and dropouts, as shown earlier in Table II-13. Other studies (e.g., Parnes and Kohen, 1976; Griffen, et al., 1981) have documented education-related differences not only in unemployment rates, but also in hourly earnings and occupational assignment.

b. California

There is little reliable data about the work skills and experiences of California young people. Several sources do, however, provide some limited insight into the situation in California.

In general, the work-related experiences of California high school seniors do not appear to differ in many ways from those of all seniors nationally. For example, unemployment is higher among 16- to 19-year-olds and non-whites than among 20- to 24-year-olds and whites, as Table II-14 shows.

Although information about the post-high school work experience of participants in the High School and Beyond study are not yet available, the initial questionnaire used in this study provides information about work-related experiences during high school. Those areas in which California students differ from the national sample include:

- Students in California have higher occupational aspirations and higher expectations in terms of initial earning power;

TABLE II-14

UNEMPLOYMENT AMONG YOUNG CALIFORNIA WORKERS, ANNUAL AVERAGES

White and Non-White, 1977-78

WORKERS	PERCENTAGE UNEMPLOYED	
	1977	1978
16-19 Year Olds		
White	17.3	17.4
Non-White	30.2	33.7
20-24 Year Olds		
White	10.7	8.7
Non-White	21.8	19.6

SOURCE: Employment Development Department. Youth Employment in California. Sacramento: Health and Welfare Agency, 1980.

- More California students work part-time during the senior year (but fewer work more than 30 hours per week); and
- The hourly wages and amount of training received on the job by Californians are higher (California Assessment Program, 1981).

These findings may say more about California labor markets than about the work skills of California students.

Some data are available from the Armed Services to compare the work-related skills of California high school graduates with graduates nationally. The number of students covered in these data is relatively small--20,000-25,000 high school graduates per year from California--and the characteristics of the population may change from year to year because of self-selection; these data must therefore be used cautiously. Table II-15 provides data on military recruits with high school diplomas in 1972, 1975, 1978, and 1981, comparing Californians with the total United States. California recruits have performed at about the same level as the total United States sample.

In addition, the Department of Defense administers the ASVAB to interested high school students in California and elsewhere each year. In 1977-78, approximately 76,000 Californians took the exam, compared to some 59,000 in 1980-81. There were no major changes in performance between these groups on either the four individual skill areas tested in the ASVAB or on the Armed Forces Qualification Test (AFQT) percentile score. Students from California performed at or slightly higher than the national sample on all five measures (Sellman, 1982).

TABLE 11-15

AFQT AND ASVAB COMPARISONS OF HIGH SCHOOL GRADUATES

National and California, Selected Years

	1972		1975		1978		1981	
	Nat.	Cal.	Nat.	Cal.	Nat.	Cal.	Nat.	Cal.
Word Knowledge	N/A	N/A	N/A	N/A	20.82	21.18	20.30	20.84
Arithmetic Reasoning	N/A	N/A	N/A	N/A	13.10	12.99	13.16	13.22
Numerical Operations	N/A	N/A	N/A	N/A	32.96	32.52	33.95	34.21
Math Knowledge	N/A	N/A	N/A	N/A	12.33	12.24	12.82	12.79
AFQT Percentile	58.57	59.50	59.14	58.25	50.48	52.33	52.45	54.14
NUMBER	259,068	25,637	267,297	26,702	231,201	19,278	264,337	21,438

SOURCE: Sellman, W. S. Unpublished state and national ASVAB and AFQT data, personal communication. Washington, DC: Office of the Assistant Secretary of Defense, May 1982.

Measuring job performance among young workers is also difficult.[1] Executives from a range of large businesses in California say that the basic reading, writing, and calculating skills of young workers has declined, and is entirely too low. They also complain that many new employees are not readily trainable, and have difficulty in simple problem-solving tasks. However, statistical data collected by individual companies are generally not comparable. In addition to problems with basic skills, employer complaints may also reflect a mismatch between current employer needs for minimum technical literacy and the technical training of young workers. Nationally, employment opportunities are growing rapidly in technologically-based areas, and most slowly in jobs that do not require technical literacy. In California, the growth in opportunities in technologically-based jobs is particularly dramatic. High technology job growth in California has been estimated at 51.4 percent between 1980 and 1990, an increase of some 327,900 jobs. This increase--an annual compound growth rate of 3.97 percent during the eighties--would be almost double the rate of increase of total jobs during the seventies--a 2.24 percent compound growth rate (Danielson and Hallinan, 1982, p. 19). Unless skills among young workers keep pace, unemployment rates in this population may increase while employer needs go unmet.

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[1]Students enrolled in vocational education programs across the United States are surveyed by state agencies after they leave the program. Their employers are also surveyed about worker quality. Because of poor response rates, however, the information from this source is subject to serious question and is not used here.

6. Summary: General Measures of Student Preparation

Secondary school enrollments and high school graduation rates in the United States are high compared to other countries, though United States graduation rates have recently leveled off and begun to decline gradually. The graduation rate in California is below the national average.

The coursework grades of students in California and the nation were inflated over the past decade, but this inflation appears to have peaked and may be declining. College-bound California students, however, report higher grades than do college-bound students nationally.

Postsecondary enrollment in the United States is much higher than it is in other countries, and though postsecondary enrollment in California is slightly higher than the national average, about seventy percent of these students in California attend two-year institutions.

In California and the nation, college-bound high school seniors have more trouble doing college level work today than they did a decade ago. In California, many entering freshmen have serious difficulty with basic writing and quantitative skills.

The higher the level of schooling completed, the more likely a person is able to find and keep a job. Generally, the unemployment rate of young people is higher than that of the general population, and minority youth have twice the unemployment rate of majority youth. Recent reports of employer dissatisfaction with new employees appear to reflect a combination of inadequate preparation of young people in basic skills, poor work attitudes among youth, and some mismatch between the training of young people and the technical needs of business and industry.

CHAPTER III

COLLEGE AND WORK-RELATED VERBAL PERFORMANCE

The preceding chapter presented broad data to assess how well today's California students are prepared for college or work, compared to students 10 or 20 years ago and to students from the United States as a whole. This chapter focuses on a specific area of student performance in high school--the ability of students to read and write--and summarizes the trends in these two aspects of verbal skill.

1. Reading

a. The National Setting

Performance of All Students. According to the results from the 1973 IEA examination, administered in 14 countries to students in the final year of secondary education, American high school seniors ranked in eleventh place in reading comprehension--only Chilean, Iranian, and Indian students compiled lower average scores. As noted in Appendix A, however, it is not entirely appropriate to compare the high school senior population in the United States with that in other nations because 75 percent of American 17-year-olds attend high school, as contrasted with only 9-45 percent in other countries. One method to take into account this international difference of the percentage of the youth population enrolled in schools is to compare scores for equal proportions of a relevant age group. Using this method, it is appropriate to compare the

reading scores of the top 9 percent[1] of the students in the different countries. When this comparison is made, the top American high school students outperformed students in all of the other 13 countries (Wolf, 1977, p. 40).

The result is similar when the scores of the IEA examination in literature are compared. High school seniors in the United States scored fifth among ten nations in literature knowledge for all students at this grade level, but when the scores of the top nine percent of the senior populations are compared, the American students led the group (Wolf, 1977, p. 43).

Within the United States, available evidence on trends in reading skills shows a slight decline. In general, literal comprehension and reference skills, or what might be labeled rudimentary reading skills, have remained relatively stable or declined slightly during the past decade. Mastery of more complex skills, including inferential comprehension (the ability to glean from a passage some idea not explicity stated), appear to have declined noticeably.

The National Assessment of Educational Progress tested reading skills of 17-year-olds during 1971, 1975, and 1980. Table III-1 presents performance results for these national assessments. Inferential

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[1]The nine percent figure is used in this and other IEA score reports in order to compare similar student populations. Nine percent was the percentage of the age group enrolled in the final year of secondary education in Germany, the IEA participant with the lowest enrollment statistic.

TABLE III-1

NATIONAL MEAN PERCENTAGES AND CHANGES IN CORRECT RESPONSES FOR IN-SCHOOL 17-YEAR-OLDS IN THREE READING ASSESSMENTS[1]

ASSESSMENT	Years			Changes		
	1971	1975	1980	1971-75	1975-80	1971-80
Total Reading Exercise	68.9	69.0	68.2	0.0	-0.8	-0.7
Literal Comprehension	72.2	72.7	72.0	+0.5	-0.7	-0.2
Inferential Comprehension	64.2	63.3	62.1	-0.9	-1.2	-2.1[2]
Reference Skills	69.4	70.1	70.2	+0.6	+0.2	+0.8

[1]Figures may not total due to rounding.
[2]Indicates significant change in performance between assessments.

SOURCE: National Assessment of Educational Progress. "Three National Assessments of Reading: Changes in Performance, 1970-80." Denver: Education Commission of the States, undated.

comprehension was the only reading skill that changed significantly during the study period.[1]

When results from the reading and vocabulary sections of the two longitudinal studies of high school seniors conducted by the National Center for Education Statistics are compared, students in the 1980 sample performed approximately .1 standard deviation below students in the 1972 sample (Fetters, 1982). Results from the reading segments of three commonly used achievement tests--the Iowa Tests of Educational Development (ITED), the Minnesota Scholastic Aptitude Test (MSAT), and the Iowa Test of Basic Skills (ITBS)--also suggest a general pattern of decline (Cleary and McCandless, 1976).

Performance of College-Bound Students. Information available from The College Board and the American College Testing Program (ACT) suggests declines in the verbal skills of the college-bound population as well. Between 1952 and 1963, student scores on the SAT-Verbal fluctuated between 472 and 479, with no particular trends. SAT-Verbal scores declined every year between 1963 and 1980 (Eckland, 1982). In 1963, the mean national score was 478; by 1980 it had slipped to 424. The following year, the mean verbal score remained stable, with a 2-point increase in 1982. Scores on the ACT-English examination were 18.5 in 1981 and 17.8 in 1970.[2]

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[1]NAEP has also conducted detailed analysis of selected sub-populations, and has found that the 1980 scores on reference skills for students in the highest achievement group, students whose parents had at least a high school diploma, and female students have declined sharply (National Assessment of Educational Progress, 1981).

[2]Part of this decline is due to the increased number of test takers, as well as changes in the composition of the test-taking population (see Appendix B).

These college aptitude tests were designed to measure verbal skills in general. However, The College Board has made available since 1975 more specific information on specific aspects of verbal performance. The College Board calculates subscores for reading comprehension (by using answers to questions requiring sentence completion after reading various materials), and subscores for vocabulary (from analogies and antonyms). Between 1975 and 1981, SAT-Verbal subscores on reading comprehension declined from 43.4 on a 20- to 80-point scale (standard deviation: 11.2) to 42.5 (standard deviation: 11.1). Vocabulary subscores decreased from 43.1 (standard deviation: 11.9) to 42.4 (standard deviation: 10.9). As noted in Appendix B, however, those who take the SAT are not the same as all college entrants, nor are they representative of high school graduates.

In summary, reading skills among all high school seniors and within the college-bound population have declined slightly over the past 10 to 15 years. Declines have been greater in the more complex skill areas than in rudimentary reading skills.

b. California

Changes in the tests used to measure twelfth grade achievement in California during the last decade make it impossible to trace precise changes in reading achievement over time. Nonetheless, the general trend in California was clearly downward until 1981. The decline occurred primarily during the early seventies. At that time, students were examined with the Iowa Test of Educational Development, and Table III-2 presents California ITED scores, along with the publisher's national norms. During the five-year period between 1969 and 1974, California

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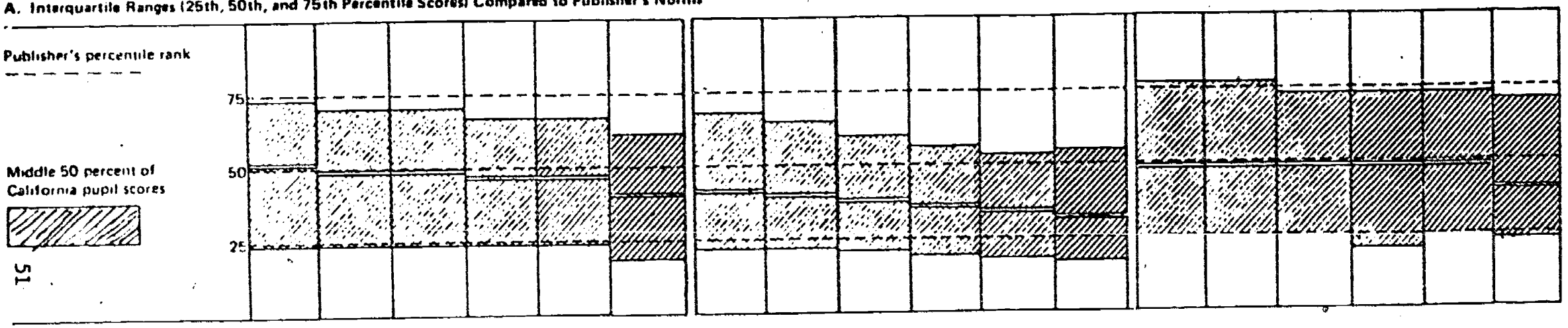
TABLE III-2

Statewide Standardized Test Results, California Public Schools, 1969-70 Through 1974-75
Achievement Tests, Grade Twelve

	IOWA TESTS OF EDUCATIONAL DEVELOPMENT, Form X-4																	
	Reading[a]						Expression[a]						Quantitative[a]					
Year administered	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75
Number of pupils tested	234,478	247,311	261,510	251,063	251,355	3,546	230,820	246,781	260,812	249,847	249,602	5,208	234,706	248,853	262,400	252,778	252,326	4,317

A. Interquartile Ranges (25th, 50th, and 75th Percentile Scores) Compared to Publisher's Norms[b]



B. Publisher's Percentile Ranks and Grade Equivalent Scores of the State Quartile Scores (25th, 50th, and 75th Percentiles)

75th Percentile (State Q3)																		
State raw score	29.8	29.4	28.8	28.1	27.9	27.3	50.8	49.8	48.4	47.3	46.4	47.8	19.0	18.7	18.4	18.3	18.2	18.1
Publisher's percentile rank	74	71	71	67	67	62	68	65	60	57	54	56	77	77	74	74	74	72
50th Percentile (State Q2)																		
State raw score	21.5	21.2	20.8	20.2	20.1	19.4	40.8	39.9	38.6	37.5	36.6	37.1	13.2	12.9	12.8	12.6	12.6	12.4
Publisher's percentile rank	52	49	49	47	47	41	42	40	38	36	34	32	48	48	48	48	48	41
25th Percentile (State Q1)																		
State raw score	15.4	15.1	14.9	14.6	14.5	13.9	30.3	29.6	28.6	27.7	27.1	27.1	8.8	8.6	8.5	8.4	8.5	8.5
Publisher's percentile rank	24	24	24	24	24	18	22	22	21	19	18	17	25	25	25	20	25	23

[a]Data for 1969-70 through 1973-74 represent fall norms, and the publisher's percentile rank and grade equivalent scores are based upon fall norms. Data for 1974-75 are based upon the performance of students tested in the spring of 1975 in a representative sample of California schools. Therefore the publisher's percentile rank and grade equivalent scores for 1974-75 are based upon spring norms. Any comparison of 1974-75 results with earlier years should take this difference into consideration.

[b]The three broken horizontal lines indicate the publisher's 75th, 50th, and 25th percentiles. The shaded columns represent the middle 50 percent of the test scores of California students in grade twelve. The top of each column represents the 75th percentile score for California students, the bottom represents the 25th percentile score, and the break in the middle of the column represents the 50th percentile score.

SOURCE: California State Department of Education, Student Achievement in California Schools, 1974-75, p. 66.

students dropped from the 52nd percentile nationally to the 41st percentile.[1] Since national performance also declined during this period, the absolute decline in reading achievement in California may be greater than is reflected in these percentile declines.

During the last half of the decade, the decline in reading skills was smaller. Table III-3 provides data from the reading portion of the Survey of Basic Skills, the test used to assess student achievement in California beginning in 1975-76. During this seven-year period, the average correct score in total reading declined from 64.1 to 63.1, rose slightly in 1980-81, then declined slightly again in 1981-82 to 63.2. Like students elsewhere in the country, the largest declines for California students came in "interpretive/critical comprehension"--a more complex reading skill. Vocabulary knowledge also declined more than the remaining skill areas, perhaps in part because of the increased number of limited English speaking students in California. However, in no area were the declines over this five-year period large.

The California State Department of Education conducts special "equating" studies each year to determine how California students would have fared had they taken any of the three nationally recognized examinations. Table III-4 presents the results of the studies of reading for 1975-76 through 1981-82. The data in this table show that California's rank varies according to which test and which set of norms

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[1]The ITED was administered to all California seniors until 1973-74; in 1974-75, the performance of California students was estimated by administering the exam to students in a representative group of high schools. The results in all three skill areas for 1974-75 appear to be discrepant with the results in 1973-74 and 1975-76.

TABLE III-3

READING SCORES OF CALIFORNIA TWELFTH GRADE STUDENTS
ON THE "SURVEY OF BASIC SKILLS: GRADE 12"

1975-76 through 1980-81[1]

Skill area	Number of questions	Average percent correct score, by year, in each skill area						Change in average percent correct score, by year, in each skill area				
		1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1975-76 to 1976-77	1976-77 to 1977-78	1977-78 to 1978-79	1978-79 to 1979-80	1979-80 to 1980-81
Total Reading	141	64.1	63.6	63.3	63.2	63.1	63.4	-0.5	-0.3	-0.1	-0.1	+0.3
Vocabulary	31	61.3	60.9	60.5	60.2	60.0	60.2	-0.4	-0.4	-0.3	-0.2	+0.2
Comprehension	97	64.5	63.9	63.7	63.7	63.5	63.8	-0.6	-0.2	-0-	-0.2	+0.3
Literal	47	69.2	68.9	68.5	68.6	68.5	68.8	-0.3	-0.4	+0.1	-0.1	+0.3
Interpretive/critical	50	60.1	59.3	59.2	59.0	58.9	59.1	-0.8	-0.1	-0.2	-0.1	+0.2
Study-locational	13	68.4	67.2	67.3	67.4	67.4	68.4	-1.2	+0.1	+0.1	-0-	+1.0

[1]Recently released data place the 1981-82 mean for Total Reading at 63.2. Sub-area breakdowns are not yet available.

SOURCE: California Assessment Program. Student Achievement in California Schools: Annual Report, 1981. Sacramento: State Department of Education, 1981.

TABLE III-4

ESTIMATED NATIONAL PERCENTILE RANKS OF MEDIAN CALIFORNIA STUDENT PERFORMANCE
1969-70 through 1980-81, Grade Twelve

CONTENT AREA	TEST ADMINISTERED												
	Iowa Tests of Educational Development Form X, normed in 1962					Survey of Basic Skills[1]	Survey of Basic Skills[1] (Revised)						
	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82
Reading													
ITED, 1972 norms	52	49	49	47	47	41	43	42	42	41	41	42	
1978 norms												44	44
TAP, 1970 norms						35	35	33	32	32	32	33	
1978 norms												42	
STEP, 1970 norms						34	38	36	35	34	34	35	
1978 norms												47	

[1]The new California test, the Survey of Basic Skills: Grade 12, was administered to all California students from 1974-75 through 1980-81. The percentile ranks are based on equating studies of the Survey of Basic Skills and three other tests with national norms: (1) Iowa Tests of Educational Development, normed in 1962 and 1978; (2) Tests of Academic Progress, normed in 1970 and 1978; and (3) the Sequential Tests of Educational Progress, normed in 1970 and 1978.

SOURCE: California Assessment Program. Student Achievement in California Schools: Annual Report, 1981. Sacramento: State Department of Education, 1981, p. 45.

are cited. If one looks at the Tests of Academic Progress (TAP), for example, and uses norms established on the basis of national performance in 1970, California students rank in the 33rd percentile; if one uses norms established in 1978, California's rank increases to the 42nd percentile. Thus, the available data indicate that, using the most recent norms, California students generally rank between the 42nd and 47th percentile nationally in reading.

The verbal skills of college-bound Californians dropped dramatically during the seventies, as Figure III-1 shows. In 1972, the mean California score on the SAT-Verbal was 464 (standard deviation: 112); by 1980, it had declined to 424 (standard deviation: 111).[1] California college-bound students currently perform one point below the national average of 426 on the SAT-Verbal, though the California average was above the national mean in the early seventies.[2] The score decline in California was earlier and more pronounced than the national decline, but the recovery came more quickly.[3]

Reading subscore information from The College Board shows only very slight declines for California since 1975. In that year, the mean SAT-Verbal subscores of California students in reading comprehension and

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[1]The increased number of Californians taking the SAT and the increased numbers of limited English speaking students explain some, but by no means all, of this decline (see Appendix B for more information on this issue).

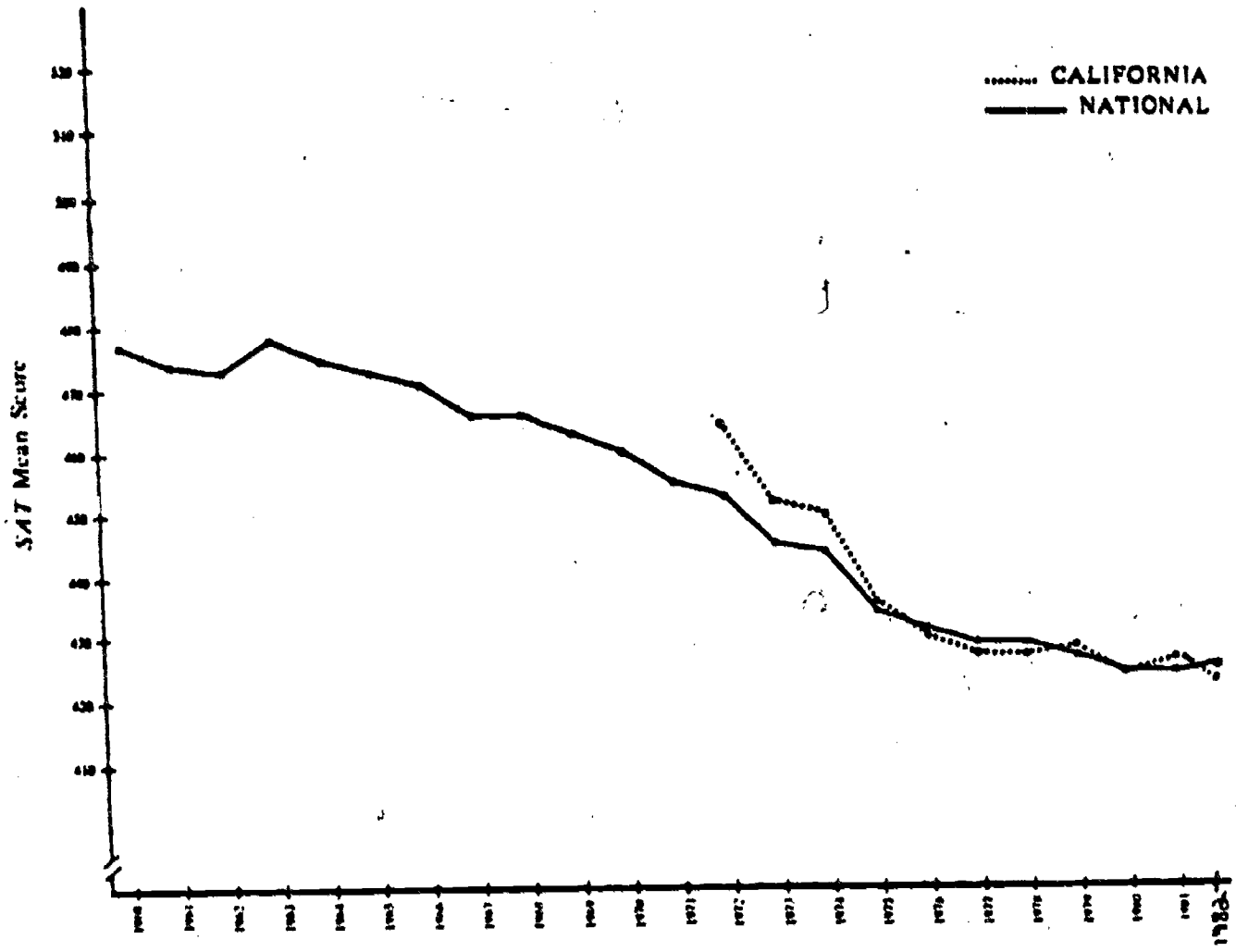
[2]The tests constructed for use in the National Center for Education Statistics' High School and Beyond study yield a similar result. On the reading test, the mean score for the California sample was 49.85; the median score was 49.98. Nationally, the mean score was 49.64 and the median 49.95 (California Assessment Program, 1981).

[3]Results from the ACT show a higher mean score for Californians on the 1981 English examination (18.4 with 5.3 standard deviation) than the national average (17.8 with 5.4 standard deviation).

FIGURE III-1

SCHOLASTIC APTITUDE TEST VERBAL SCORES FOR HIGH SCHOOL SENIORS IN CALIFORNIA AND THE UNITED STATES

1960 Through 1982



SOURCE: California Assessment Program. Student Achievement in California Schools: Annual Report, 1981. Sacramento: State Department of Education, 1981 (1982 information added).

vocabulary were 43.3 and 43.1, respectively. By 1980, the reading score slipped to 42.6 and the vocabulary score to 42.3, although both turned upward again in 1981. Performance of college-bound California students on the measures of reading comprehension did not differ significantly from the national average: Both declined slightly (see Table III-5).

This review of the performance of college-bound students is consistent with an analysis of California Assessment Program (CAP) data conducted recently by the California State Department of Education. This analysis shows that reading scores for California students in the highest achievement decile did not slip significantly between 1976-77 and 1979-80 (see Table III-6). Unfortunately, similar information is not available for other periods of time--especially the late sixties and early seventies, when most of the skill declines appear to have occurred.

2. Writing

a. The National Setting

Performance of All Students. While there are at present no data comparing the writing skills of students in different countries, some data refer to trends in writing skills within the United States. Perhaps the most comprehensive data are from the National Assessment of Educational Progress, which include results from writing assessments conducted in 1969-70, 1973-74, and 1978-79. NAEP found slight declines in the quality of writing performance among American students over the three assessment periods.

According to NAEP, "The majority of students at ages 9, 13, and 17 demonstrated control over the basic mechanics of writing. However, a sizable minority at each age appeared to have very serious problems with

TABLE III-5

SAT-VERBAL SUBSCORES

National and California Test Takers, 1975-1981

AREA	1975		1981	
	National	California	National	California
Reading Comprehension				
Subscore	43.4	43.3	42.5	42.7
Std. Dev.	11.2	11.0	11.1	11.1
Vocabulary				
Subscore	43.1	43.1	42.4	42.5
Std. Dev.	11.9	11.8	10.9	11.0

SOURCE: The College Board. Admissions Testing Program Reports. New York: 1981; The College Board. Admissions Testing Program Reports. New York: 1975.

TABLE III-6

READING PERFORMANCE, GRADE TWELVE

California Survey of Basic Skills
Percentage Correct at Selected Student Percentile Rank Points

PERCENTILE	YEAR OF TESTING					OVERALL CHANGE 1975-76 TO 1979-80
	1975-76	1976-77	1977-78	1978-79	1979-80	
90	90.3	90.1	90.1	89.8	89.8	-0.5
80	82.5	82.0	82.3	81.6	81.5	-1.0
70	76.5	76.1	76.1	75.6	75.5	-1.0
60	70.8	70.3	70.4	69.9	69.6	-1.2
50	64.8	64.3	64.3	63.9	63.6	-1.2
40	58.8	58.3	58.1	57.9	57.6	-1.2
30	51.6	51.1	51.0	50.6	50.5	-1.1
20	43.8	43.3	43.1	42.8	42.6	-1.2
10	32.3	31.9	31.9	31.6	31.8	-0.5

SOURCE: California State Department of Education. "California Survey of Basic Skills: Percentage Correct at Selected Student Percentage Rate Points." Unpublished. Sacramento: 1981.

writing. . ." Specifically, the assessments conclude that narrative writing skills declined between 1969 and 1974, and then improved dramatically; persuasive writing skills declined between 1974 and 1979; and the ability of test takers to draft business or humorous letters remained stable. There was some improvement in the coherence of student writing over the ten-year period, but the frequency of mechanical errors remained approximately the same.

NAEP's 1979-80 Assessment of Reading and Literature suggests larger declines in the more complex writing skills. Results from this examination show a ten-point decline since 1970-71 in the percentage of 17-year-olds able to write an adequate interpretation of literature.

Performance of College-Bound Students. Information on the writing abilities of college-bound students suggests small but steady declines during the late seventies. Scores on the SAT Test of Standard Written English (TSWE) have declined slightly each year since the test was first administered in 1974-75. In 1975, the mean TSWE score for all test takers was 43.2; by 1981, it was 42.2. Declines were particularly marked at the higher-scoring levels. Results from the more advanced English Comp sition test, which is generally taken by the more able SAT takers, present a mixed picture. Between 1971 and 1981, the mean score on this examination fluctuated rather erratically between 532 and 512. During this time, the number of test takers dropped markedly (see Appendix B), but changes in the composition of the test takers bear no apparent relationship to the score changes.

b. California

Performance of All Students. The California Assessment Program's Survey of Basic Skills contains a 142-question test of written

expression. Average high school student performance on this examination dropped slightly through 1977-78, then increased slightly during the following four years (see Table III-7). During the latter period, improvements occurred in sentence recognition and capitalization/punctuation--two writing skills considered rudimentary; mastery of the more complex skills barely increased, which again suggests that students are having problems with these higher-level skills. A 1977 study of the writing performance of California high school seniors (California Assessment Program, 1979) draws a similar correlation. The improvements in writing skill between 1975 and 1982 do not compensate for the sharp decline during the early seventies. Between 1970 and 1975, California performance on the language test in the ITED declined from a mean of 40.8 to 37.1. The publisher's percentile ranking for California dropped from 42 to 32 during this period.

The writing skills of California high school seniors, on average, fall below the national average. The 1980-81 CAP report places California twelfth graders at the 35th percentile on national norms in language, though other information in the CAP report suggests that this estimate may be inaccurate. Table III-8 presents writing skills information for three national examinations and several norming dates. When norms established in 1970 or earlier are used, California students rank somewhere between the 29th and 35th percentiles nationally. Because national performance on these examinations has declined, the later norms place Californians in a higher position: somewhere between the 40th and 57th percentiles. Since these data are somewhat inconsistent, California's standing compared to the national average cannot be stated exactly. However, there seems little doubt that California high school

TABLE III-7

WRITTEN EXPRESSION SCORES OF CALIFORNIA TWELFTH GRADE STUDENTS ON THE "SURVEY OF BASIC SKILLS: GRADE 12"

1975-76 Through 1980-81[1]

Skill area	Number of questions	Average percent correct score, by year, in all skill areas						Change in average percent correct score, by year, for all skill areas				
		1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1975-76 to 1976-77	1976-77 to 1977-78	1977-78 to 1978-79	1978-79 to 1979-80	1979-80 to 1980-81
Total written expression	142	62.3	61.9	62.1	62.4	62.4	63.1	-0.4	+0.2	+0.3	-0-	+0.7
Word forms	24	72.6	72.1	72.1	71.9	72.2	72.5	-0.5	-0-	-0.2	+0.3	+0.3
Language choices	32	66.9	66.7	66.6	66.6	66.3	66.7	-0.2	-0.1	-0-	-0.3	+0.4
Sentence recognition	20	67.3	67.7	68.4	68.8	69.0	70.1	+0.4	+0.7	+0.4	+0.2	+1.1
Sentence manipulation	12	42.9	42.9	43.4	43.7	43.7	44.3	-0-	+0.5	+0.3	-0-	+0.6
Paragraphs	26	59.9	59.1	59.3	59.7	59.7	60.2	-0.8	+0.2	+0.4	-0-	+0.5
Capitalization/ punctuation	28	54.6	54.3	54.7	55.4	55.4	56.6	-0.3	+0.4	+0.7	-0-	+1.2
Spelling	72	68.0	67.9	68.4	68.4	68.8	69.0	-0.1	+0.5	-0-	+0.4	+0.2

[1]Recently released data place the 1981-82 mean for Total written expression at 63.2. Sub-area breakdowns are not yet available.

SOURCE: California Assessment Program. Student Achievement in California Schools: Annual Report, 1981. Sacramento: State Department of Education, 1981.

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TABLE III-8

ESTIMATED NATIONAL PERCENTILE RANKS OF MEDIAN CALIFORNIA STUDENT PERFORMANCE
1969-70 through 1980-81, Grade Twelve

CONTENT AREA	TEST ADMINISTERED												
	Iowa Tests of Educational Development Form X, normed in 1962					Survey of Basic Skills[1]	Survey of Basic Skills[1] (Revised)						
	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82
Language													
ITED, 1972 norms	42	40	38	36	34	32	34	33	34	34	34	35	
1978 norms												43	43
TAP, 1970 norms						25	27	26	26	27	27	29	
1978 norms												40	
STEP, 1970 norms						27	29	28	28	28	28	30	
1978 norms												57	

[1]The new California test, the Survey of Basic Skills: Grade 12, was administered to all California students from 1974-75 through 1980-81. The percentile ranks are based on equating studies of the Survey of Basic Skills and three other tests with national norms: (1) Iowa Tests of Educational Development, normed in 1962 and 1978; (2) Tests of Academic Progress, normed in 1970 and 1978; and (3) the Sequential Tests of Educational Progress, normed in 1970 and 1978.

SOURCE: California Assessment Program. Student Achievement in California Schools: Annual Report, 1981. Sacramento: State Department of Education, 1981, p. 45.

seniors rank considerably below the national average in writing skills, though they may be improving their position.

Performance of College-Bound Students. There is a clear downward trend in writing skills among the most able college bound Californians. In 1972, the mean California score on The College Board's English Composition Test (ECT) was 525; by 1981, it had fallen to 495.

The data in Table III-9 show that decreases in writing skills among the highest achievers have been more pronounced than those among other students. In 1976, for example, some 1,812 California students scored above 700 on the ECT; in 1981, although slightly more California students took the exam, only 923 scored above 700 (The College Board, 1976 through 1981).

In 1972, California students exceeded the national average on the English Composition Test by some 9 points (525 v. 516 mean score). As shown in Table III-10, this relationship was reversed in 1974, and the separation between the two increased nearly every year thereafter. In 1981, California students averaged 495 points on the ECT; students across the country compiled a mean score of 512. It should be noted, however, that proportionately more California high school graduates take this exam than is the case nationally (10 percent in California versus 6 percent nationally in 1981). If the top 6 percent of the graduating class in California took the exam, the California mean might meet or exceed the national mean (see Appendix B).

As shown in Table III-11, scores from the SAT Test of Standard Written English present an interesting contrast to results from the more advanced English Composition test. While TSWE scores for the nation as a whole have declined since the test was first administered in 1974-75,

TABLE III-9

THE COLLEGE BOARD ENGLISH COMPOSITION TEST SCORES

California Students, 1976-1981

SCORE	1976 No.	%	1977 No.	%	1978 No.	%	1979 No.	%	1980 No.	%	1981 No.	%
750-800	557	(2)	210	(1)	153	(1)	203	(1)	277	(1)	179	(1)
700-749	1256	(4)	801	(3)	683	(2)	728	(3)	893	(3)	744	(2)
650-699	2424	(8)	2014	(7)	1933	(6)	1891	(7)	1889	(6)	1710	(6)
600-649	3811	(13)	3168	(11)	3029	(10)	2865	(10)	3241	(11)	3002	(10)
550-599	4458	(15)	4449	(15)	4385	(15)	4214	(15)	4122	(14)	3931	(13)
500-549	5009	(17)	4929	(17)	4884	(16)	4957	(17)	5165	(17)	5323	(18)
450-499	4814	(16)	4813	(17)	5152	(17)	4926	(17)	4886	(16)	4948	(16)
400-449	3873	(13)	4136	(14)	4633	(15)	4225	(15)	4185	(14)	4857	(16)
350-399	2276	(8)	2558	(9)	2897	(10)	2576	(9)	2839	(10)	3212	(11)
300-349	1142	(4)	1432	(5)	1588	(5)	1468	(5)	1459	(5)	1656	(5)
250-299	430	(1)	530	(2)	515	(2)	556	(2)	614	(2)	551	(2)
200-249	60	(0)	95	(0)	96	(0)	104	(0)	85	(0)	92	(0)
NUMBER	30,110		29,135		29,948		28,713		29,656		30,205	
MEAN	521		505		498		501		503		495	
STD. DEV.	110		107		105		106		108		105	

SOURCE: The College Board. Admissions Testing Program Reports. New York: 1981;
The College Board. Admissions Testing Program Reports. New York: 1980;
The College Board. Admissions Testing Program Reports. New York: 1979;
The College Board. Admissions Testing Program Reports. New York: 1978;
The College Board. Admissions Testing Program Reports. New York: 1977;
The College Board. Admissions Testing Program Reports. New York: 1976.

TABLE III-10

THE COLLEGE BOARD ENGLISH COMPOSITION TEST

Mean Scores, National vs. California

YEAR	NATIONAL		CALIFORNIA	
	Mean	Std. Dev.	Mean	Std. Dev.
1972	516	108	525	N/A
1973	517	107	519	N/A
1974	517	107	515	N/A
1975	515	107	508	N/A
1976	532	111	521	110
1977	516	107	505	107
1978	512	105	498	105
1979	514	106	501	106
1980	518	106	503	108
1981	512	104	495	105

SOURCE: University of California. Report to the Policy Committee on the University of California's Activities to Assist Underprepared Students: Part I. Berkeley, CA: 1981.

TABLE III-11

TEST OF STANDARD WRITTEN ENGLISH SCORES

National and California, 1975-1981

YEAR	NATIONAL		CALIFORNIA	
	Mean	Std. Dev.	Mean	Std. Dev.
1975	42.7	10.7	43.2	10.8
1976	42.7	10.9	43.1	10.8
1977	42.3	11.1	42.9	10.9
1978	42.3	11.0	42.8	10.8
1979	42.7	10.9	42.5	10.8
1980	42.5	11.0	42.4	11.0
1981	42.6	10.8	42.2	10.8

SOURCE: The College Board. Admissions Testing Program Reports. New York: 1981; The College Board. Admissions Testing Program Reports. New York: 1980; The College Board. Admissions Testing Program Reports. New York: 1979; The College Board. Admissions Testing Program Reports. New York: 1978; The College Board. Admissions Testing Program Reports. New York: 1977; The College Board. Admissions Testing Program Reports. New York: 1976; The College Board. Admissions Testing Program Reports. New York: 1975.

TSWE scores in California have remained relatively stable. Thus, California students scored slightly below the national average when the test was first administered (42.7 with 10.7 standard deviation versus 43.2 with 10.8 standard deviation); by 1981, the California average was slightly above the national average (42.6 with 10.8 standard deviation versus 42.2 with 10.8 standard deviation).

This anomaly has several possible explanations. First, the two tests may well measure different levels of writing skills. For example, as a part of the general SAT battery, the TSWE may focus primarily on rudimentary writing skills, while the ECT focuses on more complex skills. Second, more than 100,000 California students took the TSWE during each of the study years; only some 30,000 Californians, principally those applying to UC and other elite institutions, took the ECT. The decline in the California ECT scores may thus reflect a decline in writing performance among highest achieving students.

The apparent decline in the writing skills of top students is further illustrated by the increased number of students entering UC who are required to take "Subject A," a remedial writing course designed to bring student writing skills up to college-level standards. As noted earlier, enrollments in "Subject A" classes have increased from 48.7 percent of the freshman class in 1975 to 55.8 percent in 1980. Over half of the entering students in the California State University system are required to take equivalent classes, but the fraction has not increased significantly in the past several years.

3. Summary: The Verbal Skills of California Students

The reading skills of California high school seniors declined markedly between 1970 and 1975. Decreases occurred in all skill areas, but were more pronounced in complex areas. Since 1975, the decline has leveled off in rudimentary skills, but may still be occurring in complex skills. Most data sources agree that California students are below the national average in reading--probably between the 42nd and 47th percentiles.

The writing skills of California high school seniors declined fairly steadily between 1970 and 1977, then improved somewhat thereafter. Recent improvements have occurred primarily in rudimentary writing skills, but higher-level skills have also improved slightly. In general, the writing skills of California high school seniors are below the national average. If 1970 norms are used, California students fall in the mid 30th percentiles; if later norms are used, in the 40th to 57th percentiles.

The verbal skills of college-bound students in California who take the SAT have declined dramatically since 1971. California test takers were ten points above the national average in 1972, and dropped to the national average in 1976, where they presently stand. The information on writing skills for college-bound students shows that the advanced level skills measured by the English Composition Test have declined over the past decade, while the more rudimentary skills measured in the Test of Standard Written English have remained relatively stable. California students score slightly above the national average on the TSWE, but below the national average on the ECT.

CHAPTER IV

COLLEGE AND WORK-RELATED QUANTITATIVE PERFORMANCE

Many critics of public education believe that today's students are not being adequately prepared for a technclogically-based society. It is claimed that "there is a crisis in pre-college education in science and mathematics that is a serious threat to our nation's economic, political, and military strength" (Alder, 1982, p. 1.). Reliable commentators in government and business have predicted severe economic consequences--both for technology-oriented California and for the nation as a whole--if these programs are not improved.

The following information summarizes student performance trends in mathematics and science.

1. Mathematics

a. The National Setting

High school seniors from the United States scored considerably lower on the IEA mathematics examination than students in other participating countries. The mean mathematics score for American students was 13; students in the next lowest countries, Australia and Finland, scored 21 and 24, respectively. This examination was conducted in 1967, before American scores on standardized tests began their lengthy decline.

These international comparisions can be misleading, however, due to the vastly different national rates of school attendance through the final year of secondary education. A comparison of the scores of the top nine percent of students in each industrialized country shows a somewhat

higher ranking for American students. The scores of the top group of American students placed the United States in ninth place among the thirteen countries, as shown by the solid line in Table IV-1. The scores of top students in Japan, Sweden, and Israel exceed their American counterparts by ten or more points.

The results from the 1972-73 and 1977-78 NAEP Mathematics Assessments suggest declining mathematics skills among 17-year-olds within the United States. During that five-year period, there was a decline in mathematical understanding, problem-solving, and complex mathematics skills; and particularly in computational skills such as calculating fractions, percents, and exponents. Approximately two-thirds of the 17-year-olds could not compute multiple-step problems or problems involving application of mathematics knowledge (Forbes, 1982). However, rudimentary mathematics knowledge did not decline between the tests, and metric knowledge improved.

The analysis provided by NAEP illustrates the serious nature of the state of mathematics education in this country. Specifically, in reviewing NAEP results, analysts found:

- Over 90 percent of 17-year-olds could answer basic addition, subtraction, and multiplication items correctly; the rate was somewhat lower for division.
- Twenty-five percent of 17-year-olds could not supply the correct answer to questions about the number of quarts in a gallon, ounces in a pound, or feet in a yard.
- Most 17-year-olds could add or multiply 2- or 3-digit numbers correctly; two-thirds could add simple fractions.
- Only 58 percent of 17-year-olds knew what percentage 30 is of 60 and only 27 percent could calculate 4 percent of 75.

TABLE IV-1

INTERNATIONAL COMPARISONS IN MATHEMATICS

Results from 1967 IEA Examinations

COUNTRY	Approximate Mean Score Top Nine Percent
Israel	42
England	39
Belgium	35
France	37
Netherlands	35
Japan	44
Germany	31
Sweden	44
Scotland	28
Finland	30
Australia	32
United States	31

SOURCE: Abstracted from Husen, Torsten. International Study of Achievement in Mathematics: A Comparison of Twelve Countries, Volume II. New York: John Wiley, 1967, p. 124.

- Nearly one-fifth of 17-year-olds could not read a ruler to the nearest quarter inch and over two-fifths could not convert feet to yards.
- Only 42 percent of the 17-year-olds could successfully compute the area of a square when the length of only one side was given.

Results from the mathematics portions of other achievement tests generally suggest a pattern of decline similar to that found by NAEP.[1] Results from the ITED Test of Quantitative Thinking show declines between 1965 and 1974 of slightly more than two percent of a standard deviation per year in grade twelve. On the Project Talent examinations of math-related knowledge, scores in quantitative reasoning declined by one percent of a standard deviation per year between the 1960 and 1975 tests, computational skills by two percent of a standard deviation per year, and general mathematics skills remained stable (Cleary and McCandless, 1976).

For college-bound students nationally, the data also suggest declining mathematics performance. Mean scores on the SAT-Mathematics examination reached a high of 502 in 1962, then dropped to 466 by 1981 (Eckland, 1982). In 1982, the mean score rose to 467. On the ACT-Mathematics examination, mean scores declined from 20.0 (standard deviation: 6.6) in 1970 to 17.3 (standard deviation: 7.9) in 1981.[2]

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[1]The two longitudinal studies of high school seniors conducted by the NCES in 1972 and 1980 included tests of mathematics abilities, but comparative score data were not available as of this writing.

[2]The results from The College Board Mathematics Achievement tests are inconclusive, in part because of changes in the test-taking population. (The Math I test-taking population dropped from 240,089 in 1972 to 145,851 in 1981.) Math Level I scores have fluctuated between 536 and 547, with no discernible trends. Math Level II scores have generally headed downward since 1977.

b. California

Table IV-2 provides mathematics score information from the Survey of Basic Skills for 1975-76 through 1980-81.[1] Despite minor fluctuations, the average scores were approximately the same in this time period. At first, performance dropped somewhat, but by 1980, the mean level of "percent correct" slightly exceeded the 1975 level. Between 1979-80 and 1980-81, performance improved in all of the skill areas tested, ordinarily by about one percentage point. In general, increases were somewhat larger in the more rudimentary computational skills than in the more complex mathematics applications. In 1981-82, mathematics performance declined slightly, to a new average of 67.7.

The equating studies performed by the California State Department of Education place California students below the national average in mathematics (publisher's percentile ranking on the ITED for 1981-82 was 45). Results from the cognitive examinations administered to the High School and Beyond sample place California students fractionally above the national average. Table IV-3 provides the HS & B test results for the California and national samples.

The mathematics test-taking performance of college-bound Californians shows trends that are similar to those reported earlier for verbal skills. SAT-Math scores declined during the seventies but have

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[1]During the early seventies, the Iowa Test of Educational Development was used to measure mathematics achievement among twelfth grade students. Between 1969-70 and 1973-74, when all California seniors were tested, the average score for California seniors declined from 13.2 to 12.6, but the state's rank on the publisher's norms remained constant at the 48th percentile (California Assessment Program, 1975, p. 66). In 1974-75, when only a sample was tested, the average score dropped slightly to 12.4 (publishers ranking: 41st percentile).

TABLE IV-2

MATHEMATICS SCORES OF CALIFORNIA TWELFTH GRADE STUDENTS AND CHANGE IN SCORES
Survey of Basic Skills: Grade 12, 1975-76 Through 1980-81[1]

Skill area	Number of questions	Average percent correct score						Change in average percent correct score				
		1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1975-76 to 1976-77	1976-77 to 1977-78	1977-78 to 1978-79	1978-79 to 1979-80	1979-80 to 1980-81
MATHEMATICS, TOTAL	198	67.0	66.3	66.3	66.5	66.8	68.0	-0.7	-0-	+0.2	+0.3	+1.2
Arithmetic	98	72.9	72.1	72.2	72.7	73.1	74.5	-0.8	+0.1	+0.5	+0.4	+1.4
Number concepts	28	74.3	73.5	73.6	73.9	74.1	75.4	-0.8	+0.1	+0.3	+0.2	+1.3
Number and numeration	14	71.0	70.1	69.9	70.1	70.6	72.1	-0.9	-0.2	+0.2	+0.5	+1.5
Number theory	8	76.2	75.9	76.4	76.9	76.7	77.7	-0.3	+0.5	+0.5	-0.2	+1.0
Number properties	6	79.6	78.5	78.6	78.8	78.7	79.8	-1.1	+0.1	+0.2	-0.1	+1.1
Whole numbers	22	80.1	80.1	80.1	80.6	81.0	81.7	-0-	-0-	+0.5	+0.4	+0.7
Computation	14	80.9	81.0	81.2	81.9	82.4	83.5	+0.1	+0.2	+0.7	+0.5	+1.1
Application	8	78.7	78.5	78.2	78.3	78.4	78.6	-0.2	-0.3	+0.1	+0.1	+0.2
Fractions	26	66.0	64.5	64.3	64.7	65.0	66.3	-1.5	-0.2	+0.4	+0.3	+1.3
Computation	14	70.4	68.3	68.4	69.0	69.6	71.5	-2.1	+0.1	+0.6	+0.6	+1.9
Application	12	60.9	60.0	59.5	59.6	59.7	60.2	-0.9	-0.5	+0.1	+0.1	+0.5
Decimals	22	71.8	71.2	72.0	72.9	73.7	75.8	-0.6	+0.8	+0.9	+0.8	+2.1
Computation	14	74.1	73.8	74.8	75.8	76.7	79.1	-0.3	+1.0	+1.0	+0.9	+2.4
Application	8	67.8	66.6	67.2	67.7	68.3	70.1	-1.2	+0.6	+0.5	+0.6	+1.8
Algebra	32	62.9	62.1	61.8	62.1	62.3	63.5	-0.8	-0.3	+0.3	+0.2	+1.2
Computation	14	66.4	65.9	65.5	66.0	66.4	67.6	-0.5	-0.4	+0.5	+0.4	+1.2
Application	18	60.1	59.2	58.8	59.1	59.1	60.2	-0.9	-0.4	+0.3	-0-	+1.1
Geometry	24	62.7	62.1	61.8	61.8	62.0	62.4	-0.6	-0.3	-0-	+0.2	+0.4
Knowledge of facts	12	75.2	75.5	75.5	75.4	75.5	76.0	+0.3	-0-	-0.1	+0.1	+0.5
Application	12	50.1	48.7	48.1	48.3	48.4	48.8	-1.4	-0.6	+0.2	+0.1	+0.4
Measurement	30	60.5	59.5	59.4	59.0	59.2	60.0	-1.0	-0.1	-0.4	+0.2	+0.8
Knowledge of facts	12	71.6	70.5	70.1	69.7	69.6	70.8	-1.1	-0.4	-0.4	-0.1	+1.2
Application	18	53.1	52.2	52.2	51.9	52.2	52.9	-0.9	-0-	-0.3	+0.3	+0.7
Probability and statistics	14	57.2	56.9	57.3	57.4	57.8	59.2	-0.3	+0.4	+0.1	+0.4	+1.4
Computation	6	57.9	57.6	58.3	59.0	59.6	61.3	-0.3	+0.7	+0.7	+0.6	+1.7
Application	8	56.6	56.3	56.5	56.2	56.5	57.6	-0.3	+0.2	-0.3	+0.3	+1.1
Problem solving	62	61.8	60.7	60.6	60.7	60.9	61.7	-1.1	-0.1	+0.1	+0.2	+0.8
Arithmetic	28	68.5	67.2	67.1	67.2	67.5	68.3	-1.3	-0.1	+0.1	+0.3	+0.8
Graphs	34	56.2	55.4	55.2	55.3	55.4	56.2	-0.8	-0.2	+0.1	+0.1	+0.8

[1]Recently released data put the 1981-82 mean at 67.7 percent correct.

SOURCE: California Assessment Program. Student Achievement in California Schools: Annual Report, 1981. Sacramento: State Department of Education, 1981, p. 58.

TABLE IV-3

HIGH SCHOOL AND BEYOND COGNITIVE TESTS

Mathematics Results for National and California Samples
1980

TEST SCORE		NATIONAL	CALIFORNIA
Math - Part I	(mean)	49.60	50.48
	(median)	49.39	50.66
Math -Part II	(mean)	49.67	50.14
	(median)	48.06	51.31

SOURCE: California Assessment Program. Unpublished material on California Results from High School and Beyond. Sacramento: California State Department of Education, 1981.

thereafter been slightly above the national average, except between 1976 and 1978, as shown in Figure IV-1. However, Californians recovered from the decline more rapidly in mathematics than in verbal skills; by 1982, the California average on the SAT-Math rose to 474 while the national average remained at 467. ACT results for California show a similar trend, with mean scores in mathematics below the national average in the mid to late seventies, but above the national average now.

Results from the more advanced College Board Math I and II achievement tests reveal a distinct pattern. As noted earlier, national scores on the Math Level I exam dropped from 541 in 1972 to 536 in 1980. California scores also dropped, but to a much greater degree. In 1972, the average score in California was 551; by 1980 it had dropped to 520. Some of this decline is probably due to changes in the test-taking population, for although the national Math I population decreased over these eight years, the California population increased by some 25 percent. However, it is unlikely that the increase in test takers explains all of the decline (see Appendix B).

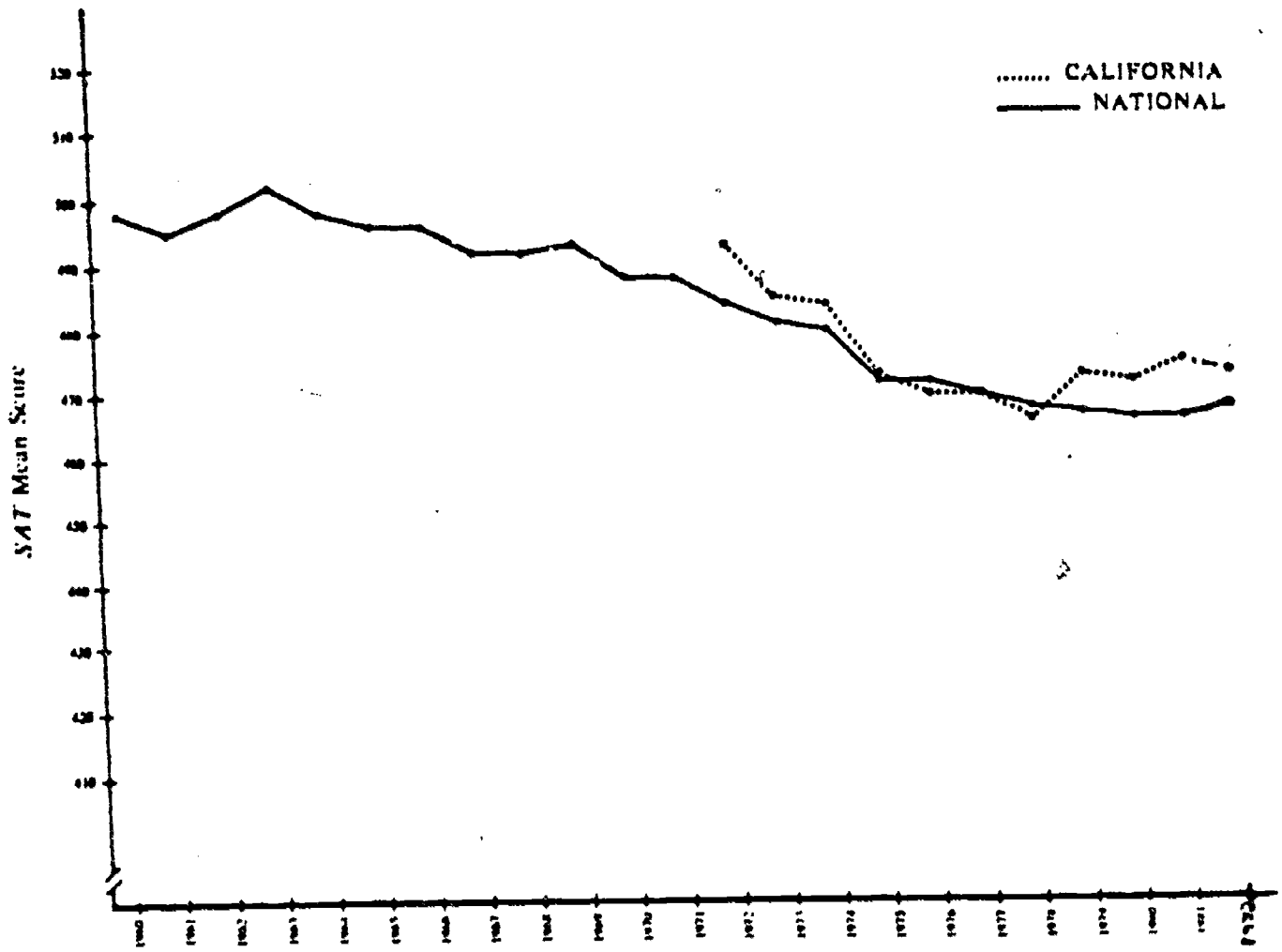
California Math Level II scores also dropped between 1976 and 1981. In 1976, the mean score was 657; by 1981, it had declined to 651. During this period the number of test takers increased from 4,289 to 5,547. Although the actual number of 700+ scores increased between 1976 and 1981 (1,887 to 2,010), the proportion of 700+ scores as a percentage of the total declined from 44 percent to 34 percent.

The declines in The College Board math achievement scores are consistent with data provided by the University of California on its entering students. A recent UC study found that course enrollments in pre-calculus mathematics, considered by the California postsecondary

FIGURE IV-1

SCHOLASTIC APTITUDE TEST MATHEMATICS SCORES FOR HIGH SCHOOL SENIORS IN CALIFORNIA AND THE UNITED STATES

1960 Through 1982



SOURCE: California Assessment Program. Student Achievement in California Schools: Annual Report, 1981. Sacramento: State Department of Education, 1981. (1982 information added).

community to be below college level, have increased dramatically. Between 1975 and 1979, the proportion of UC freshmen enrolled in pre-calculus course work increased from 36.2 percent to 48.7 percent (University of California, 1981).[1]

2. The Sciences

a. The National Setting

As with mathematics, United States high school seniors compiled a lower mean score on the 1973 IEA assessment of science achievement than students in other countries. The mean score for the United States sample was approximately 14; the mean score for the total 14-country sample was 22. However, as shown in Table IV-4, the highest-achieving American students scored approximately at the international mean of top performing students: for the top 9 percent, American students scored slightly above the international mean; for the top 5 percent, American students scored slightly below the mean; and for the top 1 percent, they scored at the international mean. However, the highest-achieving students in Australia, New Zealand, England, and Scotland achieved considerably higher scores in science than did their American counterparts. (Students in several other countries scored higher than the United States, but not by such a wide margin.)

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[1]Some portion of this increase is due to greater student interest in mathematics-based fields.

TABLE IV-4

INTERNATIONAL COMPARISONS IN SCIENCE

Results from 1973 IEA Examinations

COUNTRY	Top Nine Percent	Top Five Percent	Top One Percent
Australia	39.9	44.0	51.5
Belgium (Flemish)	30.5	33.0	39.8
Belgium (French)	28.4	30.9	36.2
England	35.5	41.6	51.6
Federal Republic of Germany	33.0	36.8	45.8
Finland	30.7	35.7	46.0
France	28.4	35.3	45.0
Hungary	35.0	39.0	48.0
Italy	22.7	27.4	38.2
The Netherlands	30.3	37.2	47.1
New Zealand	36.8	43.5	52.8
Scotland	34.4	40.6	50.7
Sweden	37.0	41.2	49.5
United States	30.7	35.7	46.0

SOURCE: Data from Combers, L. C.; and Keeves, John. Science Education in Nineteen Countries: An Empirical Study. International Studies in Evaluation, Volume I. New York: John Wiley, 1973, p. 174.

Data from the NAEP suggest that science achievement is declining among 17-year-olds in the United States. Between 1969-70 and 1972-73, the mean "percent correct" scores on the NAEP assessment declined by 2.8 percentage points. On questions dealing with the biological sciences, 17-year-old scores declined by 1.2 percentage points; in the physical sciences, the drop was larger: 3.5 percentage points. Between 1972-73 and 1976-77, the drop was 1.9 percentage points (1.1 points in the biological sciences and 2.4 points in the physical sciences).

The information available on the science achievement of college-bound students is insufficient to warrant any general conclusions. Of the two major testing organizations, only ACT tests all students in science, and scores on the natural science test of the ACT have not changed significantly between 1970 and 1981. However, some experts believe that the ACT examination is a test of science reading ability rather than a test of science knowledge, so those results are of questionable use in measuring science achievement. The College Board offers three achievement tests in science, but few students take these exams nationally. Table IV-5 presents information on the number of test takers and their mean scores in biology, chemistry and physics. The scores fluctuated in all three science fields over these years.

In sum, science achievement has apparently declined for the total national high school senior population. The rate of decline in physical sciences is greater than that of biological sciences. At the college-bound level, the data are insufficient to permit general conclusions but, at least among the highly able students who take The College Board achievement tests, they do not suggest any significant declines.

TABLE IV-5

THE COLLEGE BOARD SCIENCE ACHIEVEMENT SCORES

National--Selected Years

AREA	1972	1974	1976	1978	1980	1981
BIOLOGY						
Test Takers	51,371	46,468	46,041	47,291	*40,580	40,480
Mean Score	535	545	543	544	551	546
Std. Dev.	113	112	113	111	109	107
CHEMISTRY						
Test Takers	47,759	36,521	34,294	35,007	34,473	34,494
Mean Score	568	581	567	577	573	571
Std. Dev.	108	110	104	102	103	101
PHYSICS						
Test Takers	N/A	N/A	15,644	15,408	14,656	15,897
Mean Score	N/A	N/A	592	591	592	595
Std. Dev.	N/A	N/A	103	106	100	101

SOURCE: The College Board. Admissions Testing Program Reports. New York: 1981; The College Board. Admissions Testing Program Reports. New York: 1980; The College Board. Admissions Testing Program Reports. New York: 1978; The College Board. Admissions Testing Program Reports. New York: 1976; The College Board. Admissions Testing Program Reports. New York: 1974; The College Board. Admissions Testing Program Reports. New York: 1972.

b. California

There are no readily available general indicators of science achievement for California high school students. The California Assessment Program does not include an examination of science achievement and no other available data sources include science performance information.

At the college-bound level, there are several sources, but none permit generalized conclusions. The ACT scores in natural science have been relatively stable for college-bound students who take the ACT, with mean scores fluctuating between 20.5 and 21.1. The trend on The College Board biology achievement test is upward, from 521 in 1976 to 535 in 1981. But the number of students taking the exam dropped off considerably, from 6,683 in 1976 to 1,883 in 1981 (which may be a useful indicator of a decline in science achievement). The trend for the physics test, which is taken annually by some 800 California twelfth graders, is generally downward. Mean scores in chemistry, taken by some 1,500 Californians, fluctuate considerably.

3. Summary: The Quantitative and Science Skills of California Students

During the early seventies, California scores on twelfth grade mathematics achievement tests declined slightly. The decline continued through 1976-77, when average scores flattened out, then moved generally upward again.

Like most students nationally, California students tend to have the most difficulty with more complex skills, including algebra and multiple-step computations. Even these skill areas, however, improved somewhat between 1977 and 1980.

Most available measures of comparison suggest that California students perform at or somewhat below the national average in mathematics. Scores from the High School and Beyond test of mathematics place California students slightly above the national average, and the average score for a California student on the SAT-Math was 474, as contrasted with a national average of 467.

Nationally, the trend in science achievement is downward, and at a higher rate for physical sciences than for natural sciences. California information is too limited to permit confident generalizations.

CHAPTER V

MASTERY OF OTHER INTELLECTUAL AND LIFE SKILLS

Although few question the responsibility of the nation's schools to prepare their students for aspects of adulthood beyond college or work, relatively little has been done to measure student knowledge in areas outside of the verbal and quantitative skills. In general, there is little standardized testing in such subjects as history, art appreciation, and social studies. Similarly, non-academic skills such as informed voter participation, civic advocacy, general information acquisition, critical thinking, consumer protection, and health awareness are rarely measured. This section probes available sources of information in these areas, relying heavily on data from the National Assessment of Educational Progress.

1. Social Studies/Civic Knowledge and Participation

NAEP assessed citizenship for the first time in 1969-70, and then reassessed it in 1975-76 along with a second assessment of social studies (first conducted in 1971-72). Upon comparing these examinations, NAEP found declines in political knowledge and attitudes among 17-year-olds. The ability to explain the basic concept of democracy dropped by more than 10 percentage points, and fewer than half of the 17-year-olds in the second assessment could name either of their Congressmen or one of their Senators. One out of five 17-year-olds did not know that a Senator is elected to office.

NAEP found declines in the area of respect for others, although the percentage of students exhibiting racial tolerance increased. Also, despite the extension of voting rights to 18-year-olds, the examiners found a decline in the civic participation rate. They also found a decrease in the proportion of students who either felt they could influence local government or suggest some method for doing so.

Data on the college-bound population provide somewhat conflicting information on social studies knowledge. Like NAEP, the American College Testing Program, which tests all its students in social studies, reports declines between 1970 and 1981, from a mean score of 19.4 to 17.2. On the other hand, scores on The College Board American History achievement test, taken each year by some 20,000 college-bound Californians and 54,000 students nationally, have increased slightly. This, however, is a highly able and self-selected subgroup of the general SAT-taking population.

2. Art, Music, and Aesthetic Appreciation

During the seventies, NAEP conducted two assessments of art and music skills and knowledge among young Americans. Between the two art assessments (1974 and 1979), the proportion of teenagers pursuing artistic activities declined. So, too, did the proportion of students who valued art and tolerance for unconventional art forms. Particularly large drops occurred in knowledge about art, even among students who had taken 4-6 art courses and who possessed superior design skills. Art educators reviewing the results were distressed by the finding that 45 percent of the 17-year-olds had either never been to an art museum or had been only once.

NAEP assessed music-related skills and knowledge in 1970-71 and in 1978-79. Between the two assessments, the performance of 17-year-olds declined by 2.5 percent. Fewer 17-year-olds in the second assessment successfully answered questions requiring knowledge of the elements and expressive controls of music (4.9 percent decline). Although knowledge about music history and style did not decline, the examiners found a low level of knowledge in this area among those tested (mean score of 39 percent correct). They did find, however, that most students (75 percent) have positive feelings about music and appear able to make simple judgments about it.

3. Critical Thinking Skills

Several recent NAEP assessments have brought into question the ability of young Americans to think critically--to analyze pieces of literature, to explain their views on a subject, or to disprove false claims. The results from the 1979-80 assessment of reading and literature are a case in point: While teenagers are generally able to read a variety of materials and express initial judgments about what they read, very few were able choose an effective strategy to explain their judgments. The "overwhelming majority of students lacked strategies for analyzing or evaluating in the interest of deepening their understanding of what they read" (National Assessment of Educational Progress, November 1981). In general, students had much less difficulty with multiple-choice items than with open-ended questions. Coupled with the declines in inferential comprehension seen for 17-year-olds, these results may signify an erosion in older teenagers' thinking and evaluative skills.

4. Personal and Family Maintenance: Health, Recreation, and Consumer Skills

Parents and citizens disagree about which particular social or family-related skills should be taught in school and which should be left to the family. But most people agree that certain basic knowledge areas, including health, recreation, and consumer skills, should be covered in school. Three recent NAEP surveys suggest that young people have problems in these areas.

NAEP assessed consumer skills in 1978. In general, the 17-year olds who were tested appeared to be well-acquainted with the use of bank accounts, making purchases, and constructing simple budgets. The results in areas like economics and consumer protection, however, "suggest that 17-year-olds remain inadequately prepared for their roles as consumers in light of the demands soon to be made on them." Although students are becoming more sophisticated in knowing the questions they need to ask as consumers, they "still appear not to have a sufficient level of knowledge to transact effectively in the American marketplace" (National Assessment of Educational Progress, undated).

NAEP tested young people's knowledge about energy in 1977. The examiners found that young adults were generally familiar with energy-related terminology and some practical conservation techniques. Most were aware of the problems energy shortages might cause in the future and were also aware that the position of the United States was not unique. However, over half of the young adults reported that they usually use a car to travel half a mile or less and most doubted that they could influence government or industry with regard to energy problems (National Assessment of Educational Progress, undated).

The NAEP examination of health awareness uncovered potentially serious gaps in the health and emergency medical knowledge of young people. Between 30 and 40 percent of the young people did not know where to apply pressure to control severe arterial bleeding on an arm or leg; half did not know that a room must be ventilated when using a gas space heater; one third did not know which of four common household substances would put out a grease fire; and less than half knew how to treat a severe burn. While most understood basic nutritional concepts, many did not understand the potential dangers of severe obesity during the teen years. Only 62 percent could read and interpret a thermometer correctly (National Assessment of Educational Progress, December 1981).

5. Summary: Life Skills

Information on mastery of life skills by young Americans is insufficient to permit confident conclusions. Information available from NAEP does, however, suggest several troubling trends. Specifically, NAEP results depict recent high school seniors as less knowledgeable about governmental and political affairs, less respectful of others, and less knowledgeable about art and music than their predecessors in the early seventies. In addition, NAEP found significant gaps in the health, energy and consumer-related knowledge of 17-year-old Americans. Perhaps most disturbing, however, was the finding in several NAEP assessments that the ability of young Americans to think critically--to analyze or evaluate what they hear or read--has declined.

CHAPTER VI

SOME SUBGROUP DATA

It is difficult to interpret the meaning of test score declines in California over the past two decades, since the composition of the state's high school population has changed considerably during that period. This chapter examines available data pertinent to how the changing composition of California's high school students might have affected test score decline.[1]

1. Changes in High School Senior Population

The current population of high school seniors is considerably more diverse racially than graduating classes in the late sixties and early seventies. Table VI-1 provides comparative information on the ethnic makeup of the senior classes of 1973 and 1979-80. As shown in this table, ethnic minorities comprise a larger proportion of the later senior class.

As shown in Table VI-2, ethnic minority students comprise increasingly large fractions of the total student population as grade levels decrease. In the 1980 kindergarten class, minority students comprise 47.33 percent of the total student population; in grade 12, minority students comprise only 31.95 percent of the total.

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[1]This study is limited to secondary analysis of available data. It is possible to do original data analysis that would separate some effects of an altered test population from the effects of lower achievement levels. However, it was beyond the scope of this study to conduct the appropriate analysis.

TABLE VI-1

TWELFTH GRADE ENROLLMENT, CALIFORNIA PUBLIC SCHOOLS

1973 and 1979-80

MINORITY	1973	1979-80	PERCENTAGE CHANGE
American Indian/Alaskan	0.4	.81	+102
Asian/ Pacific Islander	3.1	4.50	+45
Filipino	unknown	1.26	N/A
Black	7.9	9.58	+21
Hispanic	12.7	15.80	+24
TOTAL MINORITY	24.1	31.95	+33

SOURCE: California State Department of Education. Racial and Ethnic Distribution of Staff and Students. In California Public Schools, 1979-80. Sacramento: 1981.

TABLE VI-2

ENROLLMENT IN CALIFORNIA PUBLIC SCHOOLS

By Grade Level and Racial Group[1]

GRADE LEVEL	RACIAL GROUP					
	A	B	C	D	E	F
K	0.66	4.18	1.66	9.21	52.77	31.53
6	1.07	4.25	1.52	9.98	60.19	23.00
12	0.81	4.50	1.26	9.58	68.05	15.8

[1]Racial Group:
A = American Indian/Alaska Native
B = Asian/Pacific Islander
C = Filipino
D = Black
E = White
F = Hispanic

SOURCE: California State Department of Education. Racial and Ethnic Distribution of Staff and Students. In California Public Schools, 1979-80. Sacramento: 1981.

Projections for language minority groups show similar increases. Table VI-3 provides projections, by age group, for various language groups. There have been other changes in senior class composition during the past 10 to 20 years, such as an increased number of students from single parent homes.

The panel of experts advising this study agreed that changes in the composition of the various test populations have contributed to changes in average test scores. They also concluded that the major score declines of the seventies were too big, and too pervasive across different student achievement levels, to be simply the result of compositional changes.

Although specific analysis of compositional effects are beyond the scope of this report, available data discussed below point to some trends pertinent to such an analysis.

2. Achievement Patterns for Students of Different Racial or Ethnic Backgrounds

Virtually all of the many analyses of academic achievement patterns during the past two decades have documented lower average levels of achievement among minority group students (excluding students of Asian ancestry) than among the majority population. James Coleman, in his 1965-66 study of equal educational opportunity, reported that twelfth grade achievement score averages for blacks were "about one standard deviation below those of. . .whites, which means about 85 percent of the (black) scores are below the white average" (Coleman, 1967). In 1977 the Wirtz Commission reported a comparable picture for the SAT, with black students estimated to average approximately 100 points below the overall

TABLE VI-3

PROJECTIONS OF THE NON- OR LIMITED-ENGLISH SPEAKING POPULATION

California

LANGUAGE/AGES	PROJECTION YEARS					
	1976	1980	1985	1990	1995	2000
CHINESE						
25-34	45.0	48.2	53.0	55.1	61.7	67.2
35-54	44.5	47.5	53.1	60.9	69.4	75.3
TOTAL	199.0	212.2	225.3	238.0	249.3	258.9
FILIPINO						
5-14	44.1	40.0	39.4	43.7	48.5	49.2
25-34	51.8	55.5	61.1	63.5	59.6	54.4
35-54	52.7	56.2	62.9	72.1	82.2	89.2
TOTAL	247.7	264.0	280.3	296.2	310.2	322.1
FRENCH						
35-54	53.2	56.7	63.4	72.7	82.9	90.0
55+	41.3	48.9	53.2	56.0	58.7	62.9
TOTAL	137.2	146.2	155.2	164.0	171.8	178.4
GERMAN						
35-54	81.3	86.7	96.9	111.2	126.7	137.6
55+	123.1	145.9	158.7	167.1	175.0	187.7
TOTAL	283.9	302.7	321.4	339.5	355.6	369.3
ITALIAN						
35-54	69.9	74.5	83.3	95.6	108.9	118.3
55+	118.5	140.4	152.8	160.8	168.4	180.6
TOTAL	263.2	280.6	297.9	314.7	329.6	342.3
JAPANESE						
35-54	90.2	96.1	107.5	123.3	140.5	152.6
55+	51.6	61.2	66.6	70.1	73.4	78.7
TOTAL	193.8	206.6	219.4	231.8	242.7	252.1
PORTUGUESE						
55+	67.4	79.9	86.9	91.4	95.8	102.7
TOTAL	160.9	171.5	182.1	192.4	201.5	209.2
SCANDINAVIAN						
TOTAL	83.8	89.3	94.8	100.2	104.9	109.0
SPANISH						
0-4	303.0	337.1	430.5	484.8	510.4	529.0
5-14	654.1	628.7	664.3	788.6	937.0	1017.3
15-24	555.2	643.6	649.8	634.5	668.9	787.3
25-34	531.4	600.9	707.6	788.4	794.2	778.2
35-54	640.8	721.6	863.6	1059.8	1292.6	1502.8
55+	286.0	357.5	416.5	469.6	526.9	605.2
TOTAL	2970.4	3345.1	3804.0	4305.2	4830.0	5374.1
YIDDISH						
55+	63.3	75.0	81.6	85.9	90.0	96.5
TOTAL	84.2	89.7	95.3	100.7	105.4	109.5

PROJECTIONS GIVEN IN 1000'S OF INDIVIDUALS

SOURCE: Macias, Reynaldo. "Projections of the NELB Population for Contiguous Age Groups." Unpublished. Los Angeles: University of Southern California, 1982.

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mean score on the Verbal and about 115 points lower on the Mathematical part of the SAT. A California-specific study conducted by the University of California in 1978 documented disproportionately low rates of postsecondary eligibility attainment for black and Chicano students: Minority high school graduates achieved eligibility to attend one of California's public four-year universities at only one-third to one-half the rate of white high school graduates.

There are many signs, however, that the magnitude of the gap between minority and white students is decreasing slowly--at least on the national level (Burton and Jones, 1982). In most subject area assessments conducted by NAEP, minority students improved their position slightly relative to the national average. For example, on the 1979 writing assessment, the differences between 17-year-old black and white students "narrowed on all but one of the writing tasks." Over the three assessments of reading, black 9- and 13-year-olds made some gains in literal and inferential comprehension and in reference skills. In social studies, "Hispanics. . .decline less than the entire group of 17-year-old students." In mathematics, "Black students at ages 9 and 13 performed closer to the national level in the 1978 assessment than they did in 1973." But the progress is uneven: In one subject, 9- and 13-year-olds progress relative to the national average, while 17-year-olds hold their ground; in another, the situation is reversed.[1]

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[1]The results of cognitive tests administered in conjunction with the NCES longitudinal studies of the high school graduating classes of 1972 and 1980 also suggest a slight reduction over time in the difference between white and black performance levels (Fetters, 1982).

On the college-bound level, a recent release from The College Board indicates that gains by blacks and other minority students on the 1982 Scholastic Aptitude Test were largely responsible for the first increase in the national average scores in nineteen years. Between 1981 and 1982, black students' scores rose by an average of nine points on the verbal exam and four points on the quantitative exam; whites gained two points on the verbal and nothing on the quantitative. However, minority students still trailed their white counterparts by a considerable margin. Current data are summarized in Table VI-4.

Unfortunately, the major source of data on California high school seniors does not include ethnic indentifiers. Thus, it is not directly possible to trace changes over time in the achievement levels of California students from different racial groups or to compare progress in California with that at the national level.

3. Achievement Patterns for Students with Different Family Backgrounds (Income and Parental Education)

In general, students whose parents are either low-income or not highly educated do not score as well as their more advantaged peers on standardized tests and other measures of achievement. Like ethnic minority students, however, these students appear to be gaining some ground relative to the norm. NAEP reports, for example, suggest that students from the "disadvantaged-urban group" are registering gains in most subject areas.

In California, information on parental education levels has been collected as a part of CAP for three years. As shown in Table VI-5, Survey of Basic Skills scores are directly related to the level of

TABLE VI-4

SAT SCORES BY RACE

National, 1982

	VERBAL	QUANTITATIVE
American Indians	391	425
Asian Americans	397	513
Mainland Puerto Ricans	361	396
Mexican Americans	373	415
Blacks	332	362
Whites	442	483
National Average	424	466

SOURCE: San Francisco Chronicle. "How Race, Income Figure in SAT Scores." San Francisco: October 5, 1982.

TABLE VI-5

CALIFORNIA SURVEY OF BASIC SKILLS: GRADE TWELVE SCORES FOR READING AND MATHEMATICS

By Parental Educational Level, 1978-79 Through 1980-81[1]

Highest education level of student's parent	Percent of Students			Reading					Mathematics				
				Average Scores			Changes		Average Scores			Changes	
	1978-79	1979-80	1980-81	1978-79	1979-80	1980-81	1978-79 to 1979-80	1979-80 to 1980-81	1978-79	1979-80	1980-81	1978-79 to 1979-80	1979-80 to 1980-81
State total	100.0*	100.0*	100.0*	63.2	63.1	63.4	-0.1	+0.3	66.5	66.8	68.0	+0.3	+1.2
Advanced degree	16.4	17.1	17.4	70.1	69.8	69.9	-0.3	+0.1	74.7	75.0	75.7	+0.3	+0.7
Four-year college	18.0	18.4	18.8	67.2	66.9	67.1	-0.3	+0.2	71.5	71.7	72.6	+0.2	+0.9
Some college	26.6	26.8	27.1	64.6	64.5	64.6	-0.1	+0.1	67.3	67.8	68.6	+0.5	+0.8
High school graduate	26.0	24.9	23.9	59.4	59.3	59.7	-0.1	+0.4	61.5	61.9	63.3	+0.4	+1.4
Not a high school graduate	11.3	11.0	10.9	53.5	53.5	54.1	-0-	+1.4	55.9	56.7	58.3	+0.8	+1.6

[1]Includes 1.7 percent non-response in 1978-79, 1.8 percent in 1979-80, and 1.8 percent in 1980-81.

SOURCE: California Assessment Program. Student Achievement in California Schools: Annual Report, 1981. Sacramento: State Department of Education, 1981.

parental education. In 1979, students whose parents had advanced degrees averaged 70.1 in reading and 74.7 in mathematics; students whose parents did not graduate from high school scored 16.6 points lower in reading and 18.8 points lower in mathematics. By 1981, however, these differences had narrowed slightly to 15.8 points in reading and 17.4 points in math.

CAP also collects information on parental occupations, but only for students in grades 3 and 6. A review of these data, however, also shows a clear link between the parent's occupation and the child's achievement level. As with parental education levels, however, the gap between students from families at the top of the occupational ladder and those at the bottom narrowed slightly during the past several years.

4. Achievement Patterns for Students in the Lowest and Highest Achievement Deciles

Trends in mean scores do not, of course, tell the whole story about academic achievement trends. For this reason, it is useful to observe any unusual patterns at the high and low ends of the achievement spectrum. General information on apparent trends is presented for each group below.

a. Low Achieving Students

Virtually all sources of data on trends in student performance agree that no group has made as much progress as the low achieving students during the past 5-10 years. On assessments suggesting a decline in student achievement, the declines have generally been smaller at the low end of the achievement scale. On assessments showing increases in student achievement, the low-end students have generally increased at a higher rate than other students.

California Assessment Program data also show this trend. At most levels tested, low achieving students have improved their scores relative to those of middle and high achieving students. Table VI-6 provides percentile score information for the grade twelve math tests administered between 1975-76 and 1979-80. Students in each of the bottom four deciles improved their scores over this five-year period; scores for the remaining group declined. Similarly, the decline in twelfth grade reading scores between 1975-76 and 1979-80 was smaller for the lowest 10 percent of the students than for any other group except the highest decile.

b. High Achieving Students

Several recent reviews of performance data suggest that the better students in our schools are showing the greatest score declines (Borkow, 1982; University of California, 1981). Most of the data reviewed for this report support this conclusion, but not without leaving some room for doubt.

On the national level, the National Assessment of Educational Progress has reported disproportionate declines among high achieving students in reading, literature, and writing. In general, students had the most difficulty with tests of higher-level skills. Performance in most rudimentary skills areas has increased, but these gains have not carried over into higher level skills.

This trend is consistent with achievement trends for the college-bound population. In general, the declines on the major college admissions tests have been greater than declines on tests administered to all high school seniors (Cleary and McCandless, 1976).

TABLE VI-6

SURVEY OF BASIC SKILLS
PERCENT CORRECT AT SELECTED STUDENT PERCENTILE RANK POINTS

Grade Twelve--Math

	YEAR OF TESTING					
PERCENTILE	1975-76	1976-77	1977-78	1978-79	1979-80	OVERALL CHANGE 1975-76 TO 1979-80
90	93.9	93.7	93.8	93.6	93.7	-0.2
80	86.5	86.2	86.5	86.3	86.4	-0.1
70	80.4	79.9	80.2	80.0	80.2	-0.2
60	74.4	73.8	74.1	73.9	74.2	-0.2
50	68.5	67.8	68.1	68.0	68.3	-0.2
40	62.1	61.5	61.8	61.8	62.3	0.2
30	55.4	54.8	55.1	55.2	55.7	0.3
20	47.6	47.0	47.4	47.6	48.2	0.6
10	37.1	36.6	37.0	37.4	37.8	0.7

SOURCE: California State Department of Education. "California Survey of Basic Skills: Percentage Correct at Selected Student Percentage Rate Points." Unpublished. Sacramento: 1981.

At the highest skill levels, SAT results for the national population suggest a decline in the number of top-level scores on both tests. In 1972, for example, some 11 percent of the test takers compiled scores of 600 or better on the verbal test; by 1981, only 7 percent had 600+ scores. In raw numbers, some 116,000 graduates scored above 600 in 1972; only some 70,000 students scored at this level in 1981. Similarly, in mathematics, some 16 percent of the test takers in 1972 achieved scores of 600 or better; by 1981, only 14 percent had 600+ scores.

The Wirtz Commission carefully reviewed these figures and concluded that the decreases in the upper achievement areas were no greater than those at other levels. Thus, these declines were interpreted to reflect the pervasiveness of the score decline phenomenon, rather than extraordinary declines at the top.

Within California, CAP data on the Survey of Basic Skills test of reading show smaller declines in the top two deciles than in all otner deciles (except the bottom decile noted earlier). On the Survey of Basic Skills mathematics test, on the other hand, the scores of students in all of the top five deciles declined, whereas those below the mean increased. In general, then, it appears that total performance of high scoring students in California declined at a greater rate than that of low scoring students, but the difference was not substantial. However, the score declines of college-bound students is significantly greater than the declines for the total high school population.

At the higher end of the achievement scale the trend is similar. As can be seen in Table VI-7, the proportion of California test takers receiving scores of 600 or better on the SAT-Math declined from 16.11 to 15.73 percent between 1976 and 1981, even though the mean SAT-Math score

during that period increased by 5 points. Similarly, the number of 600+ scores on the SAT-Verbal declined from 7.95 to 7.26 of the California test takers--but the mean score also decreased (by 4 points) over this time period.

A review of The College Board achievement tests in English and mathematics, which generally measure more advanced skills than the SAT examinations, crystallizes the problem--at least in these two skill areas. Table VI-8 provides information on achievement test scores above 600 in English, Math I, and Math II. The proportion of California students with test scores of 600 or better declined between 1976 and 1981. The largest declines occurred on the Math I and English Composition tests. (There were, however, some increases on other achievement tests.)

This pattern of larger declines at the highest achievement levels is confirmed in a recent University of California analysis of student preparation. In that report, UC documented significantly greater score declines among its new students--the elite from California high schools--than among Californians generally (University of California, 1981).

5. Differential Achievement Patterns for Male and Female Students

Recent NAEP results provide some evidence that the traditional pattern of academic achievement--in which males perform better in quantitative fields and females perform better in verbal fields--may be changing. The 1980 reading assessment shows that males improved their position on average. The mathematics assessments also reveal a narrowing

TABLE VI-7

SAT SCORES ABOVE 600

California Test Takers, 1976 and 1981

YEAR	SAT-V		SAT-M	
	#	%	#	%
1976	8,639	7.95	17,508	16.11
1981	7,272	7.26	15,752	15.73

SOURCE: The College Board. Admissions Testing Program Reports. New York: 1981; The College Board. Admissions Testing Program Reports. New York: 1976.

TABLE VI-8

THE COLLEGE BOARD ACHIEVEMENT TEST SCORES OVER 600, ENGLISH AND MATH

California Test Takers, 1976 and 1981

	MATH I		MATH II		ENGLISH	
YEAR	#	%	#	%	#	%
1976	6,295	31.39	3,449	80.41	8,048	26.73
1981	5,472	21.71	4,502	75.91	5,635	18.65

SOURCE: The College Board. Admissions Testing Program Reports. New York: 1981; The College Board. Admissions Testing Program Reports. New York: 1976.

trend, with females improving their position. On the other hand, male/female score differences did not change in writing or science (National Assessment for Educational Progress, various).

However, within the college-bound population, men now outscore women on all fronts. Since the sixties, men have outperformed women in the SAT-Verbal, and they have widened their lead since then (Harnischfeger and Wiley, 1976). In mathematics, SAT score information suggests that male/female differences are becoming greater. Table VI-9 provides a comparison of SAT score information for male and female test takers nationally between 1972 and 1980.

Since the late seventies, 17-year-old girls gained on the boys in mathematics in California, but still averaged significantly below them. In reading, boys made steady progress on the girls beginning in 1975-76, with the male average moving ahead of the female average in 1980-81.

Trends within the California college-bound population between 1974 and 1981 were similar to the national population in verbal skills but slightly different in math. Men scored higher than women on the verbal test, and the difference between them increased from 9 points in 1974 to 15 points in 1981. Men also scored higher in mathematics, but their lead decreased slightly from 55 points to 54.

As noted earlier in this report, California students performed slightly above the national average on the SAT test in 1981. On the average, California men outscored their national counterparts by 15 points; women outscored their counterparts by 7 points.

TABLE VI-9

MEAN SAT SCORES BY SEX

National, 1972 and 1981

YEAR		SAT-V	SAT-M
1972	Males	454	505
	Females	452	461
	Difference	2	44
1980	Males	428	491
	Females	420	443
	Difference	8	48

SOURCE: The College Board. Admissions Testing Program Reports. New York: 1981; The College Board. Admissions Testing Program Reports. New York: 1972.

6. Summary: Outcomes for Selected Subgroups

Test score declines in the seventies may in part have been the result of changes in the composition of California's high school student population. The number of students from racial and language minority groups has increased substantially over the last decade, and family structure and size have also changed. Nevertheless, the test score declines were too large and pervasive to be solely the result of these compositional changes.

Minority students, and students from families with low incomes and education levels, have achieved considerably lower average test scores than white-Anglo students, both in California and nationally. In California, substantially fewer minority than white-Anglo students have been eligible to attend four-year postsecondary institutions. Nationally, this achievement gap is slowly decreasing.

During the last five to ten years, the greatest improvement in test scores has been among low achieving students, both nationally and in California, whereas high achieving students have shown the greatest test score declines.

Test scores have declined more for women than for men. In tests of verbal skills, males have on the average recently performed relatively better than females, thereby narrowing the usual male-female gap on these achievement tests. Females did relatively better in mathematics, but male-female differences have not changed in writing or science. For college-bound students, however, men now score higher than women on all subjects, and this gap appears to be widening. These national differences also hold for California, except for math, where women's scores are not as far behind those of men as is the case nationally.

APPENDIX A

A DESCRIPTION OF DATA AND INFORMATION SOURCES

APPENDIX A

A DESCRIPTION OF DATA AND INFORMATION SOURCES

This appendix describes the data and information sources that have been used or referred to in this report. In addition, the data-gathering techniques, sample size, and relevant weaknesses of the various data sources are discussed. Although the number of data sources may seem large, these sources do not provide a comprehensive picture of student performance. Data are not available to assess many important goals of education.

The statewide data in California in particular are incomplete. First, longitudinal data on individual student performance are not collected. Thus, inferences about changing levels of achievement are subject to question because of changes in the test-taking population. Second, none of the key data collections on California students currently permits analysis by race or socioeconomic status. Third, frequent changes in the California Assessmen Program's high school senior test and the lack of an effective means of relating California performance to national norms make trend analysis especially difficult. Fourth, students are not examined between grades six and twelve, so identification of trouble spots is severely limited. Finally, only limited information exists on performance in areas outside of reading, writing, and mathematics. Data on science achievement or civic knowledge are simply not collected.

A. SOURCES OF INFORMATION ON GENERAL HIGH SCHOOL OUTCOMES

1. High School Graduation Rates

California has no central system for identifying the number of students who drop out before graduating from high school. Generally, the same is true nationally. There are, however, several sources of relevant information and several formulas frequently used to calculate school enrollment and graduation rates.

a. Bureau of the Census National School Enrollment Figures

These data are available annually from the Bureau, but do not include state breakdowns. The numbers are generally considered to be somewhat inflated.

b. Comparisons Between Total Population Estimates and Actual Public and Private School Enrollment Information

These comparisons are available for California from the State Department of Finance. Enrollment information is collected by public school officials at the beginning of each school year. It is believed to underestimate private school enrollment and to overestimate public school enrollment, due to its collection date.

c. Attrition Data

This method contrasts the number of students entering the ninth grade with the number of students who enter the twelfth grade three years later. It does not account for in- or out-migration, nor does it address the matter of students dropping out during grade twelve. However, attrition data can be useful in suggesting trends, and these data are available for California and the United States.

d. Estimates of Graduates as a Percentage of 18-Year-Olds

These data are available from the National Center for Education Statistics (NCES) for the nation as a whole. In California, data on the numbers of public and private high school graduates are collected annually by the State Department of Education; these can be compared with relevant census data for the state.

e. 1976 Survey of Income and Education--U.S. Department of Education

This survey was developed in order to correct an apparent mistake in counting the number of children living in poverty by the 1970 census. It consisted of a random survey of households and was designed to provide reliable state-by-state estimates of the principal activities of all household members. The results of this survey are considered the most reliable estimate of school attendance rates; unfortunately, it was a one-time only activity, so data are available only for 1976.

2. In-School Performance

There is no single source of information on the grades high school students receive over time. Instead, data from the following studies can be combined to provide a general picture of student in-class performance.

a. NCES National Longitudinal Studies--1972 and 1980

The NCES national longitudinal studies of the high school senior classes of 1972 and 1980 include student-reported data on high school grades. Separate

information on California respondents is available for the 1980 survey only. (See pages A-11 and A-12, below, for a fuller description of the surveys.)

b. Scholastic Aptitude Test (SAT)/American College Testing Program (ACT): Student Descriptive Questionnaires

Students who take either the SAT or the ACT (see Appendix B for more information) are asked to provide information on their personal characteristics, high school experiences, and postsecondary plans to the testing services. Both firms generate annual reports summarizing the overall grade-point averages and grade averages in designated subject areas for students taking their tests.

c. California Postsecondary Education Commission (CPEC) Eligibility Survey

The CPEC periodically assesses the rates at which California high school graduates attain eligibility to enter the University of California (UC) and the California State University (CSU). If the study turns up any discrepancies between current admission requirements and the "State Master Plan" guideline that UC draw from the upper eighth of high school graduates and CSU from the upper one-third, these institutions are expected to recalibrate their admissions criteria.

Such an eligibility study was performed in 1967: A random sample of transcripts from high school graduates was evaluated by university personnel as if they had been submitted by applicants. The following year, admissions standards in the two institutions were modified to conform

with the Master Plan. A second study, this time combined with an extensive survey effort to obtain information on the high school and post-high school activities of 1975 high school graduates, was conducted during 1976-77 using the class of 1975. Some 10,000 high school transcripts were evaluated for this study. Based on the findings, UC and CSU admissions standards were modified in 1978. Both studies provide some measure of high school grading practices over time.

d. Postsecondary Information Systems

Virtually all four-year colleges and some two-year institutions keep records of the high school grade averages of their entering students. These are generally not directly comparable over time due to occasional changes in admissions requirements, but do provide some indications of trends. Unfortunately, systemwide data are not always available. Further, due to differences in the way grade averages are computed (e.g., overall, overall-academic, "A-F" grade point average), interinstitutional comparisons or figures combining, for example, all four-year colleges are impossible.

3. Postsecondary Participation Rates

a. California College-Going Rates and Community College Transfers

College-going rates are calculated annually by the CPEC by comparing the number of high school graduates during a given academic year with the number of "first-time" freshmen entering postsecondary education the following fall. These provide a measure both of changes in college-going rates over

time and of changing institutional preferences. This method does not, of course, take delayed attendance patterns into account, nor does it deal with students who attend out-of-state institutions, or with the overestimation problem posed by students who drop out early in the first year. Further, at the community college level no distinctions are made between students enrolled in a full transfer-oriented curriculum and those enrolled in one art practice course. Also, since one does not need to be a high school graduate to enroll in a community college, some non-graduates are included in college enrollment figures (California Postsecondary Education Commission, 1981).

b. Beyond High School Graduation: Who Goes to College?

In this followup survey of the 1975 graduates whose transcripts were evaluated in the CPEC eligibility study (see above), respondents were asked to provide information on college attendance during the 2-1/2 years following high school graduation. Because of an extremely high response rate from high achievers and a low response rate from low achievers, even the weighted estimates from this report may overestimate attendance rates. Also, like the CPEC data, students who took only a minimal number of units at a community college are included in the "college-going" populations. The information is useful, though, in that it doesn't include only those students who went directly on to college and also because it includes data on students opting to attend vocational schools and out-of-state colleges.

c. NCES National Longitudinal Studies

The NCES National Longitudinal Study of the Class of 1972 has periodically quizzed its participants about their postsecondary educational activities. Data are available on the full national sample. The sample for the newer 1980 study, in which California students are identified separately, has yet to be surveyed regarding actual college attendance patterns. The original survey did, however, include information on college plans (see Appendix B).

4. Performance in Postsecondary Education

In general, available data on postsecondary performance only include grades received during the first year. These data are not available for either the state or the nation as a whole.

a. Postsecondary Scholarship/Performance Reports

The University of California has kept centralized information on the first year grades of new freshmen for many years. These are available for each school sending graduates to the University and for the state as a whole, and are sent to principals and superintendents annually. The University also calculates a "grade point differential" that compares the high school grade average in the so-called "A-F subjects" with the first year grade average at the University. The California State University system has just completed its first centralized student performance report this year. It contains information similar to that provided by UC, and is expected to be generated annually.

5. Youth Employment

a. United States Department of Labor Data

The United States Department of Labor produces statistical information on employment rates by age and educational level. These are available for the nation and for California.

b. California Employment Development Department (EDD) Data

The state EDD generates special analyses of California employment data. In 1980, a study of youth employment was completed. In-depth studies of trends in high technology and other specialized fields have also been generated.

B. ACADEMIC SKILLS

1. International Association for the Evaluation of Educational Achievement (IEA)

The IEA studies, which include an assessment of mathematics achievement during the mid-sixties; and an assessment of science, reading comprehension, literature, civic education, French as a foreign language, and English as a foreign language during the early seventies; represent the only comprehensive source of multinational student achievement information. The tests were developed by international subject matter committees, pretested in at least 4 countries, and administered to sample populations in 22 countries. Participating countries generally tested 3 specific student populations (full-time students age 10-10.11, full-time students age 14-14.11, full-time students in the final year of secondary education) and a fourth population of their own

choosing. The United States tested a stratified sample of approximately 3,000 students per age group in each subject area; the results were extensively weighted due to significant differences between designed and achieved samples (Wolf, 1977).

International comparisons of student achievement, particularly those dealing with the final year of secondary education, are fraught with a number of problems. First, there are apparently significant differences among countries in the amount of guessing on tests of this sort. The IEA researchers dealt with this problem by employing a formula to correct for guessing. Second, due to differing ages for the start of formal education and different curricular structures, students of similar ages do not necessarily have similar quantities of schooling. IEA results have not been adjusted for these differences.

Finally, because schooling is in no case compulsory during the final year of secondary education, the results for these populations must be interpreted with care. The United States, for example, retained some 75 percent of the age group in the twelfth grade during the testing period; the equivalent program in England enrolled some 20 percent of the age group, in France 29 percent, in Germany 9 percent, and in Sweden 45 percent. In order to produce results for more nearly comparable populations, IEA researchers (see, for example, Husen, 1979; Wolf, 1977) have isolated data on the relative performance of the top 9 percent of the student population (and, in some cases, of the top 4 percent and 1 percent as well). The 9 percent figure was selected

because Germany, the participating country with the least number of young people in its final year of secondary education, had a 9 percent "holding power." While selection factors undoubtedly still have some influence here, these data are more useful for most purposes than the gross numbers.

2. The National Assessment of Educational Progress (NAEP)

NAEP is a federally-funded program--operated under the aegis of the Education Commission of the States--to assess and report on national trends in student achievement. Governed by an independent Assessment Policy Committee, and drawing heavily on the knowledge and skills of professional educators, NAEP (1) identifies educational objectives generally accepted by schools, scholars, and citizens; (2) develops questions or "exercises" to measure the extent to which these objectives are being achieved; and (3) administers the exercises to people selected through stratified probability sampling procedures. The assessments normally focus on 9-, 13- and 17-year-olds, although other populations are tested on occasion.

Each assessment, which covers one or two learning areas, includes 60,000-90,000 test takers, although not all complete the same test booklets. NAEP is required by law to test performance in reading, mathematics, and writing every five years. Periodic testing has also been conducted in science, social studies/citizenship, literature, music, art, and career/occupational development. Test information on special

areas like consumer skills and health knowledge is also reported. Assessment information is available as follows:

Writing:	1969-70; 1973-74; 1978-79
Mathematics:	1972-73; 1977-78
Science:	1969-70; 1972-73; 1976-77
Social Studies:	1971-72; 1975-76
Citizenship:	1969-70; 1975-76
Reading:	1970-71; 1974-75; 1979-80
Music:	1971-72; 1978-79
Art:	1974-75; 1978-79
Special Reports:	
- Political Knowledge & Attitudes:	1969-76
- Health Awareness:	1977
- Consumer Skills:	1978
- Adult Work Skills:	1978

Separate data are available for various regions of the country, but not for states. Data are also arrayed in ethnic groupings, by socioeconomic characteristics, and for a number of other student characteristics. Reports are particularly useful in providing samples of the types of information or skills most young people possess. They are also helpful in distinguishing between "rudimentary" and advanced or complex skills within each subject area.

3. NCES National Longitudinal Studies of High School Seniors

a. The National Longitudinal Study of the High School Class of 1972

This is an ongoing project of the National Center for Education Statistics to monitor the educational, vocational, and personal development of 1972 high school seniors across the nation. The initial study asked some 19,000 students to complete a questionnaire about their experiences during high school and their plans for the future, and to take a

69-minute test battery (16,683 complied). Additional information was collected from school administrators. In 1973-74 NCES conducted the first followup survey of participants in the initial study (15,635 of the originals took part, as well as some 5,715 others, some of whom were added to the sample). A second followup survey was administered in 1974-75, a third in 1976-77, and a fourth in 1979-80. Each of these focused on post-school activities, especially those related to college and work.

Data from the original study and from the followup surveys are available for general use and have served as a basis for considerable research. As of 1981, some 320 reports using this data had been identified by NCES (Taylor, et al., 1981). Although Californians can be identified in the full population, concerns about the representativeness of the state sample have precluded analysis of the data on this basis.

b. <u>High School and Beyond (HS & B): A National Longitudinal Study for the 1980s</u>

HS & B is the second in a program of longitudinal studies under the sponsorship of NCES. The study design seeks to collect essentially the same type of data as were collected by the first study, with two exceptions. First, HS & B addresses elements of the educational process not covered in the first study, including parents' aspirations for their children and teacher assessments of participating students. Second, in an effort to "permit an estimation of

learning and of school effects in the last two years of high school," high school sophomores were added to the sample and will be retested and surveyed in 1982 (NCES, 1981).

HS & B data are available for participating students from California. Some 2,400 California high school seniors in 102 public high schools participated in the base year study (along with teachers and administrative personnel). This sample was subjected to careful scrutiny by the California State Department of Education and was determined to be reasonably representative.

The cognitive test results are the most useful for establishing academic skill levels. The test used in HS & B for the 28,000-member senior cohort was kept "essentially the same as the 1972 senior battery" (Heyns and Hilton, 1982), but was shortened somewhat to make way for additional items. The test for the 30,000-member sophomore cohort was designed to be more sensitive to cognitive growth, particularly when addressing material likely to be covered in school rather than general ability measures. Both test batteries are really a collection of subtests, each included for a different purpose (Heyns and Hilton, 1982). The reliability and validity of the test data appear adequate for general purposes.

As of this time only preliminary analyses comparing the results of the reading and vocabulary tests in 1972 and 1980 are available from NCES. It is anticipated that these will

be published within the year. No comparison of performance in mathematics is yet available.

4. Commonly used student achievement tests, including the Iowa Tests of Educational Development (ITED), the Test of Academic Progress (TAP), the Sequential Tests of Educational Progress (STEP), and the Comprehensive Tests of Basic Skills (CTBS)

Several studies are available tracing student scores on various administrations of the above tests (see Cleary and McCandless, 1976; Harnischferger and Wiley, 1975; Borkow, 1982). Additional information is available from the publishers of the tests.

5. College Aptitude Tests, Including the Scholastic Aptitude Test (SAT), the American College Test (ACT), and The College Board's Achievement Tests

a. The Scholastic Aptitude Test

The SAT was designed during the 1920s to assist colleges in evaluating the extent to which their applicants for admission were prepared to undertake college-level work. Scores on the exam are generally used to supplement high school grades and other admissions criteria employed by selective institutions in choosing their freshman classes. As a general rule, high school grades are considered to be the best predictor of college performance, but the addition of SAT scores to grade-based admissions criteria ordinarily improves their predictive value.

Nearly one million high school seniors take the SAT each year. The test takers represent approximately one-quarter of their age group, and nearly one-third of the high school

graduate population. About half of the students bound for college take the SAT, with students anticipating entering a four-year institution disproportionately represented.

The SAT includes both Verbal and Mathematics sections, each of which is scored on a scale from 200 to 800. According to a recent report, the Mathematics section of the test "requires as background mathematics typically taught in grades one through nine." However, the test is believed to measure reasoning and problem-solving abilities rather than formal knowledge (The College Board, 1981). The Verbal section is designed to assess reading skills and understanding of word relationships. Four areas are covered: antonyms, analogies, sentence completion, and reading comprehension. Results in these areas are combined to produce verbal subscores in reading and vocabulary. Since 1975, a Test of Standard Written English (TSWE) has also been included as a part of the SAT battery.

It is important to note that the SAT does not measure the general effectiveness of secondary schools, nor does it measure the achievement of secondary school students. Rather, scores reflect the preparation of many college-bound students to perform college-level work. Test items are formulated to predict academic grades in college, particularly those acquired during the freshman year (Wirtz, 1977).

Between 1975 and 1977, the SAT was subjected to careful scrutiny by a blue-ribbon panel appointed to examine declining scores. The panel concluded that the declines could not be explained by changes in the test over the years or in the methods of scoring. On the contrary, the members concluded that the "ETS [Educational Testing Service] procedures for 'equating' successive editions of the test. . .and for checking against 'item obsolescence' are as sophisticated and reliable as the state of the psychometric art permits." They also found that, if anything, score scaling may have drifted upward over the past years by 8 to 12 points. Thus, recorded declines may actually understate the decrease in college aptitude (Wirtz, 1977). In addition to test score data, The College Board reports also include extensive information from the Student Descriptive Questionnaires completed by test takers. This information is available for the nation as a whole and for each state separately. See Appendix B for an analysis of test scores over time and for information on the test-taking populations. A significantly larger fraction of the California graduacing class takes the SAT than do so in many other states, so scores must be interpreted accordingly.

b. The American College Testing Program (ACT)

Although not as widely used as SAT, the ACT battery is also used by many colleges to assess the ability of their applicants to perform college-level work. Some 70,000-85,000 students have taken the ACT during each of the past seven

years (American College Testing Program, 1980-1981). The ACT includes four sections, each of which is scored separately from 1 to 36 points. These sections are: English, Mathematics, Social Studies, and Natural Science. Composite scores are also presented.

Because the ACT test-taking population is not geographically balanced (states in the Northeast and mid-Atlantic regions, usually among the highest scoring, are underrepresented), national norms for the test may be skewed (American College Testing Program, 1980-1981). Otherwise, there is a fairly high correlation between scores on the ACT and scores on the SAT: Both are designed not as indices of intelligence or achievement, but rather of preparedness to perform college-level academic tasks.

c. The College Board Achievement Tests.

The College Board offers 14 one-hour achievement tests in specific subject areas, including Mathematics I and II, English Composition, American History, European History, Latin, Hebrew, Russian, French, German, Spanish, Biology, Physics and Chemistry. Some colleges and universities require applicants to submit scores from one or more achievement tests (typically three). These may be selected by the student; however, many colleges require applicants to take the English Composition test, for it is often used for placement in writing courses. Other institutions require no achievement tests, limiting their use of test scores to the SAT.

Students who take the achievement tests are generally of above-average ability. Some 175,000 high school seniors took the English Composition test and the Mathematics Level I exam last year; considerably smaller numbers take the remaining tests. Use of the achievement tests has declined during the past 10 years (Wirtz, 1977).

The achievement tests are generally considered to test higher level skills than the college aptitude tests. The tests are put together by committees and experts normally drawn from the teaching profession in each field.

The special panel that investigated SAT declines in 1975-77 found, but did not resolve, an interesting conflict between SAT and achievement test scores in certain fields. Specifically, it found that while national scores on the English, French, Spanish, Biology, Chemistry, and Physics tests increased between 1967 and 1976, the SAT-Verbal score average for the students taking these tests declined. The panel speculated about various causes, including differing levels of "relevance" between the two sets of examinations.

Score reports are available for each achievement test, on the national and state populations separately. However, as is probed in greater detail in Appendix B, the proportion of the graduating populations taking the tests differs greatly, so scores are not easily comparable.

6. The California Assessment Program (CAP)

The California Assessment Program is the only source of information on the academic achievement of the general student population within the California public schools. It annually tests all third, sixth, and twelfth grade public school students in reading, written language, and mathematics; students in grades six and twelve are also tested in spelling.

In the earliest years of the assessment program (it dates back to 1961), districts were required to test students in grades 5, 8, and 11 but were allowed to choose from a list of commercially available tests. Then, in 1965, the program was changed to require that a single standardized test be administered to students in grades 1, 2, 3, 6, and 10; due to dissatisfaction, the tests were changed in 1969. In 1972, the state moved to design its own tests, and administered them beginning in 1975.

Although the results of the California exam, called the Survey of Basic Skills (SBS), are "equated" with norms or tests published elsewhere via a complex process, this frequent changing of tests makes tracing student performance difficult for any period other than 1975 to the present. Some gross comparisons of student performance in California and nationally are, however, possible for individual years. These are ordinarily included in the California State Department of Education's annual report on "Student Achievement in California Schools."

The Grade 12 SBS uses matrix sampling, a process by which a lengthy test is developed (in this case over 1,000 questions) and items are divided among 10 to 12 alternate forms of the test booklet. These booklets are then administered to different students within a class and the results aggregated at the school and district levels. The results are considered accurate at these levels, but individual pupil achievement scores are not, of course, available.

The SBS does not attempt to measure highly complex or advanced skills. For example, the SBS Grade 12 measures what are considered to be eighth grade level skills. In addition to the four general areas noted above, scores are also available for a number of specific skills. For example, results are available for reading in general, vocabulary, comprehension (literal and interpretive/critical), and study-locational skills. Similarly, writing scores are broken down into scores for word forms, language choices, sentence recognition, sentence manipulation, paragraphs, capitalization/punctuation, and spelling. Annual results are reviewed and reported on by subject-matter assessment advisory committees.

7. Proficiency Examinations for High School Graduation

California's 1978 pupil proficiency law requires each local school district to adopt skill standards in reading, writing, and computation and to periodically assess student progress in meeting those standards. Students not making sufficient progress toward meeting the district's standards are provided with extra

assistance; those who do not meet district standards by the conclusion of grade twelve are not allowed to graduate (California State Department of Education, 1980).

Each district may develop its own standards and examination, and therefore the tests are not comparable.

8. California High School Proficiency Examination (CHSPE)

Since the mid-seventies, California students have had the option to "test out" of the last part of high school by achieving a specified score on the CHSPE. Since the number of students taking this exam is small and has not changed significantly (nor has the pass-fail rate), the exam is not likely to have any major impact on achievement test scores.

C. WORK SKILLS/INFORMATION

1. Organisation for Economic Cooperation and Development (OECD)

The OECD was established in 1960 to promote economic growth and increases in the standard of living within member countries. At present, the OECD has 24 member countries, including the United States.

In recent years, the OECD has focused a good deal of its attention on education and employment policies. The "youth problem" (high unemployment) has been of particular interest. The various reports of the OECD include considerable information on the presence of young people in the labor market over time, vocational training, and employment status by educational attainment (Organisation for Economic Cooperation and

Development, 1977). Some of the data are drawn from special studies; other pieces are compiled using official national data sources.

2. National Assessment of Educational Progress (NAEP)

In addition to its assessments of academic skills (see Section B above), NAEP has evaluated the work-related skills of 17-year-olds and young adults across the nation. The 1973-74 review of "career and occupational development" included measurement in three major areas: command of basic skills, knowledge about jobs, and career decision-making skills and knowledge.

As with most NAEP undertakings, the objectives for the examination of vocation-related skills were developed by a wide-ranging group of educators and citizens. The data provide a highly specific picture of the work-related skills of young Americans. Unfortunately, there are no comparative data, for a repeat test has not been administered. Further, this examination was administered before career education programs had been integrated into large numbers of school curricula, which brings their accuracy in describing today's students into question.

3. The NCES Longitudinal Studies of High School Seniors

a. The National Longitudinal Study of the Class of 1972

As described above, NCES has now completed four followup surveys of the nearly 20,000 1972 high school graduates included in its National Longitudinal Study. Followup data

are, therefore, rich in job-related information, particularly as related to high school achievement and educational attainment.

Approximately 30 of the 320 reports using this data base focused on work-related issues, including efforts to identify and examine employment rates, employment levels, and wage differentials. One study looked at the early labor force experience of non-college bound graduates, examining the relationships between high school and job experience (Griffen, Kallenberg and Alexander, 1981). Another study analyzed the relationship between the employment activities of the graduates and their academic preparation, vocational training, and pre-graduation work experience (Parnes and Kohen, 1976).

b. High School and Beyond (HS & B): A National Longitudinal Study for the 1980s

Using results from the initial survey and test, it is possible to compare the classes of 1972 and 1980 in some work-related respects. These include pre-graduation work experience, enrollment in classes oriented toward work skills and information, employment aspirations, and several other indicators.

4. Armed Forces Data: Armed Services Vocational Aptitude Battery (ASVAB) and Armed Forces Qualification Test (AFQT)

Each year, the Department of Defense administers the ASVAB to young people throughout the United States. Many high school seniors take this exam during the final year of school, far more

than the number of students actually enlisting. The test is administered to all enlistees except officer candidates.

The ASVAB is used by the military services to determine eligibility for enlistment and qualification for assignment to specific military jobs. Four ASVAB subtests are combined to form the (AFQT), which is considered by the Department of Defense to be a general measure of trainability and the primary criterion of enlistment eligibility (Secretary of Defense, 1982).

Until recently, the ASVAB was referenced statistically to the extensive testing of adult males that took place during World War II. In 1979, however, a decision was made to renorm the exam by testing the vocational aptitudes of a representative sample of American youth. Thus, with the assistance from the National Opinion Research Center, the ASVAB was administered to some 12,000 young people already under study in the National Longitudinal Study of Youth Labor Force Behavior (see below). The results of this testing, together with historical data on the test scores of military "accessions," have been made available recently (Secretary of Defense, 1982).

The quality of the ASVAB as a device to measure vocational aptitudes of a national sample of young people was examined in 1981 by R.D. Bock of the University of Chicago, under contract with the Department of Defense. Bock concluded that the data from student responses were "free from major defects" and provided a "sound basis for the estimation of population

attributes." Bock concluded, also, that the quality of the ASVAB equals or surpasses that of commercial aptitude and achievement tests available elsewhere (Secretary of Defense, 1982).

Results of the ASVAB administrations in California (both for enlistees and for the broader high school senior population taking the exam) are available from the Department of Defense. Both aggregate and specific skill scores are included. For this report, California and national scores have been compared.

5. National Longitudinal Study of Youth Labor Force Behavior (NLS-Labor)

The NLS-Labor monitors the employment experiences of American young people. In the 1966 study, some 5,000 civilians were included in the sample. In 1979, the sample was expanded to incorporate some 13,000 young people, including members of the armed services. National and state data are available, but the state sample is not designed to be representative, so results are of only limited use.

6. Vocational Education Data System (VEDS)

Section 112(6)(1)(B) of the Vocational Education Amendments (VEA) of 1976 requires that states evaluate all programs within their territorial limits that "purport to impart entry-level job skills." These programs are to be evaluated based on the extent to which their "completers and leavers" obtain employment in fields related to their training and are considered by their employers to be well-trained and prepared for employment. Data

collected for this evaluation are to be reported to VEDS, using guidelines on sampling, data collection, and reporting set forth by VEDS (California State Department of Education, 1981).

The state counterpart to VEDS is the Follow-up of Students and Employers (FUSE). FUSE collects followup data on students who graduate from or otherwise leave secondary or postsecondary level vocational education programs. These data are collected in compliance with the Vocational Education Amendments of 1976 and are submitted as the state report to VEDS.

Data for California include gross employment and unemployment statistics for program completers during 1971-72 through 1978-79. These are arrayed by the level of the education program (secondary or postsecondary) and by the general field in which the training occurred. These data were supplemented in 1979-80 with similar information for program "leavers" in 1979-80; salary information was also added. In 1980-81, FUSE added the employer followup component; thus, information is available on how employers evaluate the trainees in five areas.

Unfortunately, the quality of these data is very poor, and therefore these were not used in this report. Fewer than one-quarter of the students participating in VEA-funded programs participate in the followup studies. Responses from the employer sample (approximately 700 in 1980-81) are interesting, but their representativeness must be questioned.

7. Carnegie Data: Giving Youth a Better Chance

In 1979, the Carnegie Council on Policy Studies in Higher Education released a report on problems with youth employment. Although the Council did not produce new data for this report, it did array existing data (primarily from the Bureau of the Census, U.S. Department of Labor, and U.S. Department of Education) in useful ways. The Council's emphasis on the education-work linkage is important.

8. Monitoring the Future

Each year since 1975, a large national sample of high school seniors has completed an extensive questionnaire developed by the Survey Research Center at the University of Michigan. Although this survey focuses to a great extent on drug and alcohol use and other aspects of student lifestyles, it contains some information related to work.

Included in some of the annual surveys are questions about pre-graduation work experience, student perceptions of the world of work, and student comments on their perceptions of work preparedness.

D. OTHER INTELLECTUAL AND LIFE SKILLS

1. International Association for the Evaluation of Educational Achievement (IEA)

The IEA testing during the early seventies included a citizenship component. Available data contrast American students with students in other countries on such matters as acceptance of democratic ideals, nationalism, and civic participation.

2. National Assessment of Educational Progress (NAEP)

Unlike most other testing organizations, NAEP has not limited either its assessments or its objectives to basic academic or vocational skill areas. In recent years, NAEP has conducted assessments in citizenship, social studies, art, music, knowledge of energy, health awareness, and consumer skills and knowledge. These are available for the nation as a whole and for four regions.

APPENDIX B

A COMPARISON OF CALIFORNIA AND NATIONAL SCHOLASTIC APTITUDE TEST DATA

APPENDIX B

A COMPARISON OF CALIFORNIA AND NATIONAL SCHOLASTIC APTITUDE TEST DATA

To understand score report information from The College Board (or any other testing organization) it is important to know something about the test taking population, including information about changes in the number or composition of test takers over time. Major differences between state and national test populations can also assist interpretations of United States-California comparisons.

A Description of National Results and Test Taking Trends

The SAT

Over the past decade, approximately one million high school seniors have taken the SAT each year. The test takers represent roughly one-third of the high school graduating class and approximately one-half of the college-bound graduates. In general, students who take the SAT are more academically able than all high school seniors (The College Board, 1981).

Mean score information for United States high school seniors between 1967 and 1981 is shown in Table B-1. As is evident from these data, verbal scores declined steadily between 1968 and 1980, for a total decline of some 42 points. Mathematics scores declined a total of 27 points, from a high of 493 in 1969 to 466 in 1980.

During the early seventies, the test-taking population decreased somewhat--both in sheer numbers and as a fraction of the high school graduating class. As is clear in Table B-2, the 1,022,820 test takers in

TABLE B-1

SAT SCORE AVERAGES FOR COLLEGE-BOUND SENIORS

National, 1967-1982[1]

YEAR	VERBAL			MATHEMATICS		
	Male	Female	Total	Male	Female	Total
1967	463	468	466	514	467	492
1968	464	466	466	512	470	492
1969	459	466	463	513	470	493
1970	459	461	460	509	465	488
1971	454	457	455	507	466	488
1972	454	452	453	505	461	484
1973	446	443	445	502	460	481
1974	447	442	444	501	459	480
1975	437	431	434	495	449	472
1976	433	430	431	497	446	472
1977	431	427	429	497	445	470
1978	433	425	429	494	444	468
1979	431	423	427	493	443	467
1980	428	420	424	491	443	466
1981	430	418	424	492	443	466
1982	N/A	N/A	426	N/A	N/A	467

[1]The averages for 1967 through 1971 are estimates of the averages that would have been reported for college-bound seniors of those years if such reports had been produced.

TABLE B-2

SAT TAKERS AS A PERCENTAGE OF HIGH SCHOOL GRADUATES

National, 1972-1980

YEAR	NUMBER OF TEST TAKERS	PERCENT OF GRADUATING CLASS
1972	1,022,820	34.0
1973	1,014,862	-
1974	985,247	32.0
1975	996,452	-
1976	999,829	31.7
1977	979,467	-
1978	989,307	31.6
1979	991,765	31.6
1980	991,514	-
1981	994,333	-

1972 represented 34 percent of that year's graduating class. Setween 1974 and 1980, however, the test taking population stabilized at 31.5-32.0 percent of each year's graduates.

The ratio of male to female test takers has changed markedly over the past decade. The number of men taking the SAT has declined from 523,758 in 1972 to 478,625 in 1981. At the same time, the number of women taking the test climbed from 492,598 in 1973-74 to 515,708 in 1981. In 1972, women comprised 48.8 percent of the SAT takers; by 1981, they represented 51.9 percent of the test takers. Table B-3 provides male/female breakdowns of SAT takers.

Throughout the seventies men scored higher than women on both the verbal and quantitative sections of the SAT. In 1972, women averaged 452 on the verbal examination and 461 on the quantitative examination. By comparison, men averaged 2 points higher (454) on the verbal and 44 points higher (505) on the quantitative. In 1981, the gap was lengthened to 12 points on the verbal test and 49 points on the quantitative test. Table B-4 provides relevant data.

The number of minority test takers has also increased during the seventies. In 1975, some 14 percent of the test takers identified themselves as other than white. By 1981 that percentage had increased to 18.1 percent. Table B-5 provides racial and ethnic information on SAT takers from 1975 to 1981.

The College Board has recently released SAT score data for students of different ethnic groups. As is clear in Table B-6, non-Asian minority students scored well below the average mark of white students.

TABLE B-3

SAT TAKERS, BY SEX

National

YEAR	MALE TEST TAKERS	FEMALE TEST TAKERS	PERCENT FEMALE
1972	523,758	499,062	48.8
1973	515,932	498,930	49.2
1974	492,649	492,598	50.0
1975	496,876	499,576	50.1
1976	494,638	505,191	50.5
1977	479,116	500,351	51.1
1978	478,856	510,451	51.6
1979	479,319	512,446	51.7
1980	478,443	513,071	51.7
1981	478,625	515,708	51.8

TABLE B-4

SAT MEANS, BY SEX

National, 1972-1981

YEAR	MALES					FEMALES				
	VERBAL			MATH		VERBAL			MATH	
	Mean	Std.Dev.	NUMBER	Mean	Std.Dev.	Mean	Std.Dev.	NUMBER	Mean	Std.Dev.
1971-72	454	112	523,758	505	118	452	110	499,062	461	108
1972-73	446	112	515,927	502	117	443	107	498,926	460	106
1973-74	447	111	492,598	501	119	442	108	492,591	459	108
1974-75	437	111	496,860	495	119	431	108	499,568	449	107
1975-76	433	111	494,626	497	123	430	110	505,183	446	111
1976-77	431	110	479,070	497	121	427	110	500,326	445	110
1977-78	433	110	478,791	494	121	425	110	510,394	444	110
1978-79	431	111	479,224	493	121	423	110	512,393	443	109
1979-80	428	110	478,284	491	120	420	110	512,961	443	109
1980-81	430	110	478,301	492	119	418	110	515,598	443	109

[1]This column presents the number of students taking the SAT-Verbal; the number of students taking the SAT-Math was approximately the same.

TABLE B-5

SAT TAKERS, BY RACE

National, 1975-1981

YEAR	BLACKS		MEXICAN-AMERICAN		ORIENTAL		TOTAL[1] NON-WHITE
	Number	Percent	Number	Percent	Number	Percent	
1975	64,938	7.9	11,407	1.4	16,535	2.0	14.0
1976	64,755	8.2	12,221	1.5	17,274	2.2	15.0
1977	71,721	8.8	13,618	1.7	19,475	2.4	16.1
1978	80,054	9.0	15,426	1.7	23,152	2.6	17.0
1979	81,566	8.9	14,796	1.6	25,158	2.8	17.1
1980	83,321	9.1	15,488	1.7	28,889	3.2	17.9
1981	82,162	9.0	15,765	1.7	31,329	3.4	18.1

[1]Includes, Puerto Ricans, American Indians and "Other."

TABLE B-6

SAT SCORES, BY RACE

National, 1982

RACE	VERBAL	QUANTITATIVE
American Indians	391	425
Asian Americans	397	513
Mainland Puerto Ricans	361	396
Mexican Americans	373	415
Blacks	332	362
Whites	442	483
National Average	424	466

The Achievement Tests

Although scores on the two College Board achievement tests taken by the greatest number of students--English Composition and Mathematics Level I--have fluctuated over the past decade, average scores have remained essentially level. Unlike the broader SAT tests, there is no clear downward trend except in the number of test takers, which have dropped dramatically. In 1972, more than 313,000 students took the English Composition test; by 1981, the number had fallen to 182,939. Similarly, there were 240,089 Math I test takers in 1972, but only 145,851 in 1981. The score data reported in Tables B-7 and B-8 should, therefore, be interpreted in light of the declining test population--a trend which normally has had a clear upward effect on mean test scores.

The SAT

Like national test scores, the mean SAT scores of California students declined significantly during the seventies. Scores on the examination of verbal skills declined from 464 in 1971-72 to a low of 424 in 1979-80, representing a drop of 40 points. Scores on the examination of quantitative skills declined from 493 in 1971-72 to a low of 472 in 1979-80, representing a drop of 21 points. Mean score information for each of the past 10 years is provided in Table B-9.

During the seventies, there were fluctuations in the number of California students taking the SAT. Between 1972 and 1978 the trend was generally upward, but the test-taking population dropped off subsequently. In general, the test populations represented a steadily

TABLE B-7

ENGLISH COMPOSITION TEST DATA

National, 1975-1981

YEAR	MEAN SCORE	STD. DEV.	NUMBER OF TEST TAKERS
1972	516	108	313,158
1973	517	107	275,196
1974	517	107	228,300
1975	515	107	211,852
1976	532	111	212,796
1977	516	107	200,539
1978	512	105	195,173
1979	514	106	187,266
1980	518	106	184,714
1981	512	104	182,939

TABLE B-8

MATH I TEST DATA

National, 1975-1981

YEAR	MEAN SCORE	STD. DEV.	NUMBER OF TEST TAKERS
1972	541	102	240,089
1973	537	101	210,734
1974	545	101	172,032
1975	545	102	158,061
1976	546	101	158,327
1977	547	100	149,918
1978	541	99	146,426
1979	537	97	145,572
1980	536	94	146,172
1981	539	96	145,851

TABLE B-9

SAT MEANS

California, 1972-1981

YEAR	VERBAL		NUMBER OF TEST TAKERS	QUANTITATIVE	
	Mean	Std.Dev.		Mean	Std.Dev.
1971-72	464	112	91,619	493	117
1972-73	452	111	95,200	485	115
1973-74	450	110	98,140	484	116
1974-75	435	110	106,782	473	117
1975-76	430	112	108,644	470	119
1976-77	427	112	107,580	470	119
1977-78	427	112	111,514	466	120
1978-79	428	112	102,587	473	118
1979-80	424	111	102,717	472	117
1980-81	426	111	100,121	475	115
1981-82	425	N/A	102,261	474	N/A

increasing fraction of the high school graduate population through 1978, but dropped off somewhat the following year. Table B-10 provides information on the number and proportion of California students taking the SAT.

As was true nationally, the ratio of male to female test takers in California changed during the seventies. In 1972, 49.8 percent of the test takers were female. Female participation subsequently increased to a high of 53 percent in 1978 and 1979, then decreased slightly the following years. See Table B-11 for male/female counts for 1972-1981.

Throughout the seventies, female test takers from California compiled lower scores on both the verbal and quantitative tests than their male counterparts. In 1972, female students averaged 462 on the verbal test, some 4 points lower than the male test takers; by 1981, the average verbal score for a woman had dropped to 419, some 15 points lower than the average male score. Over the 10 year period, the average verbal score for women dropped by 43 points, while the men's mean declined by 32 points. On the quantitative test, women averaged 467 points in 1972, some 51 points lower than men; by 1981, the mean female score had declined to 449, some 54 points lower than men. The total decline over the decade in quantitative skills among women was 21 points, while the men's quantitative mean declined by 18 points. Table B-12 provides relevant data.

The proportion of minority SAT takers in California increased substantially during the seventies. In 1975, some 24.8 percent of the test takers identified themselves as non-white. This figure rose each year, with the 1980 non-white proportion standing at 30.8 percent of all test takers. It is important to note, however, that the bulk of the

TABLE B-10

CALIFORNIA SAT TAKERS

1972-1981

YEAR	NUMBER OF STUDENTS	PERCENT OF GRADUATES
1972	91,619	-
1973	95,200	-
1974	98,140	33.9
1975	106,786	36.3
1976	108,652	37.5
1977	107,586	37.7
1978	111,524	39.3
1979	102,595	36.8
1980	102,723	37.9
1981	100,131	-

TABLE B-11

CALIFORNIA SAT TAKERS, BY SEX

1972-1981

YEAR	NUMBER MALE	NUMBER FEMALE	PERCENT FEMALE
1972	45,965	45,654	49.8
1973	47,129	48,076	50.5
1974	47,225	50,915	51.9
1975	51,514	55,272	51.8
1976	52,248	56,404	51.9
1977	51,294	56,292	52.3
1978	52,361	59,163	53.0
1979	48,266	54,329	53.0
1980	48,505	54,218	52.8
1981	47,393	52,738	52.7

TABLE B-12

SAT MEANS, BY SEX

California, 1972-1981

YEAR	MALES					FEMALES				
	VERBAL			MATH		VERBAL			MATH	
	Mean	Std.Dev.	NUMBER	Mean	Std.Dev.	Mean	Std.Dev.	NUMBER	Mean	Std.Dev.
1971-72	466	112	45,965	518	119	462	111	45,654	467	109
1972-73	456	112	47,129	511	118	448	109	48,076	460	106
1973-74	454	111	225	509	119	446	109	50,915	460	108
1974-75	440	111	51,511	501	120	431	109	55,271	446	107
1975-76	434	113	52,244	500	123	426	111	56,400	443	110
1976-77	431	111	51,289	500	122	424	112	56,291	443	110
1977-78	432	112	52,355	496	123	423	112	59,159	440	110
1978-79	432	113	48,261	502	121	424	111	54,326	447	109
1979-80	429	110	48,502	500	119	420	112	54,215	446	108
1980-81	434	111	47,387	503	117	419	110	52,734	449	108

increase occurred in the "Oriental" category. The number of blacks taking the SAT in 1981 was almost the same as in 1975. Although the number of Chicano test takers increased by over 1,000 since 1975, the number decreased substantially from the high of 8,307 reached in 1978. Table B-13 provides information on the number of minority students taking the SAT each year since 1975; state-specific information on average scores by race has not been published.

The Achievement Tests

There is a clear downward trend in the scores of California students on both the English Composition test and the Mathematics Level I test. On the English Composition test, California students scored an average of 521 in 1976, but declined to 495 by 1981. On the Math I test, the California average declined from 543 in 1976 to 519 in 1981. The number of students taking the English Composition test remained stable over this time period; the number taking the Math I test increased by 25 percent (probably at least in part because the University of California began requiring all applicants to submit Math I scores in 1979). Tables B-14 and B-15 provide California data on the English Composition and Math I achievement tests between 1976 and 1981.

A Comparative Analysis of California and National Scores Test-Taking Trends

In general, California scores on the SAT have followed the same pattern of decline as have national SAT scores. In 1972, the first year for which state data are available, California students scored considerably higher on both the verbal and mathematics tests than did all

TABLE B-13

SAT TAKERS, BY RACE

California, 1975-1981

YEAR	BLACKS		MEXICAN-AMERICAN		ORIENTAL		TOTAL NON-WHITE	
	Number	%	Number	%	Number	%	Number	%
1975	6,347	7.0	6,007	6.6	6,509	7.1	22,621	24.8
1976	6,360	7.2	6,291	7.1	6,825	7.7	23,780	26.9
1977	6,946	7.4	7,167	7.7	7,882	8.4	26,628	28.5
1978	8,230	7.9	8,307	7.9	8,931	8.5	31,116	29.7
1979	7,304	7.5	7,287	7.5	9,382	9.7	29,144	30.0
1980	7,166	7.4	7,262	7.5	10,369	10.7	29,615	30.5
1981	6,458	6.8	7,075	7.5	10,886	11.5	29,066	30.8

TABLE B-14

THE COLLEGE BOARD ENGLISH COMPOSITION TEST SCORES

California, 1976-1981

SCORE	1976 No.	1976 %	1977 No.	1977 %	1978 No.	1978 %	1979 No.	1979 %	1980 No.	1980 %	1981 No.	1981 %
750-800	557	(2)	210	(1)	153	(1)	203	(1)	277	(1)	179	(1)
700-749	1256	(4)	801	(3)	683	(2)	728	(3)	893	(3)	744	(2)
650-699	2424	(8)	2014	(7)	1933	(6)	1891	(7)	1889	(6)	1710	(6)
600-649	3811	(13)	3168	(11)	3029	(10)	2865	(10)	3241	(11)	3002	(10)
550-599	4458	(15)	4449	(15)	4385	(15)	4214	(15)	4122	(14)	3931	(13)
500-549	5009	(17)	4929	(17)	4884	(16)	4957	(17)	5165	(17)	5323	(18)
450-499	4814	(16)	4813	(17)	5152	(17)	4926	(17)	4886	(16)	4948	(16)
400-449	3873	(13)	4136	(14)	4633	(15)	4225	(15)	4186	(14)	4857	(16)
350-399	2276	(8)	2558	(9)	2897	(10)	2576	(9)	2839	(10)	3212	(11)
300-349	1142	(4)	1432	(5)	1588	(5)	1468	(5)	1459	(5)	1656	(5)
250-299	430	(1)	530	(2)	515	(2)	556	(2)	614	(2)	551	(2)
200-249	60	(0)	95	(0)	96	(0)	104	(0)	85	(0)	92	(0)
NUMBER	30,110		29,135		29,948		28,713		29,656		30,205	
MEAN	521		505		498		501		503		495	
STD. DEV.	110		107		105		106		108		105	

SOURCES: The College Board. Admissions Testing Program Reports. New York: 1976;
The College Board. Admissions Testing Program Reports. New York: 1977;
The College Board. Admissions Testing Program Reports. New York: 1978;
The College Board. Admissions Testing Program Reports. New York: 1979;
The College Board. Admissions Testing Program Reports. New York: 1980;
The College Board. Admissions Testing Program Reports. New York: 1981.

TABLE B-15

THE COLLEGE BOARD MATHEMATICS LEVEL I TEST SCORES

California, 1976-1981

SCORE	1976		1977		1978		1979		1980		1981	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
750-800	405	(2)	352	(2)	364	(2)	225	(1)	141	(1)	214	(1)
700-749	952	(5)	900	(5)	705	(3)	667	(3)	643	(3)	660	(3)
650-699	1947	(10)	1692	(9)	1665	(8)	1619	(7)	1473	(6)	1508	(6)
600-649	2991	(15)	2869	(15)	2963	(15)	2758	(12)	3148	(13)	3084	(12)
550-599	3317	(17)	3808	(20)	3892	(19)	4279	(18)	4305	(17)	4346	(17)
500-549	3899	(19)	3468	(18)	3971	(19)	4691	(20)	5004	(20)	4843	(19)
450-499	3096	(15)	3053	(16)	3159	(15)	3911	(17)	4752	(19)	5024	(20)
400-449	2031	(10)	1831	(9)	2036	(10)	3153	(13)	3147	(13)	3215	(13)
350-399	1055	(5)	1067	(5)	1184	(6)	1629	(7)	1517	(6)	1627	(6)
300-349	329	(2)	319	(2)	432	(2)	565	(2)	522	(2)	611	(2)
250-299	26	(0)	62	(0)	44	(0)	106	(0)	57	(0)	67	(0)
200-249	2	(0)	2	(0)	0	(0)	2	(0)	4	(0)	3	(0)
NUMBER	20,050		19,423		20,415		23,605		24,713		25,202	
MEAN	543		541		536		521		520		519	
STD. DEV.	100		99		98		96		91		94	

SOURCES: The College Board. Admissions Testing Program Reports. New York: 1975;
The College Board. Admissions Testing Program Reports. New York: 1977;
The College Board. Admissions Testing Program Reports. New York: 1978;
The College Board. Admissions Testing Program Reports. New York: 1979;
The College Board. Admissions Testing Program Reports. New York: 1980;
The College Board. Admissions Testing Program Reports. New York: 1981.

students nationally. Then, during the following years, California scores dropped further than did all scores nationally, so that the California average was below the national figure between 1976 and 1978. Beginning in 1979, California scores began their recovery, especially in mathematics, while the national average continued to decline. Figure B-1 shows score trends for the two populations.

College Preparation Over Time: SAT Results

The data discussed earlier show that while there has been some recovery from the sharp decline during the early seventies, the performance of the average high school senior from California and from the nation as a whole is lower now than it was ten or more years ago.

National. Since 1974, the number of SAT takers as a proportion of the high school graduating class has remained essentially the same.

There have, however, been some changes in the internal composition of the test taking population during the seventies, principally an increase in the number of women and minorities taking the exam (see Tables B-3 and B-5). Both of these changes would normally have the effect of depressing mean scores for the total test taking population, as students in those categories generally score lower than other students. The compositional changes are not, however, of a magnitude to explain all of the decline (see Wirtz, 1977).[1]

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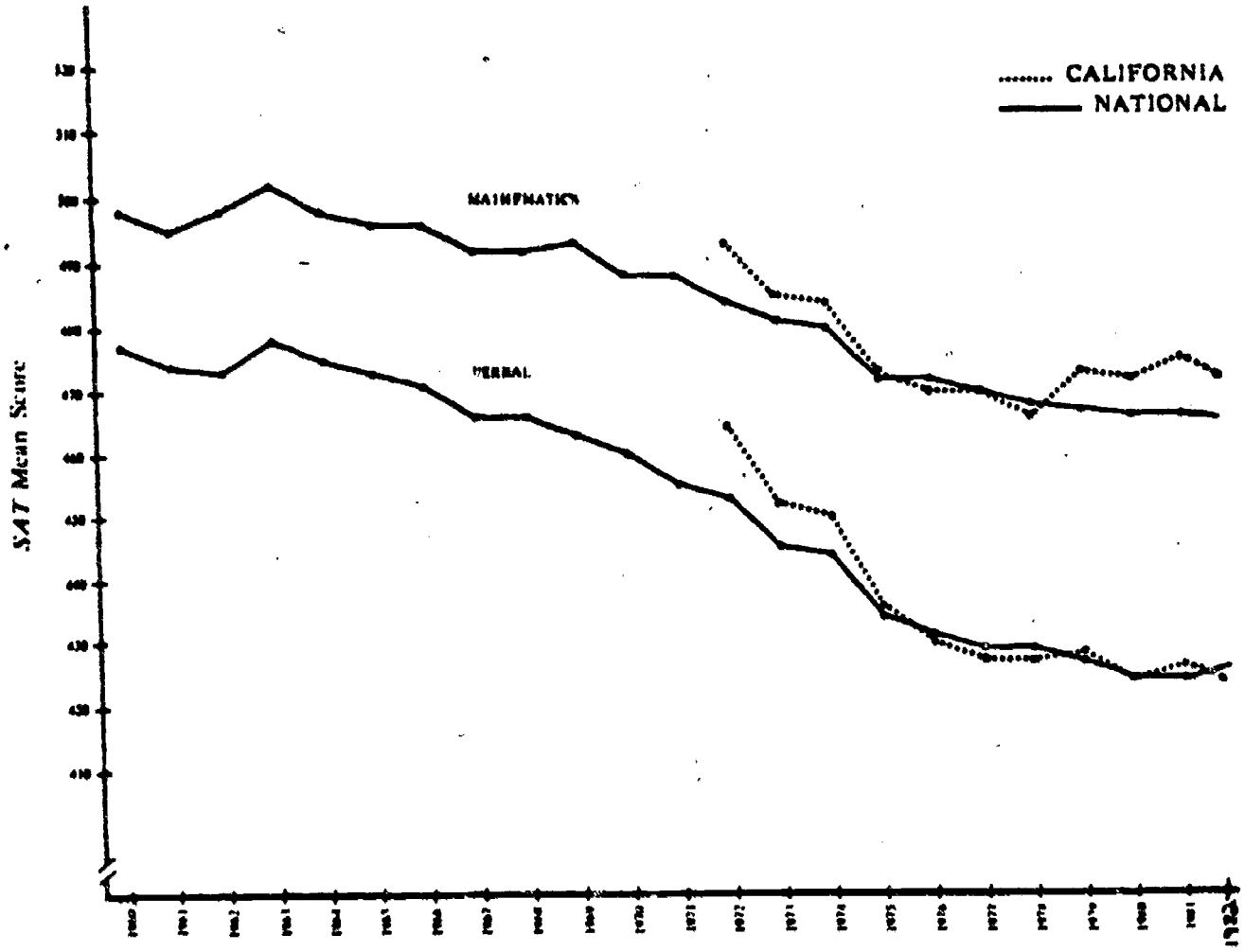
[1]One study completed for the Wirtz Commission suggested an upward trend in the scaling of SAT scores (see Wirtz, 1977). If this is true, it would more than compensate for the compositional effects outlined here.

FIGURE B-1

SAT MEAN SCORES

California and National



SOURCE: California Assessment Program. Student Achievement in California Schools: Annual Report, 1981. Sacramento: State Department of Education, 1981 (1982 information added).

BEST COPY AVAILABLE

California. During the past several years, there have been several changes in institutional policy related to use of the SAT in California. Two of these changes went into effect with the freshman class of 1979; the third began the following year. The first two changes affected students applying for financial assistance from the State Student Aid Commission and those applying to the University of California. The freshman class of 1979 were no longer required to submit SAT scores with their applications and the freshman class of 1980 were allowed to choose either the SAT or the American College Testing Program (ACT). Effective the following year, applicants to the California State University system with cumulative grade point averages of 3.2 or better were no longer required to submit SAT or ACT scores (they had previously been so required since 1965, even though they were automatically admitted on the basis of grade point average irrespective of their test scores).

As a result of these changes and other unknown factors, there have been fluctuations in the number of California test population (see Figure B-2). The drop in participation rates between 1978 and 1979 (from 39.3 percent to 36.8 percent of the graduating class) may explain some portion of the score increase between these two years. Similarly, the big increase in participation rates between 1974 and 1975--a 2,000 student increase in the test-taking population--may explain the score drop there.[1]

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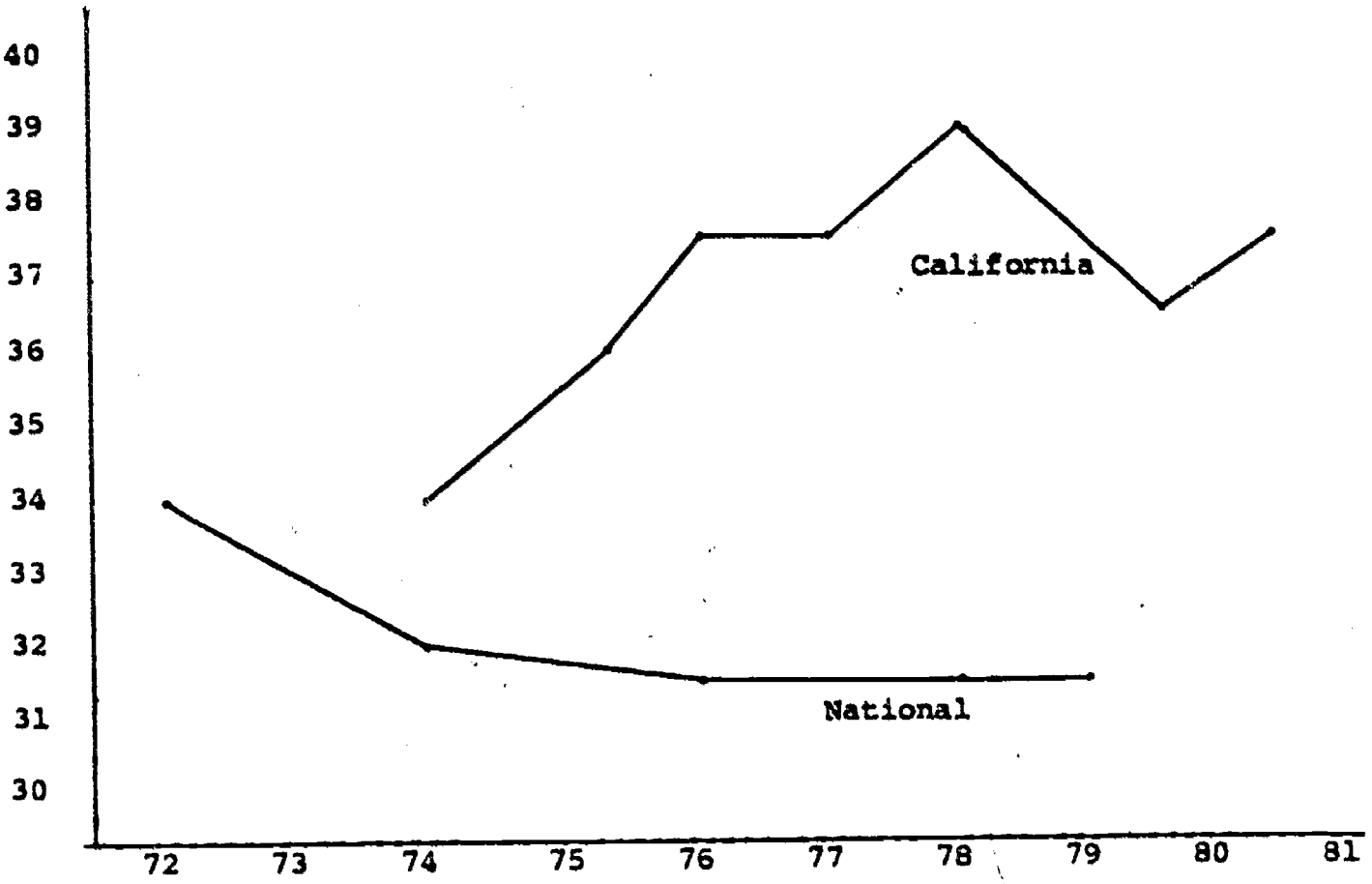
[1]Ordinarily, increases in the number of students taking the SAT are associated with decreasing mean scores. This relationship is believed to be due to increased numbers of marginal students taking the test (see Wirtz, 1977). Although the policy changes in California might have been expected to alter the nature of the association between changes in the test-taking population and mean scores, this is not the case. The self-reported grade point average data suggests a negative correlation between the two in California as well; the test results tend to substantiate this relationship.

FIGURE B-2

PARTICIPANTS IN SAT AS A PERCENTAGE OF HIGH SCHOOL GRADUATES

California and National, 1972-1981



The impact of compositional changes on California test scores is open to some question. As was noted in Tables B-11 and B-13, both women and minorities are represented at higher rates in the current test-taking population than they were in the early seventies. The increase of women would have the effect of depressing test scores, particularly in mathematics, but would by no means explain the full decline (nor, of course, why men's scores slipped too). The effects of the increasing minority population rate are not so clear cut. There were, to be sure, nearly 1,179 more California blacks and Hispanics taking the SAT in 1981 than in 1975, and these students generally average lower than other students. However, there was a far larger increase over this period in the number of students of Asian extraction taking the exam (from 6,509 to 10,886).

In sum, changes in the number and composition of test takers might explain a significant portion of changes in California test scores over the past eight to ten years.

California/National Performance Levels: The SAT

As Table B-16 shows, a substantially larger fraction of California's high school graduates take the SAT than is true nationally. Since an increase in the number of test takers generally means an expansion of the pool to include more lower achieving students (see Wirtz, 1977), this difference would have the effect of deflating California scores in relation to the national average. As was noted earlier, a larger proportion of the California test-taking population is comprised of women than is the case nationally; this would also have the effect of

TABLE B-16

MEAN SAT SCORES, BY STATE

1982

State	Verbal	Math	% of Graduates Taking Test
Alabama	463	501	6
Alaska	446	477	31
Arizona	470	511	11
Arkansas	480	519	4
California	425	474	36
Colorado	468	515	16
Connecticut	432	464	69
Delaware	432	465	42
Florida	426	463	39
Georgia	394	429	51
Hawaii	392	465	47
Idaho	482	513	7
Illinois	462	515	14
Indiana	407	453	48
Iowa	516	572	3
Kansas	500	545	5
Kentucky	475	510	6
Louisiana	470	505	5
Maine	427	463	46
Maryland	425	464	50
Massachusetts	425	463	65
Michigan	459	514	10
Minnesota	485	543	7
Mississippi	479	509	3
Missouri	465	510	10
Montana	487	546	8
Nebraska	493	552	5
Nevada	436	481	18
New Hampshire	443	482	56
New Jersey	416	453	64
New Mexico	480	517	8
New York	429	467	69
N. Carolina	396	431	47
N. Dakota	505	563	3
Ohio	456	502	16
Oklahoma	483	518	5
Oregon	435	473	40
Pennsylvania	424	461	50
Rhode Island	420	457	59
S. Carolina	378	412	48
S. Dakota	522	553	2
Tennessee	480	519	9
Texas	415	453	32
Utah	494	528	4
Vermont	433	471	54
Virginia	426	462	52
Washington	468	514	19
West Virginia	462	506	7
Wisconsin	476	535	10
Wyoming	484	533	5

SOURCE: Oakland Tribune. "State's Kids Fall Back in SAT-Tests." Oakland, CA: September 22, 1982.

depressing California scores in relation to the national norm. Finally, the proportion of non-white test takers in California is significantly higher than the national average. However, the effect of this difference is unclear.

In sum, these data support the conclusion that California's four-year college-bound population is somewhat better prepared for college than college-bound students nationally, and suggests that the skill differences between the two groups are understated by a strict comparison of mean scores. However, in many states, not only does a larger fraction of the high school graduating class take the SAT as compared with California, but the students score higher as well. As is evident in Table B-16, New York and Massachusetts figures are particularly noteworthy.

Preparation in Complex Skills: Achievement Test Results

The College Board's Achievement Tests are generally taken by relatively more able students than those taking only the SAT. Generally speaking, the tests described here (English and Mathematics) are considered to test more advanced skills than is the case in the SAT. Results from these tests, then, should be viewed as commentary on the extent to which our most able college-bound students have mastered the relatively complex skills necessary to successfully pursue academic work in a four-year college or university.

National

The average American student taking the English Composition test and/or the Mathematics Level I test in 1981 scored at approximately the same level as did his or her counterpart in previous years. However, far fewer students opted to take such tests in 1981 than was the case in 1972 (both male and female test populations decreased by approximately 40 percent). This decrease in the number of test takers would normally have increased the mean scores. Since the mean score did not increase, it seems likely that complex skills have fallen off among college-bound students nationally.

California

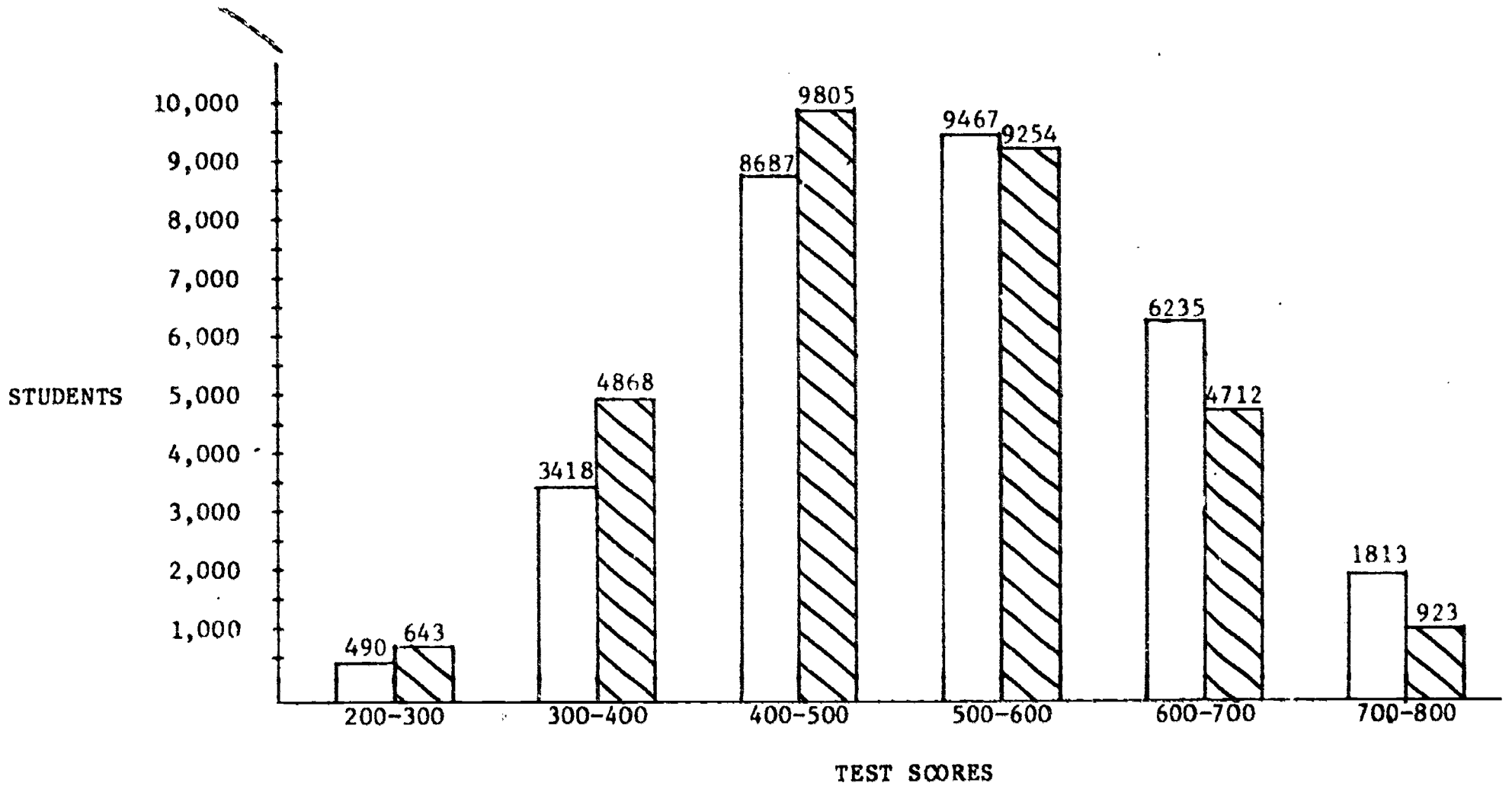
Mean scores for California students have declined since 1976 on both the English Composition and Math I achievement tests. On the English Composition test, the mean score fell from 521 to 495; in Math I, the mean dropped from 543 to 519. The number of students taking the English Composition test remained stable over this period, but those taking the Math I test increased by 25 percent--suggesting that the magnitude of the math decline was probably inflated by the increased test-taking population.

It would appear that the decline in advanced skills has been most pronounced among the most able college-bound students. As is evident in Figure B-3, for example, the number of California students scoring above 700 on the English Composition test declined from 1,813 in 1976 to 923 in 1981--even though the number of test takers remained the same. Similarly, the number of scores between 600 and 700 declined from 6,235 in 1976 to 4,712 in 1981. In Mathematics Level I the number of 700 plus

FIGURE B-3

THE COLLEGE BOARD ENGLISH COMPOSITION TEST SCORES

California Students, 1976 and 1981



	1976	1981
Number of Test Takers:	30,110	30,205
Mean Score:	521	495

scores declined from 1,357 in 1976 to 874 in 1981--even though the number of test takers increased by 25 percent. These comparisons suggest a decrease in high level skills among the most able students.

Achievement Test Results: California/National Comparisons

A comparison of mean score data from the English Composition and Mathematics Level I examinations suggests that able college-bound students in California are less well-prepared in advanced writing and mathematics skills than their counterparts nationally. However, a much larger fraction of the graduating class in California takes these examinations than is the case nationally. Each year, for example, over 10 percent of California high school graduates take the English Composition test; nationally, only approximately 6 percent do so. In Mathematics Level I, the current figure for California is approximately 9.3 percent; nationally, only 4.6 percent of high school graduates take this test. These differences in test taking populations reduce the comparability of state and national score data, suggesting that--at the very least--the difference between the average "able" college-bound student in California and his or her counterpart nationally is less than that indicated in simple comparisons of mean scores.

GLOSSARY

GLOSSARY

ACT	American College Testing Program
AFQT	Armed Forces Qualification Test
APL	Adult Performance Level Project
ASVAB	Armed Services Vocational Aptitude Battery
CAP	California Assessment Program
CHSPE	California High School Proficiency Examinaton
CPEC	California Postsecondary Education Commission
CSU	California State University
ECT	English Composition Test
FUSE	Follow-up of Students and Employers
GPA	Grade Point Average
HS & B	High School and Beyond
IEA	International Association for the Evaluation of Educational Achievement
ITBS	Iowa Test of Basic Skills
ITED	Iowa Tests of Educational Development
MSAT	Minnesota Scholastic Aptitude Test
NAEP	National Assessment of Educational Progress
NCES	National Center for Education Statistics
NLS-Labor	National Longitudinal Study of Youth Labor Force Behavior
OECD	Organisation for Economic Cooperation and Development
SAT	Scholastic Aptitude Test
SBS	Survey of Basic Skills
TSWE	Test of Standard Written English
VEDS	Vocational Education Amendments
UC	University of California

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