On Further Examination

Report of the Advisory Panel on the Scholastic Aptitude Test Score Decline

Willard Wirtz, *chairman*
Harold Howe II, *vice chairman*
Bernard C. Watson
Ralph W. Tyler
Ledyard R Tucker
Vivian H. T. Tom
Robert L. Thorndike
Barbara Thompson
Thomas W. F. Stroud
Rosedith Sitgreaves
Wilbur Schramm
Katherine P. Layton
Owen B. Kiernan
H. Thomas James
Matina S. Horner
Edythe J. Gaines
Frank W. Erwin
Bruce K. Eckland
Luis C. Cortes
Sandra A. Clark
Benjamin S. Bloom

College Entrance Examination Board
New York, 1977

On Further Examination

Report of the Advisory Panel
on the Scholastic Aptitude Test Score Decline

Copies of this book may be ordered from College Board Publication Orders, Box 2815, Princeton, New Jersey 08540. The price is $4.

The Appendixes, listed with item numbers and prices on pages 64-65, are available separately as well as in one volume. They may be ordered from the above address.

Editorial inquiries concerning this book should be directed to Editorial Office, College Entrance Examination Board, 888 Seventh Avenue, New York, New York 10019.

Library of Congress Catalog Card Number: 77-84642
Printed in the United States of America

Prefatory Note

"No topic related to the programs of the College Board has received more public attention in recent years than the unexplained decline in scores earned by students on the Scholastic Aptitude Test. The trustees and the officers of the College Board believe that we must do all that we can to investigate and interpret this phenomenon to the public at large. . . .

"We are appointing a blue-ribbon panel to assist in making sense out of the complex and interrelated issues involved. The panel will be asked to audit the steps already taken to insure the psychometric integrity of the tests, to suggest additional ones if appropriate, to examine other kinds of research already done, and to identify research that still needs to be done in order to deal effectively with the score decline issue as it relates to candidate population, secondary education, and society."

With these words, written in October 1975 in my capacity as president of the College Board, and in consultation with William W. Turnbull, president of Educational Testing Service, I invited the 21 members of the Advisory Panel on the Scholastic Aptitude Test Score Decline to undertake this work. They were asked to function "as an advisory body to the presidents of the College Board and Educational Testing Service," and in that capacity "to consider the matter of the SAT score decline and assist in the [development of an] understanding of it."

The panelists have been extraordinarily generous in the investment of their personal time and effort, and they have brought to the problem a level of professional expertise that would be hard to match. In addition to the four lengthy plenary sessions held by the full panel and the several meetings of its three working subgroups, uncounted hours of homework and individual exchanges of correspondence surrounded the deliberative process. The discussions at each session were based on diligent advance attention to a wealth of background materials requested by the members and produced by internal and external researchers. The panel's deliberations were also enriched by the availability of a number of contemporary external documents dealing with various aspects of the score decline issue. About two-thirds of the costs of the panel-generated investigations, as well as the expenses of the panel itself, have been borne by the College Board, with the rest underwritten by Educational Testing Service.

Although the panel was technically appointed to advise the College Board and Educational Testing Service, its mission from the start emphasized its independence, including the freedom to deliberate such issues as it chose to consider and to report its findings in the public interest, whether or not they might be critical of the College Board or ETS. Consistent with that spirit, the College Board is pleased to publish the panel's report as it was submitted to us. In doing so, the College Board and ETS re-

serve the right—indeed, recognize their responsibility—to comment over time on its findings as particularly interested members of the educational community and the greater society we seek to serve. Meanwhile, I wish to express President Turnbull's and my appreciation to the members of the panel and to commend their report to the attention of all who care about education in the United States.

S. P. Marland, Jr.
July 1977

Contents

Acknowledgments. vi
Introduction 1
Part One. The Scholastic Aptitude Test and the Score Decline 3
Part Two. An Unchanging Standard. 8
  As It Was in the Beginning 8
  A Changing Context? 10
Part Three. The Two Score Declines. 13
  Compositional Change. 13
  Pervasive Change 18
  Through Other Looking Glasses 21
Part Four. Circumstantial Evidence 25
  In the Schools 25
    Courses of Study 25
    Learning Standards 28
    Staff and Facilities. 31
  The Broader Learning Context. 33
    Parents as Teachers 33
    Television—Test of the Modern World. 35
    A Decade of Distraction 37
  Motivation 38
  In the View of Others 40
Part Five. Summing Up 44
Reference Notes 49
Annotated List of Studies and Papers 55
Bibliography 64
Sample Questions from the SAT 71
Advisory Panel on the Scholastic Aptitude Test Score Decline. 75

Acknowledgments

The panel's debts are so many that simple acknowledgment of the largest of them will have to suffice.

Edmund J. Farrell and Alfred L. Putnam, chairmen of the College Board's Discipline Committees in English and Mathematics, respectively, served in effect as members of the panel, taking full part in our discussions and providing special insights and assistance.

George H. Hanford, senior vice president of the College Board, contributed immeasurably to the panel's functioning. The delicate role he played as chief of staff and intermediary was vital to our effort to be both fully informed and objectively critical. Yvonne Wharton worked closely with him in all of this, as did Lillian Tucci.

Paul Barton, senior associate at the National Manpower Institute, shared the responsibilities of the panel's chairman. Arlene Huff helped draft after draft through its dreariest stage.

The officers and staffs of the College Board and ETS provided us with assistance in extraordinary measure.

We asked a number of people outside the panel for information and for reactions and are indebted to them for their response. We have also benefited greatly from the communications received from several hundred individuals who have written simply in expression of their concerns about this subject.

Willard Wirtz, *chairman*

Introduction

Every year, for 14 years now, there has been a drop in the average scores more than a million high school juniors and seniors get on the Scholastic Aptitude Test (SAT) they take in seeking admission to college. The panel has been asked by the College Board (which sponsors the SAT) and Educational Testing Service (ETS) (which develops and administers it) to look into this situation and to report publicly its findings and conclusions about the score decline. This is that report.

Starting with the technical aspects of the score decline as they appear under microscopic scrutiny and seem to permit objective analysis, we try in the later parts of the report to provide broader perspective. This means proceeding from what we have been able to establish on the basis of available data, to what we believe is reasonable interpretation of broader evidence, to what we speculate about as concerned individuals.

The particular interest of the College Board and ETS is in determining whether anything about the test itself has contributed to the decline in scores. Following a factual statement in Part One, we deal with this set of questions in Part Two.

The public's interest however, is not in the psychometric technicalities of the SAT score decline but in its implications regarding what is widely perceived as serious deterioration of the learning process in America. More and more high school graduates show up in college classrooms, employers' personnel offices, or at other common checkpoints with barely a speaking acquaintance with the English language and no writing facility at all. Parents watch children come home from school, without homework, to sit passively hour after hour and day after day in front of television sets until they have spent more time there than anyplace else except in bed. Although the SAT score figures are too small a window for surveying this broad condition, they provide special insight into it.

A major part of the decline in college entrance examination scores, especially in its earlier stages, is clearly traceable to a change in the composition of the student group taking the test, resulting from the deliberate and historic decision in this country in the 1960s to extend and expand educational opportunity and to eliminate previous discrimination in according it. The SAT data permit a relatively objective determination—covered in Part Three of the report—of the effects on the test scores of the changing composition of the group taking these examinations.

Equally clearly, the score decline also reflects, particularly in the 1970s, the operation of other more pervasive forces. Although the test score statistics do not themselves indicate the nature of these forces, there are available data that permit informed conjecture about the impact on learning of changes that have taken place in both the schools and the society during a period of turbulence and distraction rarely

paralleled in American history. This context is described and discussed in Part Four.

The sources on which we have relied are indicated in Reference Notes at the end of the report. Many of these sources are special studies made for the panel, and they are available in a separate volume of Appendixes to the report.

No one of us on the panel would have put everything in the report in the form it takes here. We share the feeling, nevertheless, that this comes close enough to what seems important to all of us to warrant submerging our small differences so that our larger agreement is plain.

Part One. The Scholastic Aptitude Test and the Score Decline

THE Scholastic Aptitude Test has been used since the 1920s to help determine high school students' apparent preparedness for college. Many colleges and universities require applicants for admission to submit SAT scores for consideration along with high school academic and extracurricular records, letters of recommendation, and the results of personal interviews. Others make similar use of a comparable examination administered by the American College Testing (ACT) Program. Still others require no standardized college entrance examination.

Given in different editions several times a year at locations all over the country, the SAT is taken primarily by seniors but also by a large number of juniors and by a few others. Some students take it more than once. The roughly one million young people in each high school senior class who take the SAT represent approximately a quarter of their age group as a whole and about half of the number going on to college. The figures for the past 26 years are in Table 1.

The SAT includes a Verbal and a Mathematical part. Scores for both parts are computed and reported separately on a scale of 200 to 800. Two and a half hours are allowed for taking the test. (The time, originally three hours, was shortened in 1973 to permit adding the 30-minute Test of Standard Written English; but the results on the latter test are not included in the reported SAT scores.)

The Mathematical portion of the SAT, which requires as background mathematics typically taught in grades one through nine, depends less on formal knowledge than on reasoning; it measures students' problem-solving ability in three areas—arithmetic reasoning, elementary algebra, and geometry. The Verbal portion, designed to assess reading skills and understanding of word relationships, covers four areas—antonyms, analogies, sentence completion, and reading comprehension; the material for this test is drawn from social, political, scientific, artistic, philosophical, and literary writing. Sample questions from the SAT are included at the end of the report.

The panel has reviewed the SAT score pattern as it has developed over the past 26 years. These figures are in Table 2 and Chart A. For convenience, we refer throughout the report to the year in which an academic or SAT year *ends*—to 1952, as an example, for 1951-52. Wherever we refer to the number of SAT takers or the average scores in a particular year, the reference will be, for all years since 1966, to the *number or the scores of high school seniors taking the test*—as distinguished from the *total number of tests taken that year* (which was the basis on which the records were kept prior to 1967); this permits better comparisons between particular groups, or "cohorts" of students. Finally, when we refer to SAT "scores" the reference is to what are technically "scaled scores."

Table 1. Numbers of 18-year-olds, high school graduates, first-time, degree-credit enrollments, and SAT takers, 1951-52 to 1976-77 (in thousands)

	18-year-olds[1]	High school graduates[2]	First-time, degree-credit enrollment[3]	SAT tests taken[4]
1951-52	2,058.0	1,196.5	532.3	81.2
1952-53	2,160.0	1,198.3	566.0	95.5
1953-54	2,135.0	1,276.1	624.9	118.1
1954-55	2,142.0	1,351.0	668.1	154.5
1955-56	2,244.0	1,414.8	715.0	208.6
1956-57	2,274.0	1,439.0	721.5	270.5
1957-58	2,307.0	1,505.9	772.3	376.8
1958-59	2,431.0	1,639.0	818.3	469.7
1959-60	2,613.0	1,864.0	923.1	564.2
1960-61	2,976.0	1,971.0	1,018.4	716.3
1961-62	2,816.0	1,925.0	1,030.6	802.5
1962-63	2,786.0	1,950.0	1,046.4	933.1
1963-64	2,763.0	2,290.0	1,224.8	1,163.9
1964-65	3,804.0[5]	2,665.0	1,441.8	1,361.2
1965-66	3,536.0	2,632.0	1,378.0	1,381.4
1966-67	3,545.0	2,679.0	1,439.0	1,422.5
1967-68	3,539.0	2,702.0	1,629.8	1,543.8
1968-69	3,676.0	2,829.0	1,748.7	1,585.6
1969-70	3,780.0	2,896.0	1,780.1	1,605.9
1970-71	3,875.0	2,943.0	1,765.6	1,537.2
1971-72	3,970.0	3,006.0	1,740.4	1,459.9
1972-73	4,044.0	3,057.0	1,756.9	1,398.4
1973-74	4,093.0	3,069.0	1,854.4	1,354.0
1974-75	4,243.0	3,140.0	1,910.0	1,371.2
1975-76	4,253.0[6]	3,150.0(est.)	2,008.0(est.)	1,415.0
1976-77	4,239.0(est.)[6]	3,147.0(est.)	2,008.0(est.)	1,401.9

1. Age as of July 1 of the later year. Estimates based on the April 1 decennial census surveys modified by records of births, deaths, immigration for intervening years. Estimates are for the total population, including Armed Forces overseas, the resident population, and the civilian population. (U.S. Bureau of the Census, *Current Population Reports*, Series P25, No. 311, 519, and 614, "Estimates of the Population of the United States by Age, Sex, and Race." U.S. Government Printing Office, Washington, D.C. 20402.)

2. Includes regular public and nonpublic schools, residential schools for exceptional children, subcollegiate departments of institutions of higher education, federal schools for Indians, and federally operated schools on federal installations. Excludes equivalency certificates. Prior to 1960 data were collected only every other year, those ending in an even number. Beginning in 1959-60, Alaska and Hawaii are included. (National Center for Education Statistics, *Projections of Education Statistics*, annual. U.S. Government Printing Office, Washington, D.C. 20025.)

3. Opening fall enrollment of first-time degree-credit students the following year. Beginning in 1960, Alaska and Hawaii are included. Beginning in 1953, extension students are included. (National Center for Education Statistics, *Digest of Education Statistics, 1975 edition*. U.S. Government Printing Office, Washington, D.C. 20402.)

4. Figures listed are for number of SATs taken in a given testing year. Candidates may be from any grade and are counted more than once if they repeated the test (College Entrance Examination Board).

5. This figure, which appears so high as to suggest error, is confirmed by reference to birth statistics (on comparable fiscal year basis) for 1945-46 and 1946-47.

6. Information from National Center for Education Statistics, Department of Health, Education, and Welfare, June 28, 1977.

In 1952, the SAT-Verbal score average for all test takers was 476 and the SAT-Mathematical average 494. Although there were year-to-year fluctuations in these averages, they remained substantially level but moved up slightly through the 1950s and into the early 1960s; by 1963, the SAT-Verbal average was up 2 points to 478, the SAT-Mathematical average up 8 points to 502. Then in 1964, both score averages started dropping. They have dropped ever since, considerably more on the Verbal than on the Mathematical part of the test. The decline, relatively gradual through about 1970, became sharper after that, especially for the Verbal scores. The past two years have suggested a possible leveling out.

The panel has considered how far back to go in trying to analyze this scoring pattern. A 20-year comparison (1957 to 1977) would show about the same decline that a comparison of the 1963 and 1977 figures does. It is generally assumed that the increase in SAT scores in the early 1960s, especially the spurt that made 1963 a high year, may have reflected the results of the post-Sputnik acceleration of educational effort in this country; and this may have significance in appraising the present prospects, which we consider real, of a comparable recovery during the next few years.

The statistical evidence for that earlier period is exceedingly thin, however, except for the SAT scores themselves. We have accordingly concentrated on the 1963-to-1977 decline: the 49-point drop during this 14-year period in the score average on the Verbal part (from 478 in 1963 to 429 for 1977), and a 32-point drop (from 502 to 470) on the Mathematical part. The Mathematical decline is 31 points, if the comparison is made on an "All candidates" basis for both years.

How significant is this decline?

When the "standard deviations" involved here are taken into account, the decline in scores means that only about a third of the 1977 test takers do as well as half of those taking the SAT in 1963 did. But *how much* worse are students doing now than their counterparts used to do? Although this can't be answered with precision, a decline of this magnitude continuing over a 14-year period, following a previous period of stable or even slightly rising score averages, is clearly serious business.

The decline must be put, at the same time, in broader perspective.

Any generalization from the SAT statistics has to be carefully qualified. It should not be extended to cover the situation of American youth as a whole or the overall effectiveness of the learning process.

The college entrance examinations are represented by the agencies administering them only as indicating students' probable accomplishments in terms of college academic grades, particularly their first-year grades. Recently published College Board *Guidelines on the Uses of College Board Test Scores and Related Data* warn sharply against their misuse as measures of the broader effectiveness of elementary and secondary education in general.

The SAT figures cover only students who are still in high school at the 11th and 12th grades and who are considering going on to college, particularly to colleges or universities requiring applicants to take the SAT. This is a significantly different test-taking population, a different cross section of young people, from what it was 14 years ago. The score decline has taken place, furthermore, during a period of such

Table 2. Scholastic Aptitude Test Score Means, 1951-52 to 1976-77

Academic year	SAT-Verbal		SAT-Mathematical	
	All candidates[1]	High school seniors[2]	All candidates[1]	High school seniors[2]
1951-52	476		494	
1952-53	476		495	
1953-54	472		490	
1954-55	475		496	
1955-56	479		501	
1956-57	473		496	
1957-58	472		496	
1958-59	475		498	
1959-60	477		498	
1960-61	474		495	
1961-62	473		498	
1962-63	478		502	
1963-64	475		498	
1964-65	473		496	
1965-66	471		496	
1966-67	467	466	495	492
1967-68	466	466	494	492
1968-69	462	463	491	493
1969-70	460	460	488	488
1970-71	454	455	487	488
1971-72	450	453	482	484
1972-73	443	445	481	481
1973-74	440	444	478	480
1974-75	437	434	473	472
1975-76	429	431	470	472
1976-77	429	429	471	470

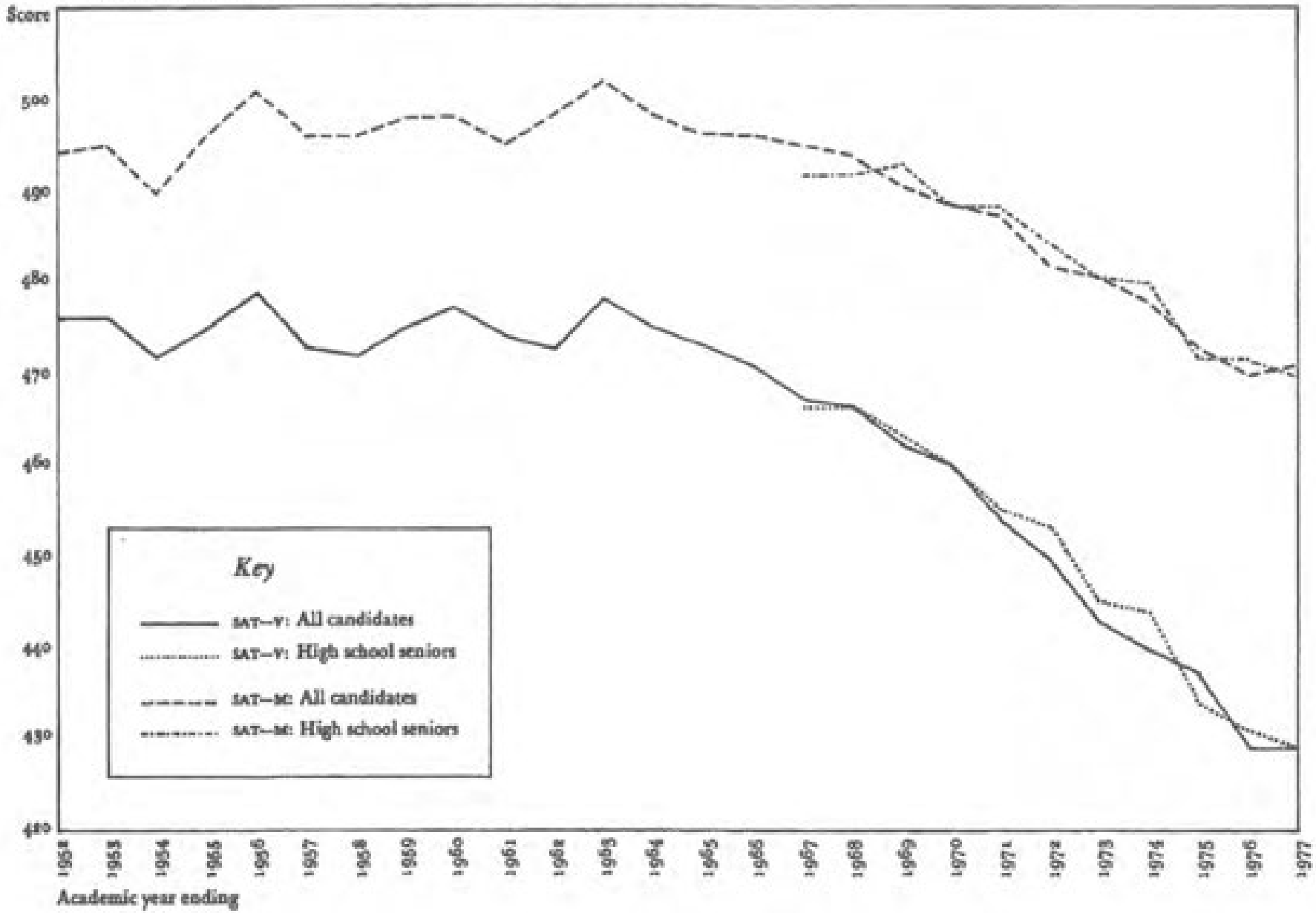
1. An individual is counted as many times as he or she is tested.

2. Each candidate is counted only once, using latest score earned (figures for 1967 through 1971 are estimates; for 1972 through 1977 are actual).

extraordinary national disruption, with particular effects on young people, that the change in the SAT score pattern is properly appraised only with full recognition of that context.

The report proceeds on the basis of the panel's persuasion that the score decline reflects a situation demanding serious attention but warranting, at the same time, cool-headedness about both the assessment of responsibility and the instruction this experience offers the future.

Chart A. Scholastic Aptitude Test Scaled Score Means, 1952 to 1977



Part Two. An Unchanging Standard

Few teachers worth the name ever settle two inner struggles: about the consistency of tests and grades with learning's ideals, and about whether to hold successive classes to a constant standard of measurement or to grade each of them "to the curve"—so that the proportion of high, medium, and low grades stays the same even though the overall quality level changes.

The SAT is designed to be an unchanging measurement. In technical terms, the score scales for the Verbal and Mathematical sections were established in 1941 and 1942, with mean scores of 500 and standard deviations of 100. Considerable effort has been made since that time to keep the test a sufficiently constant measure so that any particular score received on a current test indicates the same level of ability to do college work that the same score did 36 or 20 or 5 or 2 years ago. The SAT measures individual students' capacities not only in comparison with their peers in the particular group but also in comparison with those who took the test in earlier years.

This suggests two possible explanations of the SAT score decline involving the test itself. Because most of the SAT questions are changed with each new edition of the test, it could happen that the test would become inherently more difficult to score well on—"harder" than it used to be as a consequence of changes in the test questions and in the equating and scaling procedures involved in determining scaled scores.

An apparently converse possibility presents what is actually a very different type of issue. If the test were kept the same in every respect, but if those taking it were trained in different pursuits or by processes less consonant with the test, the resultant disjuncture would also present a possible explanation of a decline in the test scores. The point would be not that the test had changed but that by staying the same it had become less relevant to the training preceding it.

As It Was in the Beginning

The SAT score decline does not result from changes in the test or in the methods of scoring it.

Although we have gone to considerable lengths in exploring this possibility, there is no point in laboring the conclusion. The ETS procedures for "equating" successive editions of the test (by including in each new edition key questions from earlier tests and then "scaling" raw scores according to the performance on these questions) and for checking against "item obsolescence" are as sophisticated and reliable as the state of the psychometric art permits. We find complete agreement about this in the profession, and we have pressed the matter to the point of adequate lay understanding and concurrence.

These procedures neither pretend to nor do achieve perfection. In fact, two technical analyses of the equating and scaling practices, made at the panel's request (one comparing 1972 and 1960 data; the other, 1973 and 1963), indicate an "upward drift" of between 8 and 12 points in the scaling of the scores. In order to check this, a substantial group of high school students (3,174 from 66 schools) was given both 1963 and 1973 editions of the test, half of them taking the 1963 test first and half starting with the 1973 test. The results confirmed the earlier technical analysis: the test takers averaged higher scores on the 1973 tests than on the 1963 tests, both Verbal and Mathematical. This means that the declines in the ability the SAT measures have been from 8 to 12 points larger than the recorded and reported scores indicate. The panel considered casting its report in terms of figures adjusted to reflect this difference, but decided against this because of the impossibility of identifying the year or years in which the drift occurred.

A special inquiry was made into the possibility that the shortening of the SAT in 1973 from 3 hours to 2 1/2 (in order to accommodate the half-hour Test of Standard Written English) might have had some relationship to the sharp drop that year in the SAT scores. We are satisfied that it did not. The most careful precautions possible were taken to assure that the reduced item selection would not result in changing the difficulty of the test.

We have also looked into the question of whether the decline in the SAT scores has affected their "validity" as predictors of individuals' college performance. It has not.

A detailed review made for the panel of the experience between 1964 and 1974 in a substantial number of colleges discloses some minor but interesting variations in the pattern of the SAT's predictive effectiveness, depending on the type of college involved (four-year or two-year), on the test takers' sex, and on whether they come from higher, lower, or middle SAT-score groupings. There were also some perhaps significant changes in this pattern during that 10-year period: the median validity coefficients (which are measures of the predictive capacity of the test) went down in general during the late 1960s and then went up sharply in the early 1970s. Some slight additional illumination is provided by looking at a number of studies that have been made of comparative validities of the SAT, as well as other academic predictors, for students with different ethnic backgrounds.

Although some of these variations in the validity pattern probably warrant further analysis for other reasons, they reveal no lessening of the value of the SAT as a predictor of first-year college academic accomplishment. The predictive validity of both the Verbal and the Mathematical parts of the SAT increased between 1970 and 1974 in the colleges that had validity studies made during that period, while the predictive validity of high school grade records was staying about level. High school grades are still the best single predictors of college performance, but when these grades are combined with SAT scores more accurate prediction proves possible. It illuminates this picture only for those expert in the field to note that, as of 1974, the median validity coefficients for the combined six samples used in the ETS study were .39 for the SAT-Mathematical score, .42 for the SAT-Verbal score, .50 for high school grade records, and .58 for the three predictors combined. The comparable median validity coefficients in 1970 were .29 for SAT-Mathematical, .37 for SAT-Verbal, .49

for high school grade records, .56 for the three predictors combined. For the layman, this says that the SAT remains a useful, but far from perfect, predictor of college performance.

- In general, and after checking the technical and psychometric aspects of the SAT thoroughly, the panel finds consistent confirmation that the score decline has not resulted from changes in the testing instrument. The scaling and equating and item-obsolescence procedures that are followed are reliable, and the predictive validity of the test is slightly higher than it was before. The standard established in this test has remained substantially constant, and the decline the scores reflect is, if anything, slightly larger than the reported record indicates.

A Changing Context?

The harder question to answer is about the possible effect on SAT scores of a changing "relevancy" of the test because of its being kept the same despite changes in curriculums, in educational policies and practices, and in learning's processes.

We consider later in the report (Part Four) whether the score decline may have resulted in part from reduced concentration on the "basics" of reading and writing and arithmetic and from a possible lowering of standards in elementary and secondary education. The "relevancy" point, however, though it is related in one sense to those questions, goes beyond them and has a different character. The suggestion is that in the 36 years since the present SAT standard was established the society has set new and different (as distinguished from higher or lower) learning goals, that the colleges or schools or both have adopted new priorities in education, that different learning and communication processes have come into use, and that part of the reason for the decline in the SAT averages is that the test does not reflect these changes.

In one view of this line of reasoning, there is a short and complete answer to it. If the value base of the SAT is accepted as being solely the prediction of college academic performance, the critical fact is that the test's predictive validity is actually somewhat higher than it used to be. The panel's further investigation reveals a similarly increasing positive correlation over the past 10 years between SAT scores and students' grades in high school. These two findings seem to leave little basis for the suggestion that the SAT has gotten out of line with either secondary or postsecondary practices or standards—so far, that is, as these practices and standards are reflected in students' academic grades.

This doesn't actually meet, however, the broader criticism of the college entrance examinations. It is partly an objection to the common misuse of the test scores. A student leader and valedictorian in a District of Columbia high school was recently denied admission to a college because his SAT scores were low. High schools are being measured by the averages the college-bound segment of these graduates get on the college entrance examinations. The College Board's warnings against these practices are disregarded. When these test scores and averages are used as exclusive or *overall* measurements of individual or institutional quality or accomplishment, a very

real "relevancy" issue arises.

The challenge goes further. Recognizing the continuing correlation between high school grades, SAT scores, and college grades, the criticism is that this correlation covers less and less of what is important here. With grade inflation rampant in both secondary and postsecondary education, even while remedial courses have to be added constantly to first-year college curriculums, the argument seems increasingly pertinent. The correlation between grades and scores and then more grades could increase or decline or stay level, even while there was dangerous deterioration or healthy improvement *by broader measures* on both sides of the secondary/postsecondary divide. That correlation might come to apply to a smaller and smaller part of the learning actually going on.

This raises issues going beyond the panel's assignment and its competence. We have accepted, for purposes of this inquiry and report, the traditional value base of the SAT—its validity, that is, as an instrument helpful in the determination of students' likely academic performance. We have considered, in Part Four of the report, the question of whether less concentration on "basic" courses and an apparent relaxation of standards has had an effect on the SAT averages. So far as the relevancy issue goes beyond this it gets into broad and basic questions of educational policy.

Yet we feel strongly that this set of issues warrants further consideration by those more fully qualified than we are, working from a broader charter, for we have gotten a strong sense of possibly basic change taking place in the relationship between secondary and postsecondary education, and particularly in the function of testing in connection with the passage from high school to college.

We are concerned about the relationship between traditional testing techniques and the introduction into the learning processes of new forms of communication and teaching instruments: tape recorders, films and film strips, television (to which we return later), and the like. The lack of either quantifiable or other clear evidence is not enough answer to those who suggest that tests in the conventional college entrance examination form do not measure competencies developed in the schools through increasing reliance on new combinations of kinetic, audio, and visual—"kin-audio-visual"—teaching materials and processes.

We note the strongly held beliefs of many that different forms of testing would facilitate the effective and constructive transition of young people from high school to college. Questions are raised about the assumption that this testing should be based exclusively on predicting only college academic performance, particularly grades in first-year courses. There is the suggestion that consideration can and should be taken of the fact that different individuals are, as high school juniors and seniors, at such different stages of their personal development. Others question the effect of the "speededness" of tests, the use in them of uncommon words, and their possible penalization of test takers' putting ideas in personal terms.

A broader listing of questions of similar kind is included in the report of the *Conference on Declining Test Scores* held in June 1975 by the National Institute of Education. That report includes an invaluable summary of the areas in which additional research and analysis appear warranted.

The panel accordingly commends further inquiry by the Board and ETS into the

function of tests at this critical passage point. In broader terms, the agencies administering college entrance examinations have a superior opportunity to engage in what is in effect a brokering function between secondary and postsecondary education in this country—a function we consider critically important and in general too little exercised by either public or private agencies.

We are not suggesting any compromising of the levels of acceptable educational standards, for we count those currently accepted too low. The purpose of such inquiry would be to identify and put in appropriate priority whatever can be distilled from current national concerns about the society's educational values, and then to evaluate the traditional tests in the light of that determination.

Part Three. The Two Score Declines

FOURTEEN years of uninterrupted decline in the SAT scores create the illusion that there is some single force or closely related set of forces at work here. This isn't the case. The decline has developed in two distinct stages, characterized by significantly different balances of materially different causal factors.

During the first six or seven years of the decline the composition of the SAT-taking population was changing markedly. Each year it included larger proportions of characteristically lower-scoring groups of students. This pulled the overall average down. There were only slight falloffs during that period in the score means *within* any particular ability groups.

The pattern changed after about 1970. The "compositional" shifts slowed down materially. What showed up increasingly was an across-the-board score decline, the apparent consequence of more "pervasive" changes or influences affecting higher- and lower-scoring groups alike.

Compositional Change

It is already hard to remember the extraordinary confluence of forces that struck the educational system in the 1960s.

About 1,864,000 students graduated from high school in 1960, and some 564,000 juniors and seniors took the SAT that year. Ten years later the number of graduates had increased by a million, and the number of SAT takers had tripled.

This was partly a demographic change. Between 1964 and 1965 the number of 18-year-olds in the country jumped by more than a million. That was when the post-World-War-II population wave first hit this age level. It was also the time the SAT average scores started down.

By what was probably more than coincidence, the nation decided during that same period to reduce the high school dropout rate and to see to it that a larger percentage of young people had the opportunity to go on to college.

Perhaps it was a historical accident that this was also the time of tardy legislative decision to attack previous discrimination in providing educational opportunity, particularly discrimination based on race, sex, and family income.

Twenty-five years ago, only half of all young Americans were staying in school through the 12th grade; this fraction grew by 1964 to two-thirds and by 1970 to three-fourths. The proportion going on to college was about one-fourth in 1952, about a third in 1964, and almost half by 1970. (There are different published school completion statistics. The panel has relied on the Census Bureau series, which mea-

sures retention in terms of the number of students who entered the fifth grade and are still in school at various subsequent grade levels.)

It would be pleasant to think that as increased percentages of vastly larger numbers of young people stay in school longer and go on to college, the college entrance examination averages achieved before by a favored fraction of students could be held constant. Yet any such expectation would be ruefully unrealistic. The major move toward equality of opportunity in the 1960s will be judged unfairly unless it is recognized that an increasing school retention rate is bound to mean, at least at first, some drop in the *average* developed ability level (as reflected in traditional tests) of the larger number staying the course. Yet the record for the years between 1950 and 1963 indicates that the effect of this need not be either serious or enduring.

The details of the changes that took place in the composition of the SAT population during the first period of the decline are hard to identify, for no biographical data were collected on these test takers before 1972. This kind of information is available, however, in connection with two other sets of tests: those given as part of Project TALENT in 1960 and those included in the National Longitudinal Study of the class of 1972. It has proved possible to equate the reading examinations on those two tests, to identify (from ETS records) students who took one or the other of them and also took the SAT, and so to reconstruct in terms of biographical data two SAT cohorts, one for 1960 and the other for 1972. There is also relevant evidence available from the Student Profile studies made since 1966 by the American College Testing (ACT) Program and from the series of Freshman National Norm studies made by the American Council on Education (ACE).

What is clearest from all these data is that, starting in about the mid-1960s, cumulatively larger *percentages* of students with comparatively lower high school grade averages were going on to college. The ACE Freshman National Norm study shows this directly, as do the ACT Student Profile data for those students taking that college entrance examination.

This shift appears to have been sharpest of all among the SAT-taking group. The composite study (of Project TALENT, National Longitudinal Study, and SAT data) shows this in various ways, based on a comparison of scaled score averages on the equated 1960 and 1972 reading tests of all these groups. The averages of the SAT takers dropped by twice as much on these reading tests as did those of high school seniors as a whole, reflecting the increasing percentage of lower scorers among those taking the SAT. In 1960, over half (55.4 percent) of the SAT takers came from the highest-scoring groups (top 20 percent) on the Project TALENT and National Longitudinal Study reading tests; in 1972, this had dropped to a little over a third (36.4 percent). The significance of this decline among the SAT takers is emphasized by the fact that a 1970 repeat of the 1960 Project TALENT Reading Comprehension Test showed a slight gain among 11th-grade students *as a whole*—despite the fact that the proportion of the age group staying on in school through that grade level had increased from 77 percent in 1960 to 87 percent in 1970.

There is limited usefulness, however, in a finding that the first stage of the SAT score decline resulted in large part from the fact that proportionately more students with

demonstrated lower scoring records began taking it. This advances the analysis of what happened here only from one set of examination scores to another. To look with constructive intent for the root causes of the decline requires pressing further into the *reasons* for these differences in scoring capacity.

There were significant increases during the earlier period of the SAT score decline in the proportionate numbers in the test-taking population of three groups that have always registered substantially lower-than-average scores on this test: students from lower-socioeconomic-status families, members of minority ethnic groups, and (on the Mathematical but not on the Verbal portion of the test) women.

Students from families with the lowest incomes (under $6,000 in 1977 figures) average about 100 points lower on both the Verbal and Mathematical parts of the SAT than do those from families with the highest incomes ($18,000 and over); and the score averages go up consistently from one intermediate income level to the next. Students' scores also vary, on the average though with many exceptions, with the educational attainment levels of their parents.

An analysis of the 1960 Project TALENT and the 1972 National Longitudinal Study data shows substantial increases over that period in the percentages of students from the lower socioeconomic quarters who went on to college and decreases (although these characteristics are not direct functions of each other) in the percentages from the two higher quarters. These changes are more marked than those emerging when comparisons are made in terms of *ability* (as identified in terms of high school grades). When these figures are broken down to separate students going on to four-year colleges (principal users of the SAT) from those entering two-year colleges, the shifts become even larger with respect to the four-year college group.

Although the data regarding ethnic group score differentials and test-taking population changes during the 1960s are sparse, the picture is relatively clear with respect to whites and blacks (but with too little information to go on, as far as other minority groups are concerned).

Very few blacks or other minority ethnic group members were taking the SAT in the early 1960s. As of 1966, some 5 percent of the first-year college students reported on the ACE National Norms Study were black (and 91 percent white), but few of them were in colleges using the SAT. An estimate of black SAT takers in 1963 of between 1 and 2 percent of the SAT population would probably be high. The ACE studies show the percentage of black freshmen rising to 8.7 percent by 1972 and remaining at about that level since that time. By that year, too, the SAT Student Descriptive Questionnaire showed about 8 percent of the test takers to be black, and this figure has gone up only slightly in subsequent years.

A 1965-66 study of the equality of educational opportunity, made by James S. Coleman for the United States Commissioner of Education, reports 12th-grade-level achievement score averages for blacks "about one standard deviation below those of . . . whites, which means that about 85 percent of the [black] scores are below the white average." A roughly comparable picture is provided by the Student Descriptive Questionnaire data, with blacks averaging approximately 100 points below the overall average on the Verbal and about 115 points lower on the Mathematical part of the SAT.

Women and men have traditionally averaged about the same scores on the Verbal portion of the SAT, but there has been a marked difference in the Mathematical averages. In 1960 the Mathematical means (as derived from the composite study made for the panel) were 465 for women, 520 for men. Twelve years later, the average for women was virtually unchanged, but the average for men had dropped by 14 points (to 506). The 1977 Mathematical figures are 445 for women, 497 for men.

Women represented 42.7 percent of the SAT-taking group in 1960 and 47.5 percent in 1970.

Yet such groupings of SAT takers, like those in terms of grades on other tests, relate to only the superficial aspects of the score decline. The *causes* of whatever is reflected here lie in the *reasons* these groups score lower.

The suggestion is sometimes made that the SAT is culturally biased. Definitive analysis of cultural bias is virtually impossible. These same differences show up on most other standardized tests, and yet this proves nothing. The panel's inquiry into the test design procedures followed by ETS confirms that special efforts have been made to avoid the suggested prejudices. Cultural bias would appear to be more likely to affect the Verbal part than it would the Mathematical part of the test; but the differences between the averages for various ethnic groups are larger for Mathematical scores than they are for Verbal scores. Although the available information is incomplete, the predictive validity of the SAT *appears* to be substantially the same for students in different ethnic groups and for women and men.

The significant "biases" involved here clearly go much deeper and concern the society more than the tests.

We struggle as a nation against the fact that the unevenness of children's educational accomplishments parallels, in general though with many exceptions, the educational and economic attainments of their parents. When an increase in the percentage of economically disadvantaged students staying in high school and taking college entrance examinations results in lowering the average scores on these tests, one thing this says is that the national effort to neutralize this kind of disadvantage is still incomplete.

Score differences between blacks and whites parallel closely the differences in averages between students from low- and high-income families and between those whose parents have differing levels of education. Beyond this, two centuries of racial bigotry have unquestionably left an educational system that still serves blacks and other minority groups less well than whites, particularly when it comes to meeting traditionally accepted "majority" standards. The contributing cause of the score decline is not that more minority group members now take the SAT, but that despite statutory guarantees of equal opportunity the society has not yet developed either the educational means or the mores that will bring children with different racial roots to a parity of aptitude—as the SAT and other tests measure it—by the time they reach the 12th grade.

That women score lower than men on the Mathematical sections of the SAT almost unquestionably reflects more than anything else the traditional sex stereotyping of career opportunities and expectations.

In all these respects, the national decision made in the 1960s was to attempt to

neutralize the discriminatory aspects of cultural differentiations. To the extent that less-economically advantaged young people, minority group members, and women still score lower on college entrance examinations than do their counterparts, one of the causes of that score decline is properly identified as being the incompleteness so far of the society's now-earnest effort to be honest with its expressed ideals.

Realizing that even recognition of these group differentials risks irresponsible headlines, attributing the score decline to more blacks' and women's and poorer youths' taking the test, we note the figures. Even if blacks' lower scores were identified solely with race (which would ignore other factors involved here, such as income levels), their increased taking of the SAT would account for no more than 4 or 5 points of the total decline in averages over the entire 14-year period. Women's larger participation could be identified with about the same amount of the drop in the Mathematical average, but with none of the decline in Verbal scores. The effect of increased test taking by students from lower-income families cannot be this specifically quantified; it is larger. The figures for all three groups overlap. There is no legitimate short answer to be found in this set of developments alone.

Another tempting shortcut to an answer that perhaps appeals to quite a few is that there are simply too many young people now going on to college. We do not find the support for that conclusion in this evidence. Should the next 15 years see the opening of still further postsecondary educational opportunities to young people who today are not finishing high school, with another attendant decline in test scores, we suspect that the reaction would again be to welcome the problem on the one hand and on the other to recommend changes in the schools in order to meet it.

The panel has looked extensively into what is in effect another dimension of this compositional shift in the SAT-taking population, involving changing college-going patterns.

Fifteen years ago, most SAT takers were students enroute to relatively prestigious and selective four-year, liberal arts colleges and universities. While the *number* of those in the SAT population going on to this type of postsecondary institutions remained virtually constant at first (until 1967), a cumulatively increasing *percentage* of test takers began to follow different courses: to colleges and universities with less selective or even open admission policies, to two-year colleges, to training with a more technical or vocational emphasis. Most of this change, though not all of it, had taken place before 1970 or 1971.

There are average score differentials of from 60 to 85 points (1) between test takers going on to four-year colleges (who average higher scores) and those who subsequently enter two-year colleges, and (2) between test takers who go directly from high school to college (averaging higher scores) and those who do not. There were substantially larger percentages of these two lower-scoring groups in the SAT population in 1972 than there had been in 1960; the increase in both cases was from about 8 percent (in 1960) to approximately 15 percent (in 1972).

There were comparable *drops* during that same period in the percentages of SAT takers asking to have their scores sent to highly selective liberal arts colleges (from 13.2 percent in 1961 to 5.6 percent in 1974) and to research universities (from 10.5

percent to 6.4 percent); and these are groups who have traditionally scored *higher* on the SAT.

These shifts in college-going patterns were more than just reflections of the compositional changes already identified. It was during the 1960s and early 1970s that two-year community colleges grew so fast and that more flexible admissions policies were adopted by many four-year colleges and universities. The SAT, originally used as an instrument for assessing the abilities of a comparatively small group of high school students to do a particular type of postsecondary work, came to be taken increasingly by a much wider variety of students with more diverse prospects in mind.

One aspect of this change in college entrance policies was a marked diminution in the percentage of students taking the SAT more than once. Since repeaters average 15 to 30 points higher the second time they take the test (whether because of the repeating or for other reasons), the significant decline in the number of repeaters has had some small effect on the score averages. We have not broken this down into pre-1970 and subsequent years.

There is a question of whether "cramming" for the SAT is a factor here. The College Board and ETS have taken the general position, based in part on studies that may now be out of date, that this type of preparation for these tests is not effective. Although we question this, we have not pursued the point, partly because this can in no event be a significant element in the score decline, and partly because the sponsoring agencies have now taken this question under active review.

▪ We find, therefore, that the largest part of the SAT score decline between 1963 and about 1970 was identifiable with compositional changes in the mix of the SAT-taking group—considered both in terms of the test takers coming from higher- and lower-scoring groups and in terms of their plans for going on to college. Although precise identification of the degree to which these changes explain that part of the decline is impossible, fairly careful calculation indicates that they account for between two-thirds and three-fourths of it.

Already appearing during that period, however, were indications of a broader set of influences on these scores—which were subsequently to emerge more plainly and strongly.

Pervasive Change

Neither reason nor data would suggest that at some precise time the changes in the test-taking population, which had been moving the SAT averages down, ended abruptly and that a new set of forces then erupted suddenly to continue and even accelerate the previous decline. This did not happen. But under this heading we want to develop the concept that after 1970 changes in the test-taking group became less important as a cause of the score decline and other factors in the schools and in the society at large became more significant.

By 1970, the previous increases in the percentage of young people finishing high school, going on to college, and taking the SAT had either stopped or had started to reverse. It is also clear that there has been much less shifting in the past several years

in the proportions of characteristically higher- and lower-scoring groups of SAT takers, as compared to the 1963-70 period.

A relatively complete picture of the test-taking population is available from 1972 on, from the Student Descriptive Questionnaire (SDQ), which is filled out by more than 80 percent of all SAT takers and which covers some 70 informational items. A correlation of SAT scores and SDQ answers permits a year-by-year comparison of the average scores of more than 200 groups and subgroups of test takers, along with an identification of the proportion each group represents of the total SAT-taking population. The SDQ was first used in 1971-72, but was changed so materially the following year that the 1972-73 information constitutes the earliest base for reliable comparison with subsequent years. It appears, however, from other indexes and studies that most elements in the compositional pattern reflected in the SDQ data had taken shape from one to three years before that questionnaire was fully developed. The precise time factor is not significant.

The SDQ data show a limited degree of continuing compositional change in the test-taking group after 1972. The percentage of women taking the SAT has increased from 48.7 percent in 1972, to 51.1 percent in 1977—enough to account for several points of the decline in Mathematical scores. There has also been some continuing increase in the number and percentage of test takers from minority ethnic groups, although it appears to be small.

One set of SDQ questions shows that substantially more students now than in 1973 indicate an intention to pursue "occupational" or "career" majors, with proportionately fewer apparently expecting to go on to "arts and sciences" majors; and those in the former of these groups show consistently and markedly lower average scores on the SAT (Verbal and Mathematical sections alike) than do those indicating the "arts and sciences" choices. We have looked into this situation thoroughly, taking account of a possibly significant change in the form of the SDQ question, of answers to other apparently related questions, and also of the reports regarding similar questioning done on the Project TALENT and the ACE Freshman National Norms studies. While the particular point is probably of secondary importance, it confirms the broader fact that there continues to be some "compositional" change taking place within the SAT population.

The SDQ data show only insignificant changes between 1973 and 1977 in the distribution of SAT takers among students at various high school grade percentiles. It should be noted here, and more generally as well, that the SDQ data are all based on students' own answers to these questions and may therefore reflect certain biases. There have also been changes in the form of some questions, including the one about rank in high school classes, which may affect the year-to-year comparisons.

Some of the information initially submitted to the panel suggested an aberrational drop since 1970 in the number of students scoring 600 or above on either the Verbal or the Mathematical sections of the test or on both. That "high scorer" figure, which stood at 189,300 in 1970 (among *all* SAT takers, as distinguished from a one-year cohort), had gone down by 1976 to 108,200; and this drop seemed to suggest elements of compositional or other related change.

An inordinately extended analysis of the drop in the number of these "high-

scorers" indicates, however, that the decline probably results almost entirely from the reduction in the number of students taking the SAT and from the impact at the top of the same pervasive influences that have been affecting the scores of the test takers as a whole and which we discuss in the remainder of the report. This was confirmed by a special study the panel had made of the SAT scores of some 1,500 valedictorians and salutatorians in 145 high schools during the period between 1960 and 1974. The study shows that there were no significant changes in the average scores of these top-ranking students during the early period of the overall SAT score decline, but that they dropped after 1970 on the Verbal part and after 1968 on the Mathematical part of the test at about the same rate of decline in the overall averages—making these data particularly direct evidence of the panel's "two-decline" conclusion.

In general, comparatively little—perhaps 20 to 30 percent—of the SAT score decline during the past five to seven years appears attributable to compositional shifts within the test-taking group.

There is consistent evidence, at the same time, of the emergence during this more recent period of what the panel has characterized as "pervasive" score decline—in the sense that it has shown up within virtually all categories of SAT takers.

Score averages have gone down since 1973 (with the drop apparently having started two or three years before that) among students at the higher and those at the lower percentiles of their high school classes, among students in private and in public schools, among those in large and in small high schools, among those taking "academic" and those taking "career" courses of study in high school, among test takers from high- and from low-income families, among men and women, among white students and those from minority groups, among students expecting to go on to different kinds of colleges, among those intending to take postgraduate work and those looking only toward a baccalaureate.

Although the drops in score averages have varied somewhat in degree among different groups, the obviously significant characteristic of the pattern in this second stage of the SAT decline has been the pervasiveness of the effect of the forces influencing it. The statistics themselves say nothing, at least directly, of the nature of these forces. We have set this question apart for separate consideration in Part Four.

We note, although it is too early to appraise its significance, that the SAT scores have changed less in the past two years. The 1977 high school seniors' Verbal average is 5 points below what it was in 1975, and the Mathematical average is down only 2 points. The drops during the preceding two-year period had been 11 points on the Verbal part and 9 on the Mathematical.

If the figures for all candidates are taken, which means particularly including high school juniors, the 1977 Verbal average is the same as the average last year, and the Mathematical average has gone up 1 point.

Through Other Looking Glasses

To establish further basis for determining the implications of the apparent two-stage pattern of the SAT score decline and also to check this analysis, the panel has reviewed what has been happening during recent years on other standardized academic tests. Several of these are related in one way or another to the SAT itself.

We find, in general, that the SAT score decline is significantly consistent with a broader pattern. Most—though not all—standardized test score averages, which had previously been rising gradually, turned and started down in the middle 1960s. In virtually all instances there has been a much sharper drop in the 1970s. Most of what appear at first to be inconsistencies between the records on the various sets of tests became reconcilable when their histories are analyzed on the "two-decline" basis. In significant respects, at the same time, the comparison with other test score experience provides an important reminder that declining college entrance examination scores do not in themselves warrant generalization about what is happening to the abilities at large of youth as a whole.

The other widely used college entrance examination, administered by the American College Testing (ACT) Program, shows a comparable decline since the mid-1960s, with most of the drop having taken place since 1970. The averages have dropped more on the Mathematics section of the ACT than on the English section. That test also includes a Natural Science component, on which there has been no decline, and one in Social Science, which shows the largest drop. Women have consistently scored lower than men on the ACT Mathematics test but higher on the English component.

American College Testing Program representatives advise the panel that the ACT composite score average will be slightly higher for 1977 than it was last year. Taken with the current experience on the SAT scores, this affords an interesting basis for conjecture as to whether what is involved here is a pause or a possible turning point.

Score averages on tests taken by high school seniors as a whole, as distinguished from those taken only by students going on to college, remained virtually level until about 1970; but where more recent reports are available (as, for example, on the Iowa Tests of Educational Development and the Minnesota Scholastic Aptitude Test) they show declines in the last five years roughly paralleling those on the SAT and the ACT.

Score declines have been largest at the 12th-grade level and somewhat less at each successively lower grade, with the averages at grades 1 to 4 remaining relatively constant. The panel has not been in a position to analyze the extent to which this reflects various possible explanations: decreasing school system effectiveness at the upper elementary and secondary levels, increasing school retention rates, changing motivational factors, possibly diminishing relevance of some of the standardized tests to what is being taught.

We have given particular attention to the results of two other sets of examinations sponsored and administered by the College Board and ETS. One of these is the Preliminary Scholastic Aptitude Test/National Merit Scholarship Qualifying Test, a shorter version of the SAT taken annually by over a million high school students, most of them in their junior year. (The test has also been used since 1971-72 by its cospon-

sor, the National Merit Scholarship Corporation, as a qualifying test.)

For reasons and with implications that are only partially clear, the PSAT/NMSQT scores followed a different pattern than did those on the SAT between 1963 and 1973. The declines were substantially smaller. Furthermore, when the PSAT/NMSQT was given in 1960, again in 1966, and once more in 1974, to national samples of 11th graders as a whole (not being limited, therefore, to students probably college bound), these "norming studies" showed a substantial stability in averages on both the Verbal and Mathematical sections over the entire 14-year period.

An accounting of the complex variety of factors that emerged in the panel's examination of this difference between the SAT and PSAT/NMSQT patterns would burden this report unduly. We find adequate explanation for most of the difference but not for all of it. There may be support here for the view of some analysts that there has been more change taking place at the 12th- than at the 11th-grade level. What emerges as most significant, however, is that since 1973, both the Verbal and the Mathematical score averages on the PSAT/NMSQT have dropped in almost exact parallels to the declines on the SAT. So here again, the "two decline" pattern shows up, though with a perhaps noteworthy difference in timing.

There has been a probably significant difference in the pattern of scores on the Achievement Tests, covering 14 different subject-matter areas, which some high school juniors and seniors take in conjunction with the SAT. Some colleges and universities require applicants for admission to take certain of these tests; others recommend it. Students may themselves choose to take various of the Achievement Tests and to have the scores on them transmitted along with their SAT score. Each of two of these tests (in English Composition and Mathematics Level I) is taken by more than 175,000 students (high school juniors and seniors) each year; each of eight others (American History and Social Studies, French, Spanish, Biology, Chemistry, Physics, Mathematics Level II, and Literature) is taken by between 15,000 and 75,000 students; fewer than 10,000 students take the German, Hebrew, Latin, Russian, and European History tests. Use of the Achievement Tests has declined sharply in the past four or five years. Students taking them are characteristically of higher-than-average ability.

Although the group taking Achievement Tests is a special and relatively small one, several elements in the picture nevertheless appear important. There have been relatively small declines in the past 10 years on four of the more widely used Achievement Tests (American History and Social Studies, Mathematics I and II, and Literature) and *increases* on the six others (English Composition, French, Spanish, Biology, Chemistry, and Physics), during what was the period of most of the decline on the SAT scores themselves.

When students' scores on the Achievement Tests are compared with their scores on the SAT, it is apparent that in those six Achievement Test groups for which scores on the Achievement Tests went up between 1967 and 1976, the students' SAT-Verbal score averages went down. This was not true, however, as far as the SAT-Mathematical scores were concerned; all six groups showing increases in Achievement Test score averages also showed increases over the nine-year period in SAT-Mathematical averages.

We have not been able to analyze fully the possible implications of this apparent divergence between aptitude and achievement test score patterns. Perhaps part of the explanation is that the students taking the Achievement Tests are particularly highly motivated, although this does not explain the different patterns of their performance on the Verbal and Mathematical sections of the SAT. It is conceivably important that the College Board and ETS make much larger use of outside committees in connection with the Achievement Tests than with the SAT; the counsel sought is in the one case from experts in the particular disciplines, in the other more from psychometricians and psychologists. There are possibly clues here to significant questions regarding the changing "relevance" of one set of tests or another. This body of data warrants further analysis by the Board and ETS.

A mixed pattern of developments emerges in the scores on tests that college students take enroute to postgraduate study. The ETS Graduate Record Examinations averages (on the Verbal and Quantitative sections of that test) have declined at about the same rate since 1967 as have the SAT-Verbal and Mathematical averages, with almost half the drop concentrated in 1969-70. There is a similar pattern on the Graduate Management Admission Test. The Law School Admission Test and the Medical College Admission Test show increases, however, apparently reflecting primarily the increasing competition for graduate school admission in these two areas.

Only preliminary results are available so far from the National Assessment of Educational Progress (NAEP), a project that will eventually provide tests at four-year intervals of national samples of individuals at various age levels (9, 13, 17, and 26-35) in 10 different curricular areas, with a considerable amount of accompanying biographical data being supplied by the test takers. Of the four banks of NAEP tests completed so far, three are in the Reading and Writing areas. They show results differing considerably from those on most other standardized examinations. The NAEP tests in Reading Performance and in Writing Mechanics show relatively slight declines in the averages for the 17-year-old group between 1969-70 and 1973, but the test in Functional Literacy and Basic Reading Performance shows a small *increase*—particularly among the groups of students (blacks, for example, and children from lower socioeconomic families) who scored lowest on the first round of tests. NAEP Reading Performance and Writing Mechanics tests given to the 9-year-old and 13-year-old groups show the usual pattern of lesser declines (or even increases) at the lower age levels.

Although it is proposed to extend the NAEP testing project eventually to include not only enrolled students but those out of school (in the 17 and 26-35-year-old groups), very little has yet been done. So little is known about the performance of age groups as a whole on tests of this kind, except for the familiar evidence of the results, while the military draft was in effect, of the Armed Forces Qualification Test (AFQT). The average on that preinduction test went up sharply between the mid-1960s and the early 1970s. There are, however, so many possible explanations of this rise, which came during the period when most tests of *students in school* were showing decline in this age group, that comparative analysis is exceedingly difficult. There are no reliable comprehensive measures yet of the comparative competence of today's youth with yesterday's. It could occur at the same time (1) that a larger percentage of

young people going on to college would be less well equipped for what college has traditionally required, while (2) the general ability level of youth as a whole increased.

■ In summary, the evidence regarding the two stages or elements of the SAT score decline is illuminated by the data regarding what has been happening on other standardized academic tests.

Although the drop in the SAT averages (especially the Verbal scores) has been larger than that on any of the other widely used examinations, it is consistent with a general pattern of decline found in other test scores, which started to develop in the mid-1960s and has persisted ever since.

A comparative analysis of these various test score records confirms, at the same time, the necessity of recognizing clearly the dual developments this pattern reflects. First, a larger percentage of young people are staying in school through the 12th grade with the consequence that there has been a lowering of the *averages* on examinations taken previously by more select groups. Second, it has emerged as a major factor in the more recent stages of these test score patterns that there are broader influences operating to reduce young people's developed ability levels, at least at the upper high school level.

The panel has identified, with relatively firm statistical basis, roughly two-thirds to three-fourths of the decline between 1963 and about 1970 as resulting from "compositional" changes in the SAT-taking population. As nearly as we can tell, though the statistics are less helpful here, only about a quarter of the subsequent decline is traceable to continuing compositional change, with the remaining three quarters apparently resulting from the impact of more "pervasive" forces.

We turn now to what analysis is possible of the nature of this second set of influences.

Part Four. Circumstantial Evidence

SEARCHING for the causes of the SAT score decline over the past six or seven years is essentially an exercise in conjecture. So much has happened that may have affected this record that there is no way of telling what did; the only evidence is circumstantial, leaving it hard to distinguish cause from coincidence. Most of the 50 or so theories brought to the panel's attention have in common only three assumptions; first, that since the problem has been reduced to a single statistic—the drop in these averages—there must be a single answer; second, that what has happened is in every respect bad; and third, that whatever caused it is somebody else's fault.

Although the panel's only certain conclusion is that we are dealing here with a virtually seamless web of causal connections, the apparently most critical elements emerge more clearly in looking first at some developments in the schools, then at several major societal changes, and finally at the murky but probably vital area of youths' motivations.

In the Schools

While some of the observable changes in formal education during the past 20 to 25 years probably reflect evolving educational philosophy, our impression is that most of them are traceable in larger degree to the vast expansion and extension of educational opportunity in the 1950s and 1960s. The *direct* effects of "compositional" change on the SAT score averages were concentrated in the period before 1970, but this leaves the question of how much fallout effect those changes have had since that time. There is the additional question of the relationship between what has been happening in the schools and what has taken place in learning's broader societal context. Looking for causes of the SAT score decline requires going beyond the evidence of revisions in traditional educational practices to the reasons these revisions have been made.

Courses of Study

A good deal of attention has been focused on the fact that fewer "basic" courses are now being required of all students in high school, with many more "electives" being introduced into the curriculum. This is asserted to be particularly true in the English and verbal skills area, and the evidence suggests that it is.

Using nationwide data assembled by the National Center for Education Statistics, Harnischfeger and Wiley report that in one recent two-year period (1971 to 1973) English enrollments in grades 7 through 12 dropped almost 11 percent, about 50

percent in Advanced English. This drop probably involves less those students who will be taking the SAT than it does the high school student population as a whole; the Student Descriptive Questionnaire shows about 90 percent of the SAT takers reporting consistently from year to year that they have taken four "English" courses. Yet the question remains as to what kinds of courses these are.

A study by the Massachusetts Department of Education combines a survey of the development of "elective" courses in Massachusetts high schools between 1971 and 1976 with an analysis of the SAT scores in 43 of these schools—divided into three groups on the basis of how their students' SAT averages compare (in terms of change between 1971 and 1976) with the national SAT averages.

During the five-year period there were increases of over 50 percent in the number of English/Language Arts courses offered (at least as indicated by course titles) in the 43 Massachusetts high schools; the two most commonly added were Science Fiction and Radio/Television/Film. No significant correlation emerges between the number of electives added by a particular high school and the experience of students from that school on the SAT. Yet when the record of student enrollments in the two commonest "specialty" courses is analyzed, it develops with significant consistency that those schools that showed increases in these enrollments between 1971 and 1976 also showed larger than normal declines in SAT scores; and where the specialty course enrollments went down or stayed about the same, there were not substantial SAT score declines. Another Massachusetts study shows that between 1968 and 1973 over a quarter of all high schools in that State added courses in Film Making; the number offering 11th-grade English and World History courses went down.

There have been similar developments in other states. In California, for example, it is reported that "enrollment in basic English courses fell 19 percent between 1971-72 and 1974-75 and in English Composition classes it plummeted 77 percent. . . . Enrollment in contemporary literature electives (Children's Theater, Mystery and Detective Story, Executive English) has nearly doubled."

While the panel's net conclusion is that there is almost certainly some causal relationship between the shift in the high schools from courses in the traditional disciplines to newer electives and the decline in SAT-Verbal scores, we warn against any oversimplistic interpretation of this finding.

A careful probing of the evidence indicates that the new electives are being taken less by students who are going on to college (and will therefore take the SAT) than by those who are not. It will have to be determined whether the needs and interests and developed competencies *of those taking these electives* are better met by a course, for example, in Radio/Television/Film or an English IV course in the refinements of the language. Nor has it been established that even with respect to SAT takers these elective courses contribute *by their nature* less to the "aptitudes" the SAT supposedly measures—distinguishing this, to the extent such a distinction is possible, from "achievement." In our view, "returning to the basics" would be wrong unless it included full reappraisal of what the right basics are—taking account of childrens' different rates and modes of learning and their different interests and plans for the future. The need is not to revert to uniform drills and exercises commended only by a traditional pedagogy, but to move ahead to a larger emphasis on the fundamentals of learning

that can be identified as strengthening the base on which all students can build.

Our firmest conclusion is that the critical factors in the relationship between curricular change and the SAT scores are (1) that less thoughtful and critical reading is now being demanded and done, and (2) that careful writing has apparently about gone out of style. So we do not identify the score decline narrowly with reduced high school offerings of whatever used to be included in Advanced English courses. There is as much opportunity, and sometimes more incentive, for worthwhile reading and responsible writing in subject-matter areas of particular student interest.

We can't prove that learning how to write is related to a decline in scores on a test that requires no writing. Yet in our judgment this may be a significant factor. We suspect strongly that *expressing* something clearly and correctly—especially in writing—is thinking's sternest discipline. A recent study by National Assessment of Educational Progress of the number of writing assignments given a group of 11th-grade students shows that during a six-week period more than half of them were asked to write three or fewer papers, 12 percent only one, 13 percent none.

It seems clear that increasing reliance in colleges and high schools on tests requiring only the putting of X's in boxes contributes to juvenile writing delinquency. Students learn what they think they need to know. There is more than irony in the report of teachers, who used to train students to write, now advising them about the advantage in using soft-tip pens and pencils so these boxes can be filled in more quickly.

We applaud the recently announced reintroduction this year, at the December test administration only, of a written essay as part of the College Board's English Composition Achievement Test.

Our strong conviction is that concern about declining SAT-Verbal scores can profitably be concentrated on seeing to it that young people do more reading that enhances vocabulary and enlarges knowledge and experience, and more writing that makes fledgling ideas test and strengthen their wings.

It has been pressed strongly on the panel that there is a related development in the sharp decline in enrollments in high school foreign language courses, ancient and modern. Such courses, it is suggested, increase the knowledge and understanding of the English language—a development reflected in performance on the Verbal part of the SAT.

A clear parallel unquestionably shows up between students' SAT-Verbal scores and the number of foreign language courses they have taken in high school. Those who report having taken four or more such courses (about 10 percent of the test takers) average more than 100 points higher than those (about 8 percent) reporting no work in foreign language; and the averages rise progressively with the number of courses taken.

Is this, though, a *causal* relationship? Does foreign language training improve verbal ability or do students with high verbal ability take more foreign language? Is there anything here except confirmation that abler and more highly motivated students are more likely than others to take some foreign language course? It turns out that the foreign language students do as much better than others on the Mathematical part of the SAT as they do on the Verbal. The Student Descriptive Questionnaire reports show no reduction since 1973 in the amount of high school foreign

language being taken *by students who also take the SAT*. Furthermore, although students who have taken foreign language continue to average higher SAT scores, the *decline* in the averages over the past four years has been at least as large as the decline among students with no foreign language exposure.

The panel may have given too little consideration to the difference between the score decline patterns on the Verbal and the Mathematical sections of the SAT. Most of the deviation had developed before 1968; the Verbal score average was at that time already 24 points below the Mathematical average. The two averages dropped in virtual parallel between 1964 and 1970. This gap has widened significantly, however, during the later stage of the SAT decline, until it is now 41 points. At one large and prestigious Midwestern university the median SAT-Verbal score of entering first-year students dropped by 60 points (from 580 to 520) between 1970 and 1976, while the Mathematical median score went down only 20 points (from 620 to 600)—with the high school grade averages of the entering classes remaining at a virtually constant level.

There may well be clues in this difference to some of the causal elements in the general score decline.

It is perhaps relevant that there has not been the proliferation of electives in high school Mathematics that has been characteristic of the verbal skills area. While Massachusetts high schools were increasing their course offerings in English by 50 percent (between 1971 and 1976) there was virtually no increase in the number of Mathematics courses being offered. Student enrollments in high school Mathematics courses have gone down some, but markedly less than enrollments in English courses.

We suspect, too, that there is more evidence here of the importance to SAT-Verbal scores of the diminishing emphasis on reading and writing, for these skills play much less part in mathematics.

The implications of the difference in scores on the two parts of the SAT may go considerably beyond this. We have conjectured that mathematics is essentially school-based learning, while verbal skills are more influenced by experience in the home.

Why, referring back to the point covered earlier, do students taking the College Board Achievement Tests, and maintaining previous scoring levels on them, show declining SAT-Verbal averages but stable or even increasing SAT-Mathematical averages?

The realization that the decline in SAT-Mathematical averages has been at about the same rate as the decline on most other standardized academic tests, while the SAT-Verbal decline has been substantially larger than any of the others, obviously raises the question—though we imply nothing regarding an answer—of whether there is something here that is peculiar to the Verbal part of the test.

Not having gone into the matter of the difference between these two score patterns as fully as hindsight suggests might have been advisable, we commend further consideration and investigation by the College Board and ETS.

Learning Standards

There have unquestionably been changes over the past 10 to 15 years in the standards to which students at all levels of education are held. Absenteeism formerly con-

sidered intolerable is now condoned. An "A" or "B" means a good deal less than it used to. Promotion from one grade to another has become almost automatic. Homework has apparently been cut about in half. Open admissions colleges are available; if entering students don't know how to read and write and do arithmetic, "remediation" is available.

There can be little doubt, despite a dearth of direct data, that these changes in standards are reflected in the decline in SAT score averages. The harder questions are about the reasons behind these changes, and about how to meet the problems presented here without compromising some interests and values and principles that the college entrance examinations do not pretend to take into account.

Several of these developments warrant particular attention.

Although the daily attendance and absenteeism data are infected by administrative chagrin attending their reporting, the available figures reveal a seriously worsening situation in the high schools during the late 1960s and early 1970s. Average daily attendance rates went down as the school retention rates went up. A 1975 report by the National Association of Secondary-School Principals identified absenteeism as "the most perplexing student problem. . . ." Absenteeism rates above 15 percent became common and 20 to 25 percent not unusual. There has apparently been some recent improvement in this situation.

Excessive student absenteeism has a doubly corrosive effect: on the absentee and on the class as a whole, when so many of those present don't know what was covered yesterday that the teacher repeats the lesson in an attempt to bring everybody up to pace.

The schools are both contributing cause and victim of this phenomenon. To the extent school is a place youngsters flee because they find themselves diminished or bored or both, the need is plainly for internal reform. Yet without the right alliance with home and community the school's effectiveness is limited. We note the probable need here for improved guidance and attendance services—which cost money few school budgets provide for this purpose.

"Grade inflation" is perhaps most commonly pointed to as a reflection of declining educational standards. An American College Testing Program study shows an increase, between 1962-65 and 1974-75, of 25 percent in the proportion of "A" and "B" grades reported by college-bound seniors in high school English courses. Other reports reveal a comparable pattern throughout both secondary and postsecondary education.

Yet we question the significance of grade inflation *as such* so far as the decline in college entrance examination scores is concerned. While the Student Descriptive Questionnaire data clearly confirm the fact that more students are now getting A's and B's than used to be the case, the distribution of SAT takers among the various *percentiles* on high school grade records apparently has not changed substantially.

The apparently more significant development involves the increasing acceptance of the notion that advancement from one grade level to another is an entitlement rather than something to be earned—or denied. It is unlikely that very many students who are promoted when their work doesn't warrant it will ever take the college entrance examinations. Yet here again, the necessary assumption is that other students'

education suffers from teachers' having to gear their instruction to classes including too many who have fallen badly behind the rest.

The panel considers this, however, a hard problem with no easy answer. Automatic promotion hasn't developed because either teachers or principals like the idea. They don't. They know, however, the dubious value there is in "holding a student back"—so far as both that student and the rest of the class are concerned.

Now there is a nationwide movement, citing what has happened on the SAT and other comparable tests to support it, toward conditioning students' promotion at various grade levels on their achievement of prescribed scores on standardized tests. Reports, principally in the press, are that this is having a salutary effect. Yet dependence on rigid cutting points on test scores for this purpose makes no more sense than it does for college admissions. Perhaps something of this kind is valuable in reestablishing a commitment among teachers, students, parents, and community to the ideal of educational excellence. We suspect, however, that the promotion of students from one grade level to the next ought to be ultimately a matter of case-by-case decision, taking account of each student's social and psychological development as well as his or her intellectual growth and permitting flexible arrangements for moving ahead, for example, in certain subject-matter areas but not in others.

We conclude, in short, that what is reflected in the practice of automatic promotions has indeed been one of the causes of the SAT score decline, but we question an equally "automatic" answer that such promotion should depend entirely on scores on still other standardized tests.

The panel has considered, too, the relatively clear evidence (though none of it has been quantified) of reduced assignments of homework. We find this another reflection of the changing standards of elementary and secondary education, which seems to us related to the SAT score decline. There is no way of determining whether the reason for the reduction in homework was that teachers or that parents decided it was less important. We assume that television is a factor here, and we come to that problem shortly.

Trying to probe beyond these more obvious reflections of changed educational standards, the panel commissioned a preliminary investigation of the possible relationship between the SAT score decline and whatever changes there may have been in the textbooks being used at various primary, elementary, and secondary levels. Taking the Verbal score averages for SAT takers in six cohorts (1947, 1955, 1962, 1967, 1972, and 1975) as a starting point, an analysis was made of the Reading and History textbooks and related materials that were in commonest use at the 1st, 6th, and 11th-grade levels when these various SAT cohorts were getting their preparatory education. The materials were compared on the basis of several recognized measures of "readability," "difficulty," and "challenge."

Although this study proved inconclusive with respect to establishing direct correlations between the changing nature of the teaching materials and subsequent SAT scores, several of its broader findings are illuminating. By the measures adopted in the study, current 11th-grade texts are generally at what is considered a 9th-to-10th-grade level. The significance of this in relationship to the SAT experience is highlighted by the further finding that the reading passages and questions on the Verbal

part of the SAT are—by these same measures—on an 11th-to-12th-grade and in some cases at a 13th-to-15th-grade level of readability.

The study develops in statistical form the fact that a constantly increasing percentage of textbook space is taken up by pictures, wider margins, shorter words and sentences and paragraphs; the amount of exposition is decreasing, the amount of narrative going up. It also reports statistically on the extent (as indicated in the textbooks and related teacher materials) to which student exercises are being reduced to an "objective answer" basis, meaning that students will find less reason to learn to write: "generally, the assignments in the Reading, History, and Literature textbooks [ask] only for underlining, circling and filling in of single words." Samples of good writing are accompanied in one text by the editor's (or publisher's) reassuring note to the students that while the selections "should be read and appreciated, they [are] not to be considered examples of writing that students should expect to attain themselves."

The study confirms what we know from the reports of textbook writers enjoined by publishers to "make it simple" and from the echoing reactions of better students that what they are reading at school is "simpler stuff than we read in the newspapers."

Recognizing that textbooks are not in themselves measures of good or bad teaching, or of how hard or easy a course is made, or of how much writing will be required, we nevertheless have a dual reaction to the reported changes in the nature of teaching materials. If textbooks are being written down simply in response to somebody's persuasion that students at various grade levels don't have what they used to have, this is greasing the toboggan—and is *itself* a cause of the SAT score decline. If, on the other hand, these changes reflect—as we suspect they do—an attempt to adapt education to the needs of *all* students, they represent an effort that reflects an authentic purpose but yields negative side effects by shortchanging some students.

The American education system is unique in its variety and its capacity to be useful to an extremely broad constituency, in which those who are going to take the SAT are a minority. We do not read the SAT score decline as an instruction that education in this country must or should be more rigid, more selective, more rejective, more uniform. Instead, the instruction is that education, especially secondary education, must become still more diversified, more varied—but without being watered down.

So in general we find that there *has* been a lowering of educational standards and that this *is* a factor in the decline in SAT scores. We conclude at the same time that the correction of the various elements in this situation requires the collaboration of teachers, students, parents, and the broader community in the establishment of standards that can be truly considered higher only as they recognize youths' essential diversity.

Staff and Facilities

The composition of the panel makes it poor critic or judge of the extent to which the decline in SAT scores may reflect simply teacher incompetence and administrative ineffectiveness, or, on the other hand, inadequate provision of educational facilities.

The sudden influx of students into the elementary and secondary schools during the 1960s and early 1970s resulted in a sharp increase in the demand for teachers and a considerable reliance on substitute teachers. The average years-of-experience fig-

ure for elementary school teachers was 13.3 in 1961; it dropped by 1966 to 10 years; then moved down in 1971 to about 8 years.

On the other hand, teachers' educational levels have been rising for the past 30 years.

Reported pupil–teacher ratios have been going down gradually but steadily in both elementary and secondary schools during the entire period relevant to the score decline: from 29.6 pupils per teacher at the elementary level in 1956 (for the country as a whole) to 23 per teacher in 1974; and from 21.2 to 19 students per teacher in the secondary schools. These figures are misleading in their lumping together of full-time classroom teachers and auxiliary personnel; the nationwide averages conceal the fact that in a good many school systems few teachers ever meet classes with fewer than 30 students in them. Although we do recognize that the compositional changes that have occurred place added burdens on teachers and argue for reconsideration of their responsibilities in order to achieve better writing and other desirable ends, it would be a mistake to attribute the SAT score decline to teacher overload.

Though there are no reliable objective measures of administrative competence, elementary and secondary school principals and superintendents have become increasingly men and women with both teaching experience and special training as administrators. Many of them now are political executives in the better sense of the term.

Teaching and administrative salaries have been increasing in comparative terms throughout this period and the general financial support base for education has been substantially expanded. It is clearly arguable that only part of the price tag on *real* equality of educational opportunity has yet been paid. We suspect that the inequitable distribution of funds for schools may be related to the problems of standards and quality, but we cannot claim to have investigated the matter. Yet to attribute the SAT score decline to inadequate financial support of education would both abuse the facts and worsen the ironical truth that this decline has already prejudiced the probably legitimate case for increasing this support.

These statistical facts—regarding teachers' years of experience and training, student–teacher ratios, salary levels, and the like—obviously involve, however, only superficial aspects of the issue that is now becoming the center of national debate regarding what to do about the quality of education. Despite increasing recognition of the role of the community and the family in learning's processes, attention is being centered on the qualification of teachers.

Over half the state legislatures have either enacted or are considering bills to condition the hiring of elementary and secondary teachers on their achieving statutorily prescribed grades on standardized teacher examinations. The legislative debates invariably invoke the decline of student scores on the SAT and other comparable examinations as support for these bills; the decline is introduced as evidence in litigation regarding the legality of this legislation.

The panel recognizes and in no sense minimizes the role of teachers and school administrators in what has happened here. Our best judgment is that their responsibility centers in their having made more concessions because of changing circumstances and demands—by tolerating excessive absenteeism, for example, and by themselves credentialing incompetence, by adopting less-demanding textbooks, by

condoning little reading and less writing—than has been good for anybody involved. But this becomes a hard question of how much choice they have had, and of how the demands of a changing student clientele are best met.

We also recognize that there are compositional changes taking place in the teaching profession, involving the elimination of racial discrimination, that parallel in some respects the compositional changes among high school juniors and seniors and students going on to college. We see as much danger in compromising standards in the one case as in the other. Our increased understanding of the workings of standardized student examinations in such situations does not, however, commend exclusive reliance on the use of comparable examinations for teachers. Whatever may be wrong with teachers today is too important to be left to standardized examinations alone.

The Broader Learning Context

Most of us, doing poorly on a test, go through two stages in trying to figure out why it happened. With the SAT score decline there are four stages. Suspicious first of the test, next of the schools, then of the younger generation, we turn finally to look in the mirror. But the reflection is cloudy, our vision of ourselves only partly clear.

Most people accept the propositions that the population wave that engulfed the schools was of national making, that school absenteeism begins at home and corridor crime in the streets, that ill-considered promotions from one grade to the next trace at least as much to parental and community pressure or indifference as to principals' taking the easy way out. Yet there is virtually no statistical evidence of any *causal* connections between societal developments and SAT scores. There are delicate matters involved here—such as changes in the American family, the advent of television, and an embarrassing decade in American history.

Parents as Teachers

James S. Coleman, Christopher Jencks, and others have now established the relationship of various "family background variables" to educational outcomes, and we have taken account in Part Three of the unquestionable influence of some of these variables—socioeconomic status, for example—on SAT score averages during the period of changing composition of the test-taking population. But there is more here than that.

The period preceding and including the decline of the SAT scores has also been a period of marked change in the family.

Only one aspect of this change, involving family size, has been analyzed in terms of its possible relationship to college entrance examination scores. Several studies indicate that first-born children average higher scores on these tests than their siblings do and that the averages decline with each succeeding birth. This has been correlated with the decreasing score averages during the period when the post-World War II population wave affected this situation. Although the effect of multiple variables may be relevant, we find these research findings credible as far as they go.

More penetrating investigation of other possible causal factors in this situation has been handicapped by social sensitivity; the Student Descriptive Questionnaire asks

SAT takers how many siblings there are at home, but not how many parents. So research is only now beginning into the questions of what effect there may be on academic test scores as a consequence of broken homes, of there being one parent (or none) present instead of two, of the mother's working outside the home either by necessity or by choice, or of the father's allocation (again by either necessity or choice) of his time and interests.

We do know that in 1960 some 89 percent of all children under 18 in this country were living with both parents, and that this figure has dropped now to 80 percent. The number of children in other situations—living with one parent or none—is increasing at the rate of over 300,000 each year.

We know that the number of children from divorced families has doubled in the past 10 years, and that desertion rates are increasing.

We know that one obvious implication of women's exercising the now recognized right to equal employment opportunity is that they will be spending more time outside the home. The figures, which may be enemy to the truth because they tell only part of it, are that more than half of all women with children of school age (and 40 percent of those with children under 6) are now holding either full-time or part-time outside jobs; and these figures are rising rapidly.

What we *do not* know is what the relationship of these developments to children's learning may be—either under present circumstance or when appropriate adjustments are made to accommodate to a changing set of family life styles. The question usually left out is what the learning implications of alternative situations would have been in the particular case involved. The tendency is to look too much at the "status variables" in the picture, because they can be measured, and too little at the "learning process variables" that actually determine what kind of education takes place in any home as well as in any classroom.

In the panel's view, nevertheless, the matter of home learning is of critical importance in any attempt to identify the causes of the decline in academic test score averages. Although the key factors have not been identified—or even whether they involve the nature and amount of communication and of reading that goes on in the home, or the balance between concentration and distraction, or the mysteries of motivation and of self-image—there is probably more than coincidence between the decline in the SAT scores and the drop in the number of children living in two-parent homes.

Perhaps there is another related factor here. If there have been negative effects from changes in parents' functioning as teachers, they are probably paralleled by the effects of a weakening in traditional relationships between teachers at home and teachers at school. Most parents, regardless of the particular family situation, want to help in this teaching business as much as they can, but a lot of them feel they no longer know how. Changes in educational practice, as well as changes in family life styles, have probably contributed to a strain on the teacher–parent relationship, which may have had more effect than anything either partner has done alone. If this is true, as we suspect but cannot prove, it is an encouraging report from school book publishers that one of the largest new demands (next to the call for more basics-oriented and career-oriented materials) is for texts and teaching guides aimed directly at re-en-

listing parent participation.

It is perhaps equally important to recognize that if little is known about the impact on achievement of changing family configurations and circumstance, still less is understood about the effects of the changing state of childhood and youth itself. There has been a steady lengthening of the period during which the family either cares for or seeks surrogate care for its younger members and exercises some form of jurisdiction over them. At the same time, there has been perceptible acceleration of young people's physical and sexual, and probably intellectual, maturation.

Are these opposing trends creating within youth, and between them and adults, tensions that manifest themselves in school in the forms of rebellious behavior and underachievement? The 17-year-old of 1977 is not the same in body or in mind as the 17-year-old of 1947 was. It can hardly be coincidence that problems of discipline and absenteeism appear at a time when changing life styles and values in adult society, earlier physical maturity, higher mobility, drugs, and the pill are all interacting.

None of this is translatable in the present state of the evidence into point declines on college entrance test score averages. Yet if the question is why those scores have been going down, few would respond without recognizing that part of the answer is almost certainly hidden in these gaps in present knowledge—about the effects of change on the whole meaning of family and youth.

Television—Test of the Modern World

By age 16 most children have spent between 10,000 and 15,000 hours watching television, more time than they have spent in school. When they reach the 1st grade, their average watching time is between 20 and 35 hours a week; this usually peaks at about age 12. The average time per child per day increased by about an hour between 1960 and 1970. Children are doing what their parents are; television now occupies about 40 percent of Americans' leisure time.

Is television a cause of the SAT score decline? Yes, we think it is. This cannot be proved, and we don't know *how much* a factor it is. By 1965, when scores started dropping, there were already television sets in 95 percent of all American homes; so ordinary research methods won't work here, for there are no non-television-watching control groups to use for comparison. Neither the difficulty of proof nor the impossibility of measurement, however, warrants diluting the answer. Television has become surrogate parent, substitute teacher.

What direct research there is on correlations between television watching and academic test scores is in fact entirely inconclusive. One earlier study comparing a television-watching Canadian town with another that was still at the radio-listening stage found T.V. Town's children had advanced vocabularies in the 1st grade, but that this advantage had disappeared by the 6th grade; there were no observable differences in academic achievement in grades 6 through 10. A 1954 series of studies of children in grades 3 through 6 in Evanston, Illinois, found that children in the lowest quarter of academic achievement averaged six hours more television viewing per week than those in the top quarter; but these studies took no account of other variables. In a sophisticated study conducted in Tokyo in 1970, an apparently significant correlation emerged at first between academic achievement scores and the

test takers' reports of the amount of television they had been watching (the more television the lower the scores); but when controls were introduced for such variables as intelligence, creativity, and adaptability the separate significance of television watching disappeared.

So the panel's conclusions here must be plainly identified as essentially subjective.

We suspect that the three or four widely known and generally respected educational television programs designed for younger children are giving them a faster start with their letters and numbers. This may be at least one reason standardized tests show increases rather than declines in recent years at the first several grade levels.

So far as the scores on college entrance examinations are concerned, however, we are impressed and persuaded by two interrelated considerations. One of these involves the assumption that spending 10,000 to 15,000 hours on television's fare means a significant reduction in time, some of which would otherwise have gone into the development of the skills and aptitudes measured on college entrance examinations. An unquestionably considerable amount of time at the set used to go into homework and into reading and writing. To call television a thief of time is in a sense to beg the issue. Yet if developing the capacities that are measured by the SAT is taken as a value, the only question is whether television's larceny is petty or grand.

Another dimension of this first consideration involves the hypothesis that part of television's impact on education is that it raises children's expectation levels so that they are then discouraged by the comparative blandness of what they find when they open a book or encounter the next morning in the classroom. A member of the panel who is a teacher makes the point: "Sometimes I feel I'm competing with television stars who can sing and dance while they add and subtract and do the alphabet. I can't!"

The second set of considerations seem to us perhaps more important for what they suggest about the possible reach of television's implications than for anything specific. We have considered the apparently supportable working hypothesis that reading a line of script or type (as on a college entrance examination or in a textbook) involves a "linear, verbal, logical" function, which is performed in the left hemisphere of the brain, while watching something such as a television screen involves a "simultaneous, visual, affective" function—performed in the brain's right hemisphere.

Mindful of the dangers of a little learning, we simply note some of the questions those with larger but still very incomplete knowledge are also asking—without yet knowing the answers. Could this much (10,000 to 15,000 hours) functioning of one area of the brain alter the neural mechanisms of the mind—with *possible* effect on the handling of verbal materials? When so much more of children's time now goes into developing what they need for processing information in the visual mode (as in television) instead of the reading mode, would this result in lowered performance on the SAT test of verbal aptitude?

Could there be a suggestion here of a reason for larger declines on the Verbal part of the SAT than on the Mathematical part—in the possibility that geometry, for example, involves more a visual than a linear function, that mathematical problem solution is more simultaneous and holistic than linear, that the sense of algebraic equa-

tions comes from a grasp of the whole equation rather than from a linear view of one symbol following another?

Is part of the reason children's academic test scores are staying at previous levels or are increasing in the lower grades, but not in the higher, that there are closer similarities between television and the teaching methods used in the first few grades?

We know only that we stand on a frontier of knowledge that probably leads to partial answers to the questions we are considering, and that television's effects may in fact be so much broader than this one suggestion of them as to mock its unimportance.

The prospect is one of competing promise and threat. Traditional education and television are currently out of kilter, and the stakes in correcting this quickly seem to us higher than is generally realized. Yet if television's abuses have made it a "vast wasteland," its potential is of becoming learning's most fertile grove. We see this only as a question of when the family and the community will decide, as they have in the case of the schools, what kind of education they want this master but unprincipled teacher to give their younger members.

"I believe television is going to be the test of the modern world and that in this new opportunity to see beyond the range of our vision, we shall discover either a new and unbearable disturbance of the general peace or a saving radiance in the sky." This was E. B. White; the date was 1938. On that test, too, the scores have been declining.

A Decade of Distraction

When democracy thrives, Bernard Murchland points out, so does education, and when democracy is in crisis, so is education. Whatever application this truism may have to the SAT score decline is best suggested quickly and let go at that, for the facts are as obvious as the proof of any causal relationship is impossible.

The SAT scores dropped more sharply between 1972 and 1975 than during any other period. Most of the score decline on the ACT also came after 1970. It is hard to understand the suddenness and concentration of these changes—except for the realization that the students entering college during that period had gone through five or six years of national disillusionment, especially for young people, virtually unparalleled in American history.

It is arguable that the military draft, with its exemption of students, had a direct effect on the SAT score average along the course of its decline. Although our attempted analysis of this particular possibility leaves it in question, we suspect that there was a related but broader set of influences here. There is simply no way of knowing how much the trauma, between 1967 and 1975, of coincident divisive war (which youth had to fight), political assassination (of their particular heroes), burning cities, and the corruption of national leadership affected the motivations of the young people of that period—and whether there was consequent effect on their college entrance examination scores.

That concatenation of sad events unquestionably undermined respect for established institutions and processes, and this was manifested most overtly by young people. Because they were closest to education's institutions and processes, these were the focus of their protest. It was a time of extraordinary distraction, when it would have

been hard for students to put the best that was in them into getting high marks on a college entrance examination.

This probably made quite a difference.

Motivation

The further the panel has gone into various aspects of this general question of reasons for the score decline, the more the matter of "motivation" has come up in varying forms relating not only to the taking of the college entrance examinations themselves but to virtually all aspects of the learning process.

A study commissioned by the panel, summarizing research in the area of achievement motivation, warns of the complexity of the subject and the difficulties of applying what is known about it to the limited information available to us. Yet we sense the motivational implications of a good many of the points that have been considered in other contexts.

It seems plausible speculation that as opportunities for getting into college have widened there may have been less concentration of student efforts on preparing for college entrance examinations. This would be in no way inconsistent with recognition of the fact that reducing anxiety improves some test takers' performance. The point is rather that there would appear to have been a lessening, for better or for worse, in the competitiveness or higher purpose that can be an incentive to excellence.

We have suggested earlier our persuasion that women's lower average scores on the Mathematical part of the SAT reflect a traditional stereotyping of roles and occupations, which has resulted in at least some young women's seeing no earthly point in developing that particular proficiency.

The differences in academic performance among students with different socioeconomic backgrounds have been widely analyzed in terms that put less emphasis on cognitive development than on training in independence, resourcefulness, confidence, willingness to take risks, and realism in setting aspirations levels.

Distinctions are drawn in some of the studies between the effect of various patterns of parental relationship (1) on what children learn, and (2) on the degree to which they are encouraged to learn.

Are ill-considered promotions, increased absenteeism, and "easier" textbooks causes or consequences of reduced student motivation? Both, we suspect.

To have noted some of the motivational elements that seem apparent in the effects of television is only to have suggested others of perhaps larger significance.

We have made the point, involving what is essentially motivation, that the extraordinary national events of the past 10 years may very well have had the effect of distracting young people from the pursuit of intellectual excellence.

It has been suggested that youth's changing job prospects and attitudes toward work may be important elements in the chemistry of their motivation to prepare for college entrance examinations. Although this is probably true as far as individual students are concerned, some fairly careful analysis of the timing of "labor market" changes over the past 10 years and changes in the test score averages discloses no significant relationship so far as any *net* effects are concerned. There have probably

been different changes in this respect between female and male attitudinal patterns, and between those of higher- and lower-scoring groups of students. It is difficult to generalize about what effect varying degrees of encouragement and concern about job prospects may have in stimulating efforts to qualify for whatever may be available.

We note the possible motivational implications of the reports regarding two sets of questions on the Student Descriptive Questionnaire. One asks whether the test takers "want to receive help outside regular course work from the college you plan to attend. . ." going on then to list specific areas of possible assistance, including reading, mathematics, and writing. The answer is a resounding No in each of these three cases, by margins of about 8 to 1; and the percentage answering Yes has fallen off during the three years this question has been asked in its present form. (The only question showing any different reaction is one about help in finding work; a third of the test takers say Yes to this.) The panel members interpret this no-help-wanted reaction variously as a reflection of motivation, conditioned response, or a declaration of students' independence.

A good deal more significance may attach to the fact that there have been smaller than average declines during the past several years in the SAT scores of students who report on the SDQ that they have participated in various high school extracurricular activities (athletics; social clubs or community organizations; religious activities; music; journalism, drama, debating; student government; preprofessional or departmental clubs; or ethnic activities), and that they expect to do more of this in college. There are different views about the motivational elements involved in such participation, but the item has perhaps special interest in view of the suggestion that engaging in this kind of activity is a particularly reliable index to young people's longer-run future accomplishments. We commend further inquiry by the College Board and ETS into this area. It could possibly have considerable significance in suggesting not only basic elements in the reasons for the SAT score decline but also alternative forms of predictive testing.

We have noted in an earlier section of the report (Part Three) the possibility that there are motivational elements reflected in the fact that students taking Achievement Tests in conjunction with the SAT show a significantly less-than-average score decline pattern on the SAT itself (at least on the Mathematical part).

These would be, even at best, only possible footnotes to a motivational analysis of the SAT score decline, which we are not competent to make but which we commend as warranting further consideration. Such an analysis would not be limited to students' attitudes about tests but would include consideration of the motivational elements in the interrelationship between formal education and its broader societal context. It appears to us to be not just youth's motivations that are involved but also those of the society.

With respect to not only this motivational point but the preceding points as well, the panel notes that the frustrating limitations on understanding of the elements contributing to the "pervasive" influences on SAT-measured competence will be removed only when two additional research steps are taken: first, the extension of the Student Descriptive Questionnaire's scope to cover individual test takers' circumstances out-

side their formal education; second, the undertaking of longitudinal studies permitting the following up of sample cohorts of young people from childhood to maturity. The society has drawn back from this on grounds of concern about rights of privacy. But these can be fully protected. The larger problem is to overcome sensitivity about inquiring into areas in which the answers may be embarrassing because of what they indicate about such influences as poverty, prejudice, and the functioning of various institutions, including particularly the schools and the family.

Also, it is important to note that a limited instrument such as the SAT should not become the sole thermometer for measuring the health of schools, family, and student. It tells us nothing about young people's honesty and integrity, about whether they care about each other, or about a lot of other things that matter more than test scores. It would be a mistake to think about such major institutions as the schools and the family solely in terms of their effects on test scores.

In the View of Others

The panel has benefited from a generous volunteering of views regarding reasons for the SAT score decline. Although most of these comments are incorporated or at least reflected in various other sections of this report, this is not true of all of them. None of the suggestions received has been disregarded, and it is appropriate to note here those brought to our attention that we have either not pursued as fully as may be warranted or have followed up to the point of concluding that they are not significant.

Many of these reactions relate to the schools and suggest at least partial attribution of the decline to:

- "New math."
- Reading programs with insufficient emphasis on phonetics, vowels, consonants, and so forth.
- The expenditure of funds on school facilities instead of on teachers.
- Rising costs of postsecondary education, discouraging some superior students from applying to the characteristically more expensive colleges and universities, which require SAT scores.
- The independent school board system, which makes it impossible to set and require national achievement standards.
- Increasing legislative involvement in education, "tying the hands of school personnel with respect to discipline."
- Excessive reliance on clerical aids.
- The influence of "the soft pedagogical left," which "believes expressiveness is an adequate substitute for thinking and knowing, and which views leniency as a kindness to the underprivileged."
- The increased numbers of married female teachers.
- The "influx of male teachers and principals in the 1960s into a traditionally female domain."

Because of the frequency of suggestions that the score decline is attributable to "the introduction of experimental teaching methods," (or to "open classrooms in

which students choose activities in nongraded groups and work largely without teachers," etc.) the panel made particular efforts to explore this general area. Two different investigations proved generally inconclusive. Their indicated results are confirmed, however, by a federally sponsored study of some 30,000 students at the primary and elementary levels in 18 school districts in nine states, recently (December 1976) completed by the American Institutes for Research. The AIR study was based on a three-year follow-up of students who took the Comprehensive Test of Basic Skills in 1970-71 at the 1st, 4th, or 6th-grade levels. "The single most important and well-documented finding," the AIR report concludes, "was the lack of either substantial or consistent association between student achievement and overall level of innovation across the grades." We find no evidence of any causal relationship between what are commonly referred to as "experimental teaching methods" and the SAT score decline.

The panel also looked into the suggestion that the introduction of more experiential (outside-of-school) training in the high schools may have contributed to a lessening development of students' abilities in the basic skill areas covered by the SAT. What evidence there is points in the other direction. One of the SDQ questions is about the part-time work the test takers have been doing. It has been going up slightly since 1973. Yet test takers reporting 1 to 15 hours of outside work a week average higher SAT scores than those doing no such work at all, and their score *declines* over the past four years have been less than the overall average. (Students reporting more than 15 hours of outside work show generally lower-than-average SAT scores, particularly Verbal scores. We assume, though without knowing, that this is the lower-socioeconomic-status group.)

A related question involves whatever shift may be taking place at the secondary school level away from liberal arts and toward more vocational and technically oriented training. Here again there is only totally inconclusive evidence about any possible effect on the SAT score averages. The SDQ reports confirm the fact that test takers enrolled in "career" courses of study in high school (which is a very small percentage, about 6 percent) average much lower scores on the SAT than do those enrolled in "academic" courses. The differences are about 100 points on both the Verbal and the Mathematical parts of the test. There has been only a negligible shift since 1973, however, in the percentage of SAT takers in the two groups; and the score declines have been almost identical.

Although the panel's attention has been directed repeatedly to the facts of increased schoolground violence and crime and juvenile alcoholism and drug addiction, we can add nothing here to what common knowledge and common sense already establish. These aberrations obviously affect not only the individuals directly involved but the broader educational process, and they have been increasing as the SAT scores have been going down. It seems worth noting only that these matters are consistently raised in terms of what is happening in the schools and among children. The problem is obviously broader than that. So far as the issue is why the SAT scores have been going down, the question is: What is causing the delinquent behavior?

With respect to the "forced busing" question, also frequently raised, we conclude from what information it has been possible to obtain that in those relatively few in-

stances in which busing has meant large-scale disruptions of one kind or another there has been an immediate negative impact on the educational process, although this has been characteristically of short duration. There is no way of determining or quantifying its *net* effect. Its incidence has in any event been restricted to so small a proportion of the national student population that it could have had at most only very slight effect on the SAT score averages.

There have been a number of suggestions that teacher organization and the development of collective bargaining have affected adversely both the amount of time teachers spend with students and their attitudes toward the profession. We have looked into this only to the extent of determining that there is no evidence available to permit an objective judgment one way or the other. This has seemed a sufficient basis for not going further into an issue on which the panel members' views would probably be about as divided as are those of the broader public.

So far as suggestions regarding possible causal factors outside the school system are concerned, the panel has taken particular notice of a number of suggestions that the score decline is attributable to health factors of one kind or another: to the increased use of chemical additives in foods, for example; to an increased resort to induced labor in pregnancy (with resultant brain damage); or to the effects of the uses of various forms of anesthesia in connection with childbirth. A study was commissioned to determine, broadly, the possibilities of a medical basis for the declining SAT scores. Its advice to the panel is, in short, that nothing in the available evidence warrants identifying these factors with the score decline, and that the evidence of stable or even increasing score averages in tests administered at the primary grade levels denies the suggestion that the test results at the higher grade levels can be properly traced to medical or health factors that have their largest impact during earlier childhood years.

Other suggestions tie the test score decline to increased pregnancy among younger women and rising abortion rates.

Still others attribute the decline to "a growing rejection of traditional Western religions" and to a concomitant turning to "religions of the East, drug-related religions, mysticism, witchcraft, astrology," or, with different emphasis, to a growing "preference for fantasy over reality" and "celebration of the ideology of irrationalism, in which knowledge is attained through intuition, inspiration, and revelation."

Concern about a "crisis in values" is widely expressed, but with varying emphases: on "subversive political activity by Communists"; on the promotion of pornography; on the "grabbing of political power by the NAACP, NEA, CLU and others . . . [so that] public school children are misguided through negative education, . . . groomed in total disgust with the nation, family, and self"; on the "impact of the counterculture with its hostility to reason, to science, to technology, to industry, to the work ethic"; on a "revolution in values, including a decline in the Protestant ethic . . . , the idea of success, . . . the idea of work itself"; a "tidal wave of moral bewilderment, concern, and resentment."

Although some of these suggestions seem to the panel to offer little in themselves as far as explaining the decline in the test scores is concerned, we imply nothing one way or the other here about the broader values they reflect. In general we find the

sum of these contributions substantially helpful in suggesting the character of a period, covered by the score decline, which has been an unusually hard one to grow up in.

Part Five. Summing Up

If you turned to this concluding section for a quick and easy understanding of the panel's views on the decline of test scores, you are indulging in a practice like some of the educational shortcuts that may have contributed to the decline. This is a complex subject, and our views of it are filled with nuances, qualifications, and some doubts. The quality of our judgments is conditioned by the quality of the evidence. Without a reading of the report, the summary may suggest a simplicity that is unfair to an important subject.

Looking first at the technical aspects of the SAT score decline, the panel has determined that the decline does not result from the test having become, in terms of common usage, "harder." More precisely, our analysis of the equating and scaling procedures that have been followed here indicates that the decline has been several points larger than is shown. To the extent, nevertheless, that the SAT is held out as providing an essentially constant measure of levels of aptitude in the areas it covers, permitting reliable comparisons over periods of time, we find it to have been maintained with superior competence and fidelity.

We find that, despite the decline in score averages, the SAT continues to be a valid instrument for helping to determine how well those taking it will do in their college courses, especially those in the first year. Its predictive validity has in fact increased slightly over the past several years.

We commend to the College Board and ETS, nevertheless, the undertaking of a broader inquiry into the function of tests at the passage point between high school and college. Such an inquiry would not be limited to what conventional testing procedures measure regarding traditionally emphasized competencies; nor should it be confined to an evaluation based on examinations and statistics comparing the effectiveness of learning today with what it was in the past—by standards the past adopted. That inquiry would proceed from a determination of how much this country wants to develop of the limitless human resource, which is what education is all about.

The panel members share strongly what has now become national concern about the implications of the declining test scores, about the increasing (or at least increasingly recognized) signs of functional illiteracy, and about an apparent deterioration in the use of the English language. Yet we share, too, the sobering realization that a good many of the younger members of our families seem to know quite a lot more about quite a few things than we did when we were their age. Even as we pursue this inquiry into what is apparently going wrong as reflected in the decline of the SAT scores, we urge that a broader look be taken at the whole picture—including whether we are testing in the best possible way whatever ought to be tested.

Turning then to the broader aspects and implications of the SAT score decline, our assessment of this continuous 14-year drop in averages is that it is unquestionably significant. Particularly when the SAT record is set beside the broader pattern of comparable declines on other standardized academic tests, it emerges as a development warranting careful attention by educators and by everybody interested in education.

It is in no way inconsistent with this appraisal to point out that these declines cover a period of notable extension and expansion of educational opportunity in the United States, coincident with the experiencing of virtually unprecedented turbulence in the nation's affairs. The record may suggest as much about youth's inherent resiliency and the resourcefulness of the formal educational process under unusual circumstances as about deterioration in either personal or institutional fibers. We have wondered sometimes in the course of our inquiry why the score declines haven't been larger.

In general, the causal factors apparently involved here fall into two categories so different that it seems helpful to think in terms of what are virtually two score declines. One reflects primarily changes in the SAT-taking population; these score averages measure a different and broader cross section of American youth from the group they measured 20 or 15 or even 10 years ago. The reasons for the other aspect of the decline are more elusive; they include the apparently pervasive influences, affecting virtually all groups of students alike, of changes in the practices of the schools and in the American social fabric.

Most—probably two-thirds to three-fourths—of the SAT score decline between 1963 and about 1970 was related to the "compositional" changes in the group of students taking this college entrance examination.

That was a period of major expansion in the number and proportion of students completing high school, resulting only in part from the post-World War II population wave, which came along then. The rest of the growth reflected the deliberate national undertaking during that period to expand and extend educational opportunity—by reducing the high school drop-out rate, by trying to eliminate previous discrimination based on ethnicity or sex or family financial circumstance, and by opening college doors much wider.

In the panel's view, it would be a deceptive misstatement to describe this first cause of the SAT score decline as being simply that increased percentages of lower-scoring groups of students began taking the test. The cause lies rather in whatever the reasons may be for this lower scoring. What the decline reflects is the incompleteness so far of the national undertaking to afford meaningful equality of educational opportunity. This leaves the question of whether a 75 percent cross section of all young people *can* be brought up to the 11th- or 12th-grade academic attainment level previously achieved by 50 percent of them. Part of democracy's sustaining notion is that they can be.

It is important to recognize in a related connection that to the extent the lower SAT averages reflect an expansion of the test-taking population to include a different mix of young people, the decline indicates nothing about changing abilities or aptitudes of this age group *as a whole*. We simply don't know what the *net* effects here have been.

Even during this first period, however, there were emerging signs of more "pervasive" influences or forces, going beyond any "compositional" changes, which were having an effect not only on the overall SAT averages but also within the various groupings of test takers.

From about 1970 on, the composition of the SAT-taking population has become comparatively more stabilized with respect to its economic, ethnic, and social background. Yet the score decline continued and then accelerated; there were particularly sharp drops during the three-year period from 1972 to 1975. Only about a quarter of the decline since 1970 can be attributed to continuing change in the make-up of the test-taking group. With a handful of exceptions, the drop in scores in recent years has been virtually across the board, affecting high-scoring and lower-scoring groups alike.

This second set of factors contributing to the SAT score decline can be summarized only in broad terms and with full recognition of two related qualifications. First, any attempt to isolate developments in the schools from those in the society at large turns out to reflect principally the inclination to institutionalize blame for whatever is going wrong; the formal part of the learning process cannot be separated from its societal context. Second, to the extent these causal factors are understood at present, they are inextricably interwoven with each other; any pointing to one development or another as if it were *the*, or even *a*, cause of the decline is invariably misleading.

As already noted, we think that two-thirds to three quarters of the score decline from 1963 to 1970 and about a quarter of the decline since 1970 were caused by complex interacting factors relating to the changing membership in the population tested. Overall this suggests that about half of the decline is properly traced to these factors. The remainder seems to us identifiable in large part with six other sets of developments:

- *One.* There has been a significant dispersal of learning activities and emphasis in the schools, reflected particularly in the adding of many elective courses and a reduction of the number of courses that all students alike are required to take. This has been true particularly in the English and verbal skills area.

In the panel's judgment, any broadside condemnation of "more electives" is mistaken. Many of these courses are designed to interest and motivate students, and they are not properly considered as having by their nature a negative effect on basic learning. We would not recommend any single formulation of subject matter or teaching method, for it is clear that both traditional and innovative approaches to learning can produce good results—or bad. We are inclined to believe, nevertheless, that probably well-intentioned change has reduced the continuity of study in major fields with consequent effect on the development of verbal and (to a lesser extent) quantitative relations skills, and that too large a proportion of the curriculum changes in recent years has been accompanied by a tendency to avoid precise thinking and the demands it makes on both students and teachers. The SAT score decline probably reflects in part the effects of the schools' placing reduced emphasis on steady growth in verbal and mathematical competence.

We attach central importance to restoring the traditions of critical reading and careful writing.

- *Two.* There is clearly observable evidence of diminished seriousness of purpose and attention to mastery of skills and knowledge in the learning process as it proceeds in the schools, the home, and the society generally. This takes a variety of apparently disparate but actually interrelated forms: automatic grade-to-grade promotions, grade inflation, the tolerance of increased absenteeism, the lowering of the demand levels of textbooks and other teaching and learning materials, the reduction of homework, the lowering of college entrance standards, and the inclusion of "remedial" courses in postsecondary education.

Each of these issues presents its own quandary. We are *not* suggesting simplistic "solutions" through which all students are treated alike by being held in a grade until they reach a common standard, suspended from schools as a penalty for absenteeism, subjected to the same more demanding reading materials, overloaded with homework, confronted with some national common denominator of college entrance, or denied needed help in skills development in college.

Each of these problems has developed in response to the wider spectrum of interests and abilities the schools and colleges are now trying to serve. In a sense the schools may have tried so hard to accommodate the special needs of new and unfamiliar students that these very students along with others have been ill served by not being held to demanding expectations of performance. The lowering of teaching sights is the wrong answer to whatever may have been the consequences of the expansion and extension of educational opportunity. The only right answer is to vary the instructional process still more to take account of increased individual differences, but without lowering standards—which we recognize as a form of magic, but one that has been performed in this country for a long time.

- *Three.* Particularly because of the impact of television, but as a consequence of other developments as well, a good deal more of most children's learning now develops through viewing and listening than through traditional modes. Little is known yet about the effects of this change, including its relationship to performance levels on standardized examinations.

We surmise that the extensive time consumed by television detracts from homework, competes with schooling more generally, and has contributed to the decline in SAT score averages. Yet we are convinced that television and related forms of communication give the future of learning its largest promise. The most constructive approach seems to us to depend less on limiting the uses of these processes than it does on the willingness of the community and the family to exercise the same responsibility for what is taught and learned this way as they have exercised with respect to older forms of education.

- *Four.* There have unquestionably been changes, during the period relating to the score decline, in the role of the family in the educational process. Social sensitivity has precluded thorough inquiry into this area, so that only the readily observable structural changes can be noted: the rapidly increasing number and percentage of children, for example, in less than complete families. While evidence is not available to determine the effect of these changes on students' college entrance examination scores, our conjecture is that it is negative.
- *Five.* The concentration of the score declines in the three-year period between

1972 and 1975 leads the panel to suspect strongly that one important element here was the disruption in the life of the country during the time when those groups of test takers were getting ready for their college entrance examinations.

▪ *Six.* For whatever combination of reasons, there has been an apparent marked diminution in young people's learning motivation, at least as it appears to be related, directly and indirectly, to their performance on college entrance examinations. Although this may be largely only another dimension of the preceding points, it is perhaps most significant of all that during the past 10 years the curve of the SAT scores has followed very closely the curve of the entire nation's spirits and self-esteem and sense of purpose.

So there is no *one* cause of the SAT score decline, at least as far as we can discern, and we suspect no single pattern of causes. Learning is too much a part of Life to have expected anything else.

It would be too bad, furthermore, if our concentration on the implications of a decline in the statistical averages on a set of standardized examinations should seem to ignore how incomplete a measure this is of either educational or broader human purpose. While we ask why the scores on college entrance examinations have gone down, T. S. Eliot's probing goes much deeper: "Where is the learning we have lost in information? Where is the understanding we have lost in knowledge? Where is the life we have lost in living?"

Yet in the panel's view of it all, the fact of the hard asking—of both kinds of questions—offers new promise of new answers. We find nothing in the record we have reviewed to discourage the conviction that learning in America can be made all that is hoped for it. What is clearest is the reflection, in the reactions to these test scores and to the poet's lament alike, of renewed purpose to implement these hopes. The future continues to seem a good idea.

Reference Notes

The panel has relied in large part on studies undertaken and reports prepared at its special request. These are being published as appendixes to this report. An annotated listing of them follows these Reference Notes, as does a more comprehensive Bibliography of all sources on which the panel has relied. The specially prepared papers and reports are identified in the Reference Notes by an asterisk. They are all the work, except where otherwise indicated, of the staff of Educational Testing Service or the College Board.

Part One. The Scholastic Aptitude Test and the Score Decline

The description of the SAT score pattern is based largely on *A Summary of SAT Score Statistics for College Board Candidates** (1976) prepared for the panel by Rex Jackson. Additional sources are indicated in the footnotes to Table 1.

Sample questions from the various sections of the SAT appear at the back of this report, following the Bibliography.

Part Two. An Unchanging Standard

As It Was in the Beginning:

The technical details of procedures followed in making scaled scores comparable over time and equating new editions of the SAT with previous editions are set out in *The College Board Admissions Testing Program: A Technical Report on Research and Development Activities Relating to the Scholastic Aptitude Test and Achievement Tests*, published by the College Board in 1971. For technical descriptions and assessments made under independent auspices, see *The Seventh Mental Measurements Yearbook*, edited by Oscar Buros (1972).

The panel's conclusions regarding the effectiveness of the scaling and equating procedures are based on two studies, one by Christopher Modu and June Stern, *The Stability of the SAT Score Scale** (1975), the other by Albert Beaton, Thomas Hilton, and William Schrader, *Changes in the Verbal Abilities of High School Seniors, College Entrants, and SAT Candidates between 1960 and 1972** (1977). The panel's review of possible "item obsolescence" in the test items which reappear in different forms and are used for equating was facilitated by the analysis by James Braswell and Nancy Petersen, *An Investigation of Item Obsolescence in the Scholastic Aptitude Test** (1976).

The discussion of the predictive validity of the SAT is based on the studies made by the colleges participating in the Admissions Testing Program Validity Study Service, the results of which have been synthesized by Susan Ford and Sandy Campos, *Summary of Validity Data from the Admissions Testing Program Validity Study Service** (1977).

The development and administration of the SAT are reported on in a series of four

articles by Jim Landers and J. Stryker Meyer in *The Sunday Times-Advertiser* and *The Evening Times*, Trenton, N.J., March 28-31, 1976.

A Changing Context?

The panel's consideration of the "relevancy" issue was illuminated by letters received from Terry Herndon, executive director of the National Education Association, and Professor Robert Bannister of Swarthmore College.

The reference to the continuing correlation of SAT scores with high school grades is based on an analysis by Rex Jackson, *Correlations of SAT Scores with High School Record** (1977).

The student valedictorian story is reported by Stephen Klaidman in *The Washington Post*, August 15, 1976.

Cross sections of current adverse criticism of educational testing are contained in several recent symposiums: Association for Childhood Education International, *Testing and Evaluation: New Views* (1975); American Federation of Teachers, "To Test or Not To Test: An Examination of the Educational Testing Controversy," *American Educator*, Winter 1977; National Education Association, "Special Feature on Testing," *Today's Education*, March-April 1977; *The Myth of Measurability*, edited by Paul L. Houts (1977). See also Cynthia Parsons, "SAT + ACT = College Tests in a Mess," *The Christian Science Monitor*, March 29, 1976; B. Bruce Briggs, "The Great Classroom Debacle," *The Wall Street Journal*, July 20, 1976. The panel notes these criticisms without any suggestion of its views regarding them.

Part Three. The Two Score Declines

Compositional Change:

The data used at the beginning of the section to describe youth and student population changes are from Table 1 of the report. The discussion of changes in the proportions of students graduating from high school and going on to college is based on the historical series maintained by the Bureau of the Census, recording the percentage of 1,000 5th-graders who are retained in school at each grade beyond that, who graduate from high school, and who enroll in college (see *Digest of Educational Statistics*, 1975 edition, Table 10, p. 14, National Center for Educational Statistics). The statistics in Table 1 cannot be used to derive school retention rates since any one school class is composed of youth of varying ages, while the population figures in Table 1 cover only 18-year-olds.

The composite analysis of SAT, Project TALENT, and National Longitudinal Study data was made for the panel by Albert Beaton, Thomas Hilton, and William Schrader, *Changes in the Verbal Abilities of High School Seniors, College Entrants, and SAT Candidates between 1960 and 1972** (1977). Data from the American Council on Education's annual Freshman National Norms Study and from the ACT Student Profile reports were also used to examine compositional changes. See Richard L. Ferguson and E. James Maxey, *Trends in the Academic Performance of High School and College Students*, American College Testing Program Report No. 70, January 1976; E. James Maxey, *Trends in the Academic Abilities, Background Characteristics, and Educational and Vocational Plans of College-Bound Students*, American College Testing Program Report No. 74, May 1976.

Changes in college-going patterns as they affect SAT scores are analyzed in the study by William Schrader, *Distribution of SAT Scores to Colleges as an Indicator of Changes in the SAT Candidate Population** (1976), and in Samuel S. Peng's paper, "Some Trends in the Entry to Higher Education: A Comparison between NLS and Project TALENT" (1976).

The influence of changes in the extent of repeating the SAT is explored in Rex Jackson's study, *An Examination of Declining Numbers of High-Scoring SAT Candidates** (1977).

Regarding reliance on cram courses, see *Effects of Coaching on Scholastic Aptitude Test Scores* (College Entrance Examination Board, 1965); Lewis W. Pike and Franklin R. Evans, *Effects of Special Instruction for Three Kinds of Mathematics Aptitude Items* (College Entrance Examination Board, 1972); Bart Barnes, "Area Pupils Attend Special Cram Courses to Prep for SAT," *The Washington Post*, October 18, 1976; Linda K. Nathan, "'Improving' Law School Aptitude Is Big Business," *The New York Times*, November 14, 1976.

Pervasive Change:

Evidence of the relatively more stable makeup of the SAT population and of the pervasive nature of much of the decline during the period between 1973 and 1977 has been obtained from a computer printout of the Student Descriptive Questionnaire data. A generally corroborative picture of experience with respect to the ACT is provided by *The High School Profile Report, 1975-76*, issued by the American College Testing Program.

Further and more detailed information on the nature of the SAT score decline in this period is contained in the papers by Rex Jackson on *An Examination of Declining Numbers of High-Scoring SAT Candidates** (1977) and on *Trends in Mean SAT Scores for Students from the High School Classes of 1971-72 and 1975-76 Belonging to Selected School and College Groups** (1977); in Thomas Donlon and Gary Echternacht's report on *A Feasibility Study of the SAT Performance of High-Ability Students from 1960 to 1974 (Valedictorian Study)** (1976); in James Nelson's *A Review of Data Available regarding Family Income and Financial Aid Characteristics of Students** (1976); and in June Stern's analysis of *Selected Percentiles for Scholastic Aptitude Test Scores (1966-67 through 1975-76)** (1977). For a state-level study reaching similar conclusions about the pervasive nature of the score decline in this period see Janice J. Weinman, *Declining Test Scores: A State Study*, Massachusetts Department of Education (1977).

Through Other Looking Glasses:

The panel's consideration of the experiences of other major national or statewide testing programs is based on the standard published reports of the sponsoring agencies and on studies that include summaries and analyses of a variety of other tests. Particular note is made of the analysis of other test score experiences by Annagret Harnischfeger and David Wiley in *Achievement Test Score Decline: Do We Need to Worry?* (1975); the ACT research report by Leo Munday on *Declining Admissions Test Scores*, American College Testing Program Report No. 71, February 1976; a report by Frank E. Armbruster, *The U.S. Primary and Secondary Educational Process* (Hudson Institute, 1975); the analysis by John Flanagan and Steven Jung, *Progress in*

Education: A Sample Survey (American Institutes for Research, 1971); John Flanagan's report at the American Educational Research Association meeting in 1976 on "Changes in School Levels of Achievement: Project TALENT Ten and Fifteen Year Retests"; an exerpt* from the paper, *A Summary of Score Change*, delivered by T. Anne Cleary and Sam McCandless at the 1977 annual meeting of the Northwest Association of Schools and Colleges.

Data regarding PSAT/NMSQT scores are presented in Rex Jackson's study *Mean Scores for PSAT and PSAT/NMSQT Junior Candidates* (1976).

The discussion of Achievement Test candidates' scores on both those tests and the SAT is based on June Stern's *Table of SAT and Achievement Test Scores for Samples of Candidates Taking Achievement Tests 1966-67 to 1975-76** (1977).

Part Four. Circumstantial Evidence

In the Schools:

Courses of Study. As indicated in the report, extensive reliance has been placed by the panel on the studies by Harnischfeger and Wiley and by Weinman, noted above. See also the *Survey of Curricula Offerings*, prepared by the Massachusetts Department of Education, 1967-68, 1970-71, 1972-73, and 1975-76. The California picture is described in a series of three articles by Jack McCurdy and Don Speich in *The Los Angeles Times*, August 15-17, 1976; the panel has not made an independent check of the reported facts. Changes in courses taken have also been traced through special tabulations of the Student Descriptive Questionnaire data; these data are subject to the possible influences on student self-reporting.

The panel has not made an independent study of the extent to which there have been declines in reading and writing. Reference is appropriate, however, to the report prepared for the U. S. Office of Education by ETS and the University of Indiana (R. Farr, J. Turnman, and M. Rowls) on *Reading Achievement in the United States: Then and Now* (1975); Donald Graves, "Writing: An Endangered Species," *The Common*, March 1977; A. Bartlett Giamatti, "The Language Barrier: Why Students Can't Write," *Yale Alumni Magazine*, January 1976; "Why Johnny Can't Write," *Newsweek*, December 8, 1975. A study of the federally financed Follow Through program, entitled *Education as Experimentation*, has been made recently by Abt Associates for the Office of Education; not yet available for general distribution, its conclusions are suggested by Lawrence Feinberg in "Basic Teaching Methods More Effective, Study Says," *The Washington Post*, June 20, 1977.

Learning Standards. Average daily attendance data are derived from the *Digest of Educational Statistics* and *A Century of Public School Statistics* (1975), both prepared by the National Center for Educational Statistics. The National Association of Secondary-School Principals' report, on "Student Attendance and Absenteeism," is in *The Practitioner*, March 1975.

The panel's discussion of textbook content is based on a study made by Professor Jeanne Chall of Harvard University, *An Analysis of Textbooks in Relation to Declining SAT Scores** (1976). See also the *Report on a National Study of the Nature and the Quality of Instructional Materials Most Used by Teachers and Learners*, Educational Products Information Exchange Report No. 76 (1977).

Staff and Facilities. Information on teacher experience and education and on pupil-teacher ratios is based on data developed by various offices of the Department of Health, Education, and Welfare, particularly by the National Center for Educational Statistics (*The Condition of Education* [1975-77]); most of it is summarized in Harnischfeger and Wiley, noted above.

The Broader Learning Context:

Parents as Teachers. The specific references are to James S. Coleman's *Equality of Educational Opportunity* (1966) and to Christopher Jencks' *Inequality: A Reassessment of the Effect of Family and Schooling in America* (1972). A large number of studies of the comparative importance of family background and school influences have appeared subsequently (see Edward Kifer, "The Relationship between the Home and School in Influencing the Learning of Children," a paper delivered at the Pre-Convention Conference on Research, National Council of Teachers of English, Chicago, Illinois, November 23, 1976).

Regarding the effects of family size and sibling order on academic tests, the panel had available to it the studies of R. B. Zajonc, "Intellectual Environment and Intelligence" (unpublished paper, 1975) and "Birth Order and Intellectual Development" (*Psychological Review*, 1975) as well as Hunter Breland's *Family Configuration Effects and the Decline in College Admissions Test Scores: A Review of the Zajonc Hypothesis** (1976). See also Carol Tavris, "The End of the IQ Slump," *Psychology Today*, April 1976.

The Condition of Education (1975-77) (National Center for Educational Statistics) provides a historical series on children under 18 who are living with two parents, one, or none. See also Urie Bronfenbrenner, "The Calamitous Decline of the American Family," *The Washington Post*, January 2, 1977.

The report of trends in published teaching materials is from Barbara Thompson Howell's presentation to the New Jersey Association of School Administrators, Atlantic City, New Jersey, May 12, 1977.

Television—Test of the Modern World. We relied heavily on panel member Wilbur Schramm's report to us on *Television and the Test Scores** (1976).

The conjecturing about the functioning of the mind is based on suggestions received from Professor Bikkar S. Randhawa of the University of Iowa. There is help for understanding, too, in a symposium entitled "Inside the Brain: The Last Great Frontier," *The Saturday Review*, August 9, 1975; *Television and Children, Priorities for Research*, a report of a conference sponsored by The Ford Foundation at Reston, Virginia, November 5-7, 1975; "What TV Does to Kids," *Newsweek*, February 2, 1977. But see also Max Gunther, "How Television Helps Johnny Read," *TV Guide*, September 4, 1976.

The E. B. White quotation is from his column "One Man's Meat," *Harper's Magazine*, 1938.

A Decade of Distraction. At the panel's request, R. H. Glover prepared two contextual maps of *Major Societal Changes in U.S. (1933-44 and 1945-75): Contextual Mapping** (1976). The influences we refer to particularly are described in the chapters entitled "Up against the Wall" in William Manchester's *The Glory and the Dream* (Boston: Little, Brown and Company, 1974).

Motivation:

The paper prepared for the panel is by Professor David Winter of Wesleyan University, *Motivational Factors in the SAT Score Decline** (1976).

We have also relied to a limited extent on the Student Descriptive Questionnaire data, but with realization of the various elements that may affect the test takers' answers to these questions.

In the View of Others:

These views have been distilled from a large number of letters, personal conversations, and publications by Yvonne Wharton, in *List of Hypotheses Advanced to Explain the SAT Score Decline** (1975).

The two studies of the history of SAT scores in various types of schools are Gary Echternacht's *A Comparative Study of Secondary Schools with Different Score Patterns** (1976) and Rex Jackson's *Comparison of SAT Score Trends in Selected Schools Judged To Have Traditional or Experimental Orientations** (1976). The panel also drew on the study by the American Institutes for Research, *Impact of Educational Innovation on Student Performance* (1976).

Annotated List of Studies and Papers

The panel asked for a variety of studies and papers to assist in understanding the score decline. These papers proved useful for that purpose, even though the panel did not use all the material in them or necessarily agree with all the conclusions. They are published as a separate Appendix to the panel's report, so that this information will be available to others who wish to go more deeply into the subject. What follows is an annotated list of these commissioned studies and papers.

Arnold, C. B. *Could There Be a Medical Basis for the Declining SAT Scores?* January 1977. 8 pages.

A brief summary and analysis of the medical and epidemiological literature dealing with nutrition, drugs, genetic and prenatal conditions, labor and delivery, child development, health status, and health care over several decades in the United States. It concludes that the decline in SAT scores is probably not the result of disease processes or physical environmental factors.

Beaton, A. E.; Hilton, T. L.; and Schrader, W. B. *Changes in the Verbal Abilities of High School Seniors, College Entrants, and SAT Candidates between 1960 and 1972.* January 1977. 81 pages.

Two major social science research efforts—Project TALENT in 1960 and the National Longitudinal Study in 1972—obtained extensive data on ability and other significant characteristics for national probability samples of high school seniors. Both surveys made follow-up studies to determine which of these seniors had entered college in the year following high school graduation. This study was designed to use these two exceptional data bases to document changes between 1960 and 1972 for high school seniors, college entrants, and the SAT-taking population. The data of the national surveys were supplemented by the results of a special equating study and by a search of SAT files for about 20,000 members of the TALENT sample.

The study was concerned with three groups—high school seniors, college entrants, and SAT takers. Because reading scores were available for all three groups, it was possible (after equating the reading tests used) to measure changes in reading ability for all three groups. In addition, it was possible to study subgroups of the three main groups. The subgroups were defined on the basis of each of the following characteristics: age, sex, father's education, mother's education, father's occupation, mother's occupation, family configuration, high school curriculum, and expected college major field.

The main conclusions of the study are as follows.

1. All three groups showed a decline in reading ability between 1960 and 1972. The

decline for SAT takers, however, is markedly greater than that for the other two groups.

2. A much greater increase in the proportion of low-ability than of high-ability students who took the SAT appears to be the predominant source of the SAT score decline between 1960 and 1972. The decrease in ability level of high school seniors during this period also contributed to the decline.

3. There is some evidence that SAT scores earned in 1960 and 1972 are not precisely comparable. The data suggest that the actual decline in average verbal ability of SAT candidates from 1960 to 1972 was somewhat greater than the SAT scores indicate.

4. There were appreciable changes in the background characteristics studied for all three groups. None of them made a major contribution to accounting for the score decline among high school seniors or college entrants. A decrease in the percentage of SAT takers entering four-year colleges may help to explain the greater score decline observed for this group.

Braswell, J., and Petersen, N. *An Investigation of Item Obsolescence in the Scholastic Aptitude Test.* October 1976 (revised January 1977). 74 pages.

Two panels, one concentrating on the verbal sections of the SAT and the other on the mathematical, were appointed to review and rate questions that appeared in earlier editions of the test and then in more recent editions. Raters were asked to indicate how the difficulty of each question might be expected to change between the two administration dates. The raters' predictions were then compared with available item analysis data. For the most part, the changes predicted by raters were not substantiated by the statistical analysis. While the relative difficulty of some questions changed between administration dates, it was not possible, except for a few mathematical questions, to attribute these changes to curricular change or to broader social factors. These mathematical questions were predicted by the raters to be relatively easier at the more recent administration, and their prediction was supported by the statistical analysis.

Breland, H. M. *Family Configuration Effects and the Decline in College Admissions Test Scores: A Review of the Zajonc Hypothesis.* September 1976 (revised February 1977). 15 pages.

A hypothesis that part of the SAT score decline is a result of changing American family sizes and configurations is explored. This possible explanation of declining SAT scores had been offered by Robert B. Zajonc in an article in *Science* that reviewed the evidence for a relation between family configuration and cognitive development. Since a number of investigations have shown that "earlyborn" students—those who were the first or second child in their families—and members of small families tend to have higher scores on tests such as the SAT, a change in the representation of students who are earlyborn and members of small families in the population could possibly cause a decline in the average for the total population. The hypothesis is explored through a consideration of the magnitude of the change in family configurations over the years of interest and the magnitude of observed score differences for the SAT. It is concluded that, while the Zajonc hypothesis seems sound, it could only account for a small portion of the total SAT score decline.

Breland, H. M. *The SAT Score Decline: A Summary of Related Research.* January 1976, 40 pages.

This paper surveys the available evidence pertaining to the score decline in terms of five hypothesis areas: the test, the test-taking population, the college-bound population, the schools, and societal factors. It contains a description of the SAT score decline in both graphic and tabular form as well as population data for the years 1957 through 1973. Based on the data available at the time the panel began its deliberations, it is concluded that the evidence confirms a general decline in the abilities of the college-bound population but is less clear with respect to the high school population. It is speculated that the declines in the college-bound population are due to several factors acting in combination: increases in the proportion of low- and middle-income students, reductions in the numbers of test repeaters, changes in the mix of SAT-user colleges, and less-strict policies regarding college admissions.

Chall, J. S., with Conard, S. S., and Harris, S. H. *An Analysis of Textbooks in Relation to Declining SAT Scores.* November 1976 (revised March 1977), 99 pages.

The authors analyzed the reading selections from six SATs, two from the stable years (1947 and 1955), one from a pivotal year (1962), and three from the declining years (1967, 1972, 1975). Samples of the textbooks used most widely by these six SAT cohorts during their elementary and high school years were analyzed—35 textbooks and approximately 20 workbooks and teacher's guidebooks in reading, grammar and composition, literature, and history for grades 1, 6, and 11.

The various textbooks and SAT reading passages were analyzed using various indices of difficulty and challenge—the Dale-Chall Readability Formula for level of reading/comprehension difficulty, Chall's Reading Stages for level of linguistic and cognitive maturity, a rating scale for assessing question difficulty adapted from Bloom's Taxonomy, etc.

1. Readability analyses of the SAT passages reveals a general decreasing trend in difficulty from the two stable years (1947 and 1955) through the pivotal year (1962), to the declining years (1967, 1972, and 1975).

2. A possible gap between the difficulty of the SAT passages and the difficulty of the 11th-grade textbooks is indicated. The SAT passages proved to be the most difficult of any of the materials analyzed—more difficult than any of the textbooks. Two of the SAT passages were on the level of grades 13-15 and four on the level of grades 11-12. The history, literature, and grammar and composition 11th-grade textbooks had an average readability level of grades 9-10.

3. There are signs in the data of a recent increasing challenge in the textbooks, particularly at the elementary level.

4. The authors find what appears to be a particularly low level of challenge in writing. Generally the assignments in reading, history, and literature textbooks ask mostly for underlining, circling, and filling in of single words. Few assignments ask students to write a paragraph, story, letter, or theme.

Cleary, T. A., and McCandless, S. A. *Summary of Score Changes (in Other Tests).* February 1, 1977, 10 pages. An excerpt from the authors' "Score Declines and Grade Inflation," a paper delivered at the annual meeting of the Northwest Association

of Schools and Colleges, Portland, Oregon, December 1976.
Summarizes the experience of other testing programs, indicating the degrees to which average scores in each changed over the period of the SAT score decline.

Donlon, T., and Echternacht, G. *A Feasibility Study of the SAT Performance of High-Ability Students from 1960 to 1974 (Valedictorian Study).* October 1976 (revised February 1977), 53 pages.
This is a study of the SAT records of valedictorians and salutatorians in three groups of schools: "experimental" schools, specifically chosen for demographic stability; "comparison" schools, selected for stability but by less stringent criteria; and "private" schools. For each group SAT-V and SAT-M scores in the even-numbered years from 1960 to 1974 were studied.

For the "experimental" group, there is no evidence of score decline in either SAT-V or M. Instead the trends have been toward very modest annual increases. For the "comparison" group the data indicated an initial period of increase, followed by a decrease. Each of these two special samples differed significantly from the SAT-taking population. The "private" schools, however, were not significantly different, showing a decline similar to the total College Board population.

Echternacht, G. *A Comparative Study of Secondary Schools with Different Score Patterns.* October 1976 (revised January 1977), 52 pages.
In this study, the curriculum, institutional, teacher, and student factors associated with those schools having large decreases in SAT score averages were compared with the same factors associated with schools having increasing or steady SAT score averages. It was believed that by identifying these factors, some insight into the role that school characteristics have played in the score decline might come to light. Although some significant differences between the two groups were found in terms of enrollments in academic courses, ability grouping, age of schools, dropout rate, and teacher experience, these were judged not to explain a large portion of the decline. Indeed, differences among schools do not appear to have had large differential effects on the decline of scores.

Ford, S. F., and Campos, S. *Summary of Validity Data from the Admissions Testing Program Validity Study Service.* June 1977.
Validity data (prediction of first-year grade-point average) for colleges participating in the Admissions Testing Program Validity Study Service (VSS) and based on students entering college in 1964 through 1974 are summarized for the following predictors: SAT-verbal score, SAT-mathematical score, high school record, and these three predictors combined.

No definite trends over time are apparent for SAT validities, although those obtained for 1973 and 1974 were generally among the highest observed. There was a downward trend in the validity of high school record accompanied by a slight downward trend in multiple correlations for all three predictors combined. Median validities for colleges having SAT-V means between 450 and 549 tended to be higher than those for colleges having means below 450 or above 550. The great majority of colleges participating in the VSS were found to be four-year colleges. Separate analyses

of the small number of two-year colleges in the sample yielded slightly lower median validities for each of the predictors than those found for the total sample.

Glover, R. H. *Major Societal Changes in U. S. (1933-44 and 1945-75): Contextual Mapping.* April 1976 (revised August 1976).
For a span of 42 years (1933-75) a fold-out chart displays major events and influences on events, products, and other phenomena, suggesting their interconnectedness in graphic form. The presentation covers occurrences in the following areas: political, social and cultural, economic and financial, legislative and legal, population and human ecology, and knowledge and technology. The August 1976 revision is accompanied by a scenario for the period 1976-85.

Jackson, R. *Comparison of SAT Score Trends in Selected Schools Judged To Have Traditional or Experimental Orientations.* October 1976, 7 pages.
A group of schools consisting largely of highly regarded schools in affluent suburban areas was divided into two groups—those judged to have a traditional orientation and those judged to have a more experimental orientation (in terms of course and program structure). A review of the mean SAT scores of SAT candidates from the 1966, 1969, 1973, and 1976 graduating classes from these schools shows that (a) mean SAT scores for both school groups were substantially higher than national averages, and (b) declines in mean SAT scores for both groups over the period studied very nearly paralleled the national declines.

This was a small-scale pilot test using available data. Because of the relatively fallible procedures used for classifying schools and because of a general lack of experimental controls of the effects of extraneous factors, the results cannot support any general conclusions about the possible relation of experimentation in the schools to score decline. Because of the essentially negative findings of this pilot test, a more substantial study of this group of schools was not attempted.

Jackson, R. *Correlations of SAT Scores with High School Record.* January 1977, 6 pages.
Two sets of data are examined: (a) correlations of SAT scores with student reports of class standing (collected by means of the Student Descriptive Questionnaire) for 1971-72 through 1975-76, and (b) correlations of SAT scores with measures of high school performance for groups of students attending colleges participating in the College Board Validity Study Service, for entering classes from 1964 through 1974. The correlations of SAT scores with self-reported class rank are virtually level over the five years studied. The longer-term comparisons using validity study data suggest that the median correlations of SAT verbal or mathematical scores with high school record may have increased somewhat over the 11 years studied.

Jackson, R. *An Examination of Declining Numbers of High-Scoring SAT Candidates.* January 1977, 12 pages.
The sharp declines in numbers of SAT candidates scoring over 600, which were observed from 1969-70 through 1974-75, are examined. Several suggested explanations of this phenomenon relating to test-taking patterns are discussed. Specifically examined are the possibilities that less SAT-to-SAT repetition, or less PSAT-to-SAT repetition, or less overlap between SAT and ACT among high-scoring students might ac-

count for some part of the observed declines. Although ideal data for testing all these explanations were not available, certain data in hand suggest that, while changes in test-taking patterns may have had some effect, they probably cannot entirely explain the trend in question.

Jackson, R. *Mean Scores for PSAT and PSAT/NMSQT Junior Candidates.* December 20, 1976, 5 pages.

Gives the numbers of students taking the Preliminary Scholastic Aptitude Test and the Preliminary Scholastic Aptitude Test/National Merit Scholarship Qualifying Test and their mean scores for the period 1959 through 1976. The implications of these results in relation to changes in the candidate group are discussed.

Jackson, R. *A Summary of SAT Score Statistics for College Board Candidates.* December 1975 (revised October 1976), 20 pages.

Summaries of SAT score statistics for test candidates are presented for students grouped according to testing years (for 1956-57 to 1975-76) and for students grouped according to high school classes (from 1966-67 to 1975-76). For recent years, mean scores for geographical regions and for students grouped according to selected responses to the Student Descriptive Questionnaire are also presented.

Jackson, R. *Trends in Mean SAT Scores for Students from the High School Classes of 1971-72 and 1975-76 Belonging to Selected School and College Groups.* January 1977, 9 pages.

Data are presented on trends in SAT performance from the year 1971-72 to 1975-76 for students who (a) attended certain selected high schools for which group summary reports had been produced through the College Board summary report service, or (b) had their scores reported to colleges in groups similarly formed for summary reporting purposes. All school and college groups for which reports were produced both in 1971-72 and 1975-76 are included. The great majority of these groups exhibited declines in mean SAT scores over this period. With only a few exceptions, those groups showing increases in either SAT-verbal or SAT-mathematical mean scores had substantially smaller numbers of students in the more recent year.

Modu, C., and Stern, J. *The Stability of the SAT-Verbal Score Scale.* September 1976, 35 pages.

This study was designed to assess the stability of the score scale between 1963 and 1973 for the verbal sections of the SAT. In a previous study, scores on two old forms were equated to a 1973 form and, through that form, to the College Board scale by means of sets of items common to the new and old forms. This earlier study suggested that the SAT scale had shifted upward by an average of 14 points on the verbal sections and 17 points on the mathematical sections.

In the present study, pairs of 1963 and 1973 forms of the SAT-V were administered in counterbalanced order to spaced samples of the same group, with each candidate taking a 1963 and a 1973 form. The obtained scores were used to place the 1973 scores on the reporting scale used for the 1963 form. The experimentally derived scores on the 1963 scale were then compared with their corresponding scores on the 1973 scale for candidates of the same ability levels in order to estimate the degree of scale shift.

The findings of the present study confirm an upward scale drift which gave the 1973 candidate group an average of 8 to 10 points higher than they would have earned had these experimental equating results rather than the operational equating results been used in reporting the 1973 scores. The scale drift observed for the present study was not uniform over the extent of the scale; it was found to increase as scores decreased from 600 to 200. Little scale drift was noticed over the 10-year span for scores of 650 and above. Based on the evidence from this study it would appear that the reported declines in mean SAT-verbal scores from 1963 to 1973 are about 8 to 10 points smaller than they would have been had the scale been completely stable.

Nelson, J. E. *A Review of Data Available regarding Family Income and Financial Aid Characteristics of Students.* October 1976, 7 pages.

Greatly expanded programs of financial aid based on need have made it possible for large numbers of low-income students to attend college. Since test scores have high correlation with family income, has the increase in low-income students taking the SAT produced the decline in mean scores? This review of available College Board candidate data, income distributions of entering freshmen, percentage of age groups in college by income levels, and impact of student aid on low-income enrollment shows an increased percentage of students coming from lower-income families before 1972, but no significant change since that time.

Reed, J. S. *Available Evidence on Public Attitudes toward Education.* June 1976 (Draft), 31 pages.

Questions dealing with education asked by American survey organizations since 1936 are examined, and over 60 taken to illustrate (1) changes in public opinion since 1960 that might have altered students' evaluations of college going or academic excellence, and (2) changes prior to 1960 that might have affected the quality of preparation for college.

Tables summarize responses to the following broad groups of questions: satisfaction with public schools and personnel and with college and university personnel; adequacy of homework in the public schools, of time spent in school, of discipline in the public schools, of the public school curriculum, of treatment of students with differing ability; desirability of nationwide testing programs; and evaluation of the teaching profession.

It is found that there was a period of criticism of all levels of schooling during the late 1950s, increasing satisfaction with schools and colleges during the 1960s, and a renewed dissatisfaction that starts at the end of the sixties. It would probably be impossible to reconstruct opinion changes between 1950 and 1970 in sufficient detail to relate them to changes in SAT scores.

A catalog of survey questions dealing with education, other than the questions analyzed in the report, is appended.

——A supplement to Reed's paper, consisting of excerpts from the *Eighth Annual Survey of the Public's Attitudes toward the Public Schools.* A project jointly conducted by The Gallup Poll and the Charles F. Kettering Foundation. Princeton, New Jersey: Public Opinion Surveys, Spring 1976.

A significant drop in the public's rating of the schools was recorded between 1974 and 1975, but this decline leveled off between 1975 and 1976. Adults perceive the following as the major problems of the local public schools: lack of discipline; integration, segregation, and busing; lack of proper financial support; poor curriculum; use of drugs; difficulty of getting "good" teachers; parents' lack of interest; size of school or classes or both; school board policies; pupils' lack of interest.

The public believes that the decline in national test scores in recent years means that the quality of education is declining; it would like more attention paid to basic skills and to discipline in the schools in order to counteract the perceived decline of quality in the schools. It inclines, however, to place blame on parents rather than preponderantly on the schools.

Rosenthal, E., and Beaton, A. E. *Annotated Bibliography.* December 1, 1975 (revised April 28, 1976), 17 pages.

More than 30 reports and publications pertaining to national declines in abilities are cited, and most are annotated. The citations in this bibliography include evidence available at the time the panel began its work.

Schrader, W. B. *Distribution of SAT Scores to Colleges as an Indicator of Changes in the SAT Candidate Population.* September 1976, 14 pages.

This study identifies trends in the extent to which SAT candidates were applying to various groups of colleges in 1960-61, 1966-67, and 1973-74. Colleges were grouped on the basis of: (1) the classification developed by the Carnegie Commission on Higher Education, (2) the test or tests they required applicants to take, and (3) state and region. Results provide pertinent data on two main topics: (a) widening access to higher education and (b) acceptance of either SAT or ACT scores for admissions by some colleges. Although the interpretation of the data is complicated, especially by the lack of knowledge about the relation between college choice and taking the SAT, the results offer some reason to believe that both these factors resulted in changes in test taking between 1966-67 and 1971-72 that could have contributed to the SAT score decline. They do not, however, provide a numerical estimate of the size of the effects.

Schramm, W. *Television and the Test Scores.* August 1976, 31 pages.

There is no conclusive evidence as yet that television has been a sufficient cause for decline in test scores, although it may be one of several elements in a complex causal system. The major studies show that television viewing, after the early school years, tends to be associated with lower-than-average achievement, although the relative extent to which viewing affects achievement or unsatisfactory achievement encourages children to take refuge in television is not fully understood. Television reduces reading time, social interaction time, and the opportunity to practice certain skills necessary to academic excellence. It tends to reduce the average level of intellectual stimulation available to a child after the age of 9 or 10. The trend of the evidence is that television viewing patterns belong to a group of strong variables that interact with each other and with school (and, therefore, test) performance, probably with negative effect.

Stern, J. *Selected Percentiles for Scholastic Aptitude Test Scores (1966-67 through 1975-76).* January 1977, 1 page.

This table presents the ninetieth, seventy-fifth, fiftieth, twenty-fifth, and tenth percentile groupings for SAT Verbal and Mathematical scores reported in the 10-year period between 1966-67 and 1975-76. A testing year is defined as extending from September to August; data are collected without regard to level of preparation or the number of times an individual student was tested during the defined year.

Stern, J. *Table of SAT and Achievement Test Scores for Samples of Candidates Taking Achievement Tests 1966-67 to 1975-76.* January 1977, 2 pages.

The table provides the SAT and the Achievement Test means and standard deviations for samples of candidates taking each of the 15 Achievement Tests offered in the Admissions Testing Program battery during the period 1966-67 to 1975-76. The samples, drawn annually through 1971-72 and biennially thereafter, provide estimates of SAT means for each Achievement Test population.

Wharton, Y. *List of Hypotheses Advanced to Explain the SAT Score Decline.* December 3, 1975 (revised February 20, 1976), 8 pages.

A listing of hypotheses to explain the SAT score decline (advanced in letters to the College Board, to the Advisory Panel, in magazine articles, and in newspaper stories) is presented and categorized using a four-part classification scheme: changes in the schools, changes in society, changes in the population, and problems with the tests. The first major category (changes in the schools) is further broken down into hypotheses relating to curriculum, institutional policies, teachers, and students. The second major category (changes in society) lists hypotheses related to family, religion, civil rights, crisis of values, national priorities, economic, labor movement in education, and technological changes.

Winter, D. G. *Motivational Factors in the SAT Score Decline.* October 1976 (Draft), 23 pages.

The paper examines the research evidence and theory about three human social motives that could be expected to play some role in test performance and academic functioning: the motives for achievement, for affiliation, and for power. It also considers the possibility of a "motivational overload." Broad cultural trends (i.e., post-Sputnik emphasis on academic achievement, revolt of the counterculture, crisis of values in Vietnam and Watergate) and related specific changes in the educational system ("open," "alternative," and "humanistic" education) may have had direct and indirect effects on motives. Some of the hypotheses suggest that actual motive levels went up or down with corresponding effects on academic performance. Others suggest the ways in which social forces may have changed beliefs about the nature and value of academic work, beliefs that may interact with relatively constant motive levels to produce behavior changes.

Bibliography

Commissioned by the Panel

Arnold, C. B., *Could There Be a Medical Basis for the Declining SAT Scores?* New York: College Entrance Examination Board, 1977. $2 (2517043).

Beaton, A. E., Hilton, T. L., and Schrader, W. B., *Changes in the Verbal Abilities of High School Seniors, College Entrants, and SAT Candidates between 1960 and 1972.* New York: College Entrance Examination Board, 1977. $6 (2517051).

Braswell, J., and Petersen, N., *An Investigation of Item Obsolescence in the Scholastic Aptitude Test.* New York: College Entrance Examination Board, 1977. $5 (251706X).

Breland, H. M., *Family Configuration Effects and the Decline in College Admissions Test Scores: A Review of the Zajonc Hypothesis.* New York: College Entrance Examination Board, 1977. $2 (2517078).

Breland, H. M., *The SAT Score Decline: A Summary of Related Research.* New York: College Entrance Examination Board, 1977. $3 (2517086).

Chall, J. S., with Conard, S. S., and Harris, S. H., *An Analysis of Textbooks in Relation to Declining SAT Scores.* New York: College Entrance Examination Board, 1977. $5 (2517094).

Cleary, T. A., and McCandless, S. Q., *Summary of Score Changes (in Other Tests).* New York: College Entrance Examination Board, 1977. $2 (2517108).

Donlon, T., and Echternacht, G., *A Feasibility Study of the SAT Performance of High-Ability Students from 1960 to 1974 (Valedictorian Study).* New York: College Entrance Examination Board, 1977. $3 (2517116).

Echternacht, G., *A Comparative Study of Secondary Schools with Different Score Patterns.* New York: College Entrance Examination Board, 1977. $3 (2517124).

Ford, S. F., and Campos, S., *Summary of Validity Data from the Admissions Testing Program Validity Study Service.* New York: College Entrance Examination Board, 1977. $2 (2517132).

Glover, R. H., *Major Societal Changes in U.S. (1933-44 and 1945-1975): Contextual Mapping.* New York: College Entrance Examination Board, 1977. $2 (2517140).

Jackson, R., *Comparison of SAT Score Trends in Selected Schools Judged To Have Traditional or Experimental Orientations.* New York: College Entrance Examination Board, 1977. $2 (2517159).

Jackson, R., *Correlations of SAT Scores with High School Record.* New York: College Entrance Examination Board, 1977. $2 (2517167).

Jackson, R., *An Examination of Declining Numbers of High-Scoring SAT Candidates.* New York: College Entrance Examination Board, 1977. $2 (2517191).

Jackson, R., *Mean Scores for PSAT and PSAT/NMSQT Junior Candidates.* New York: College Entrance Examination Board, 1977. $2 (2517175).

Jackson, R., *A Summary of SAT Score Statistics for College Board Candidates.* New York: College Entrance Examination Board, 1977. $2 (2517183).

Jackson, R., *Trends in Mean SAT Scores for Students from the High School Classes of 1971-72 and 1975-76 Belonging to Selected School and College Groups.* New York: College Entrance Examination Board, 1977. $2 (2517205).

Modu, C., and Stern, J., *The Stability of the SAT-Verbal Score Scale.* New York: College Entrance Examination Board, 1977. $3 (2517213).

Nelson, J. E., *A Review of Data Available regarding Family Income and Financial Aid Characteristics of Students.* New York: College Entrance Examination Board, 1977. $2 (2517221).

Reed, J. S., *Available Evidence on Public Attitudes toward Education*. New York: College Entrance Examination Board, 1977. $3 (251723X).

Rosenthal, E., and Beaton, A. E., *Annotated Bibliography* New York: College Entrance Examination Board, 1977. $2 (2517248).

Schrader, W. B., *Distribution of SAT Scores to Colleges as an Indicator of Changes in the SAT Candidate Population*. New York: College Entrance Examination Board, 1977. $2 (2517256).

Schramm, W., *Television and the Test Scores*. New York: College Entrance Examination Board, 1977. $2 (2517264).

Stern, J., *Selected Percentiles for Scholastic Aptitude Test Scores (1966-67 through 1975-76)*. New York: College Entrance Examination Board, 1977. $2 (2517272).

Stern, J., *Table of SAT and Achievement Test Scores for Samples of Candidates Taking Achievement Tests 1966-67 to 1975-76*. New York: College Entrance Examination Board, 1977. $2 (2517035).

Wharton, Y., *List of Hypotheses Advanced to Explain the SAT Score Decline*. New York: College Entrance Examination Board, 1977. $2 (2517299).

Winter, D. G., *Motivational Factors in the SAT Score Decline*. New York: College Entrance Examination Board, 1977. $2 (2517280).

Appendixes to On Further Examination. New York: College Entrance Examination Board, 1977. $25 (2517027).

General

Abt Associates, *Education as Experimentation*. Report prepared for the Office of Education. Washington, D.C.: United States Department of Health, Education, and Welfare, 1977. Vol. IV-A.

American College Testing Program, *The High School Profile Report, Years 1975-76*. Iowa City, Iowa: American College Testing Program, 1977.

American Council on Education, "National Norms for Entering College Freshmen—Fall 1966." *ACE Research Reports*, 1967, Vol. 2, No. 1.

American Council on Education, "The American Freshman: National Norms for Fall 1972." *ACE Research Reports*, 1972, Vol. 7, No. 5.

American Federation of Teachers, "To Test or Not To Test: An Examination of the Educational Testing Controversy." *American Educator*, Winter 1977.

Anchor Test Study, Fifth-Grade Reading Achievement as a Function of Selected School, Classroom, and Pupil Variables. Washington, D.C.: National Center for Educational Statistics, 1976.

Angoff, William H. (editor), *The College Board Admissions Testing Program: A Technical Report on Research and Development Activities Relating to the Scholastic Aptitude Test and Achievement Tests*. New York: College Entrance Examination Board, 1971.

Angoff, W., "Why the SAT Scores Are Going Down." *English Journal*, March 1975, pp. 10-11.

Armbruster, Frank E., *The U. S. Primary and Secondary Educational Process*. With contributions by Paul J. Bracken and the assistance of Joyce Lind. Final Draft. Croton-on-Hudson, N.Y.: Hudson Institute, 1975.

Astin, Alexander et al., *The American Freshman: National Norms* (for years 1966-76). Cooperative Institutional Research Program, American Council on Education and University of California at Los Angeles.

Bannister, Robert C. (Professor of History, Swarthmore College, Swarthmore, Pennsylvania), Letter to George H. Hanford, College Entrance Examination Board, October 8, 1976.

Beshoar, Barron B., "The Condition of Student Writing." *American Education*, March 1976.

Brewster, Galen, "Anxiety, Identity, and Declining Scores." *Independent School*, October 1976, pp. 15-18.

Bullock, R., and Stern, J., *Estimated SAT Summary Statistics for High School Cohorts 1967-1974*.

Memorandum dated September 3, 1974. Princeton, N.J.: Educational Testing Service.
Buros, Oscar K. (editor), *The Seventh Mental Measurements Yearbook.* Reviews of the College Board Scholastic Aptitude Test by Philip H. DuBois and Wimburn L. Wallace. New Jersey: The Gryphon Press, 1972, Vol. 1, pp. 640, 646-650.
A Century of Public School Statistics (1975). Washington, D.C.: National Center for Educational Statistics.
Coleman, James S., *Equality of Educational Opportunity.* Washington, D.C.: Office of Education, United States Department of Health, Education, and Welfare, 1966.
College-Bound Seniors, 1974-75. New York: College Entrance Examination Board, 1975.
College-Bound Seniors, 1975-76: National Report. New York: College Entrance Examination Board, 1976.
The Condition of Education (1975-77). Washington, D.C.: National Center for Educational Statistics.
The Decline in Achievement in Science and Other Disciplines. Edison Foundation and the Institute for Development of Educational Activities, Inc., 1975.
Declining Test Scores: A Conference Report (edited by Evelyn Stein Silver, Lawrence Johnson & Associates, Inc.). Washington, D.C.: National Institute of Education, February 1976.
Digest of Educational Statistics, 1975 edition. Washington, D.C.: National Center for Educational Statistics, Table 10, p. 14.
Ebel, Robert L., "Declining Scores—Why?" Paper prepared for presentation at the annual meeting of the North Central Association, Chicago, Illinois, on March 30, 1976.
Effects of Coaching on Scholastic Aptitude Test Scores. New York: College Entrance Examination Board, 1965.
Ernest, John, *Mathematics and Sex.* Santa Barbara, California: Mathematics Department, University of California at Santa Barbara, 1976.
Farr, R., Tuinman, J., and Rowls, M., *Reading Achievement in the United States: Then and Now.* Report prepared for the United States Office of Education by Educational Testing Service and Indiana University, 1975.
Fasold, J., Hall, M., and Impara, J., *Decline in Standardized Test Scores: A Widespread Phenomenon.* Salem, Oregon: Oregon Department of Education, 1974.
Ferguson, Richard L., and Maxey, James E., *Trends in the Academic Performance of High School and College Students.* American College Testing Program Report No. 70. Iowa City, Iowa: American College Testing Program, January 1976.
Flanagan, John C., "Changes in School Levels of Achievement: Project TALENT Ten and Fifteen Year Retests." Paper presented at the Symposium of Division D and National Council on Measurement in Education during the 1976 meeting of the American Educational Research Association, San Francisco, April 22, 1976.
Flanagan, John C., and Jung, Steven M., *Progress in Education: A Sample Survey* (1960-70). Palo Alto, California: American Institutes for Research, December 1971.
Foster, B. J., *Statistics of Public Elementary and Secondary Day Schools, Fall 1972.* Department of Health, Education, and Welfare Publication No. (OE) 73-11402. Washington, D.C.: United States Government Printing Office, 1973.
Froomkin, Joseph, "Declining Test Scores: Reasons and Impacts." Paper prepared for the Higher Education Policy Research Center, United States Department of Health, Education, and Welfare. Washington, D.C.: United States Government Printing Office, 1976.
Functional Literacy, Basic Reading Performance (1974 and 1975). National Assessment of Education Progress Report. Denver, Colorado: Education Commission of the States.
Gallup, George H., "Eighth Annual Gallup Poll of the Public's Attitudes toward the Public Schools." Reprinted from the October 1976 *Phi Delta Kappan.*

Giamatti, A. Bartlett, "The Language Barrier: Why Students Can't Write." *Yale Alumni Magazine*, January 1976.

Gleazer, Edmund J., Jr., "Declining Achievement of High School Graduates." Presentation to the Cosmos Club, Washington, D.C., January 18, 1977.

Graves, Donald, "Writing: An Endangered Species." *The Common*, March 1977.

Guide for High Schools and Colleges (Interpretive publication of the Admissions Testing Program). New York: College Entrance Examination Board, 1975.

Hanford, George H., "Change in SAT Scores." Remarks prepared for presentation at the 1976 annual meeting of the North Central Association, Chicago, Illinois, on March 30, 1976.

Harnischfeger, A., and Wiley, D., *Achievement Test Score Decline: Do We Need to Worry?* Chicago, Illinois: CEMREL, Inc., 1975.

Hawes, G. R., "The Decline of the SAT's." *CHANGE*, November 1972, pp. 17-19.

Herndon, Terry (executive director, National Education Association), Letter to S. P. Marland, Jr., College Entrance Examination Board, April 9, 1976.

Hilton, T. L., Rhett, H., Broudy, I. L., Bower, C., Carter, M. M., Creech, F. R., and Echternacht, G. J., *The Base-Year Survey of the National Longitudinal Study of the High School Class of 1972*. Final Report. Princeton, N.J.: Educational Testing Service, 1973.

Houts, Paul L. (editor), *The Myth of Measurability*. New York: Hart Publishing Co., 1977.

Howell, Barbara Thompson, Presentation to New Jersey Association of School Administrators, Atlantic City, New Jersey, May 12, 1977.

Impact of Educational Innovation on Student Performance. Project Longstep – Final Report: Vol. I, Executive Summary. Palo Alto, California: American Institutes for Research, 1976.

"Inside the Brain: The Last Great Frontier." Symposium: Albert Rosenfeld and Kenneth Klivington, Maya Pines, Richard Restak, Howard Gardner, Roger W. Sperry. *The Saturday Review*, August 9, 1975.

Jackson, Rex, Paper for the panel showing tabulation of College Board's Student Descriptive Questionnaire data – 1973-77.

Jackson, Rex, and Schrader, William B., *Verbal and Mathematical Ability of High School Juniors in 1974: A Norms Study of PSAT/NMSQT*. College Entrance Examination Board Research and Development Reports RDR-76-77, No. 2. New York: College Entrance Examination Board, 1976.

Jencks, C., *Inequality: A Reassessment of the Effect of Family and Schooling in America*. New York: Basic Books, 1972.

Johnson, Charles E., Jr., "Changing Trends in College Enrollment." *College and University*, Fall 1973, pp. 35-41.

Karpinos, Bernard D., *AFQT [Air Force Qualifying Test]: Historical Data (1958-1972)*. Alexandria, Virginia: Manpower Research and Data Analysis Center, Human Resources Research Organization, 1975.

Kifer, Edward, "The Relationship between the Home and School in Influencing the Learning of Children." Paper delivered at the Pre-Convention Conference on Research, National Council of Teachers of English, Chicago, Illinois, November 23, 1976.

Kolata, Gina Bari, "Aftermath of the New Math: Its Originators Defend It." *Science*, March 4, 1977, pp. 854-857.

Layton, Katherine P., Informal report to George H. Hanford on a meeting of the Mathematical Association of America, October 19, 1976.

Maguire, John, "That Which Comes Down, Must It Go Up?: The Decline of SATs." Paper presented at the College Board New England Regional Meeting, February 1976.

Manchester, William, "Up against the Wall." In *The Glory and the Dream*. Boston: Little, Brown and Company, 1974.

Marco, G. L., and Stern, J., *Investigation of the "Repeater" Hypothesis Concerning SAT Score Declines*. Princeton, N.J.: Educational Testing Service, April 1974.

Maxey, E. James, *Trends in the Academic Abilities, Background Characteristics, and Educational and Vocational Plans of College-Bound Students*. American College Testing Program Report No. 74. Iowa City, Iowa: American College Testing Program, May 1976.

McCandless, Sam A., "The SAT Score Decline and Its Implications for College Admissions." Paper presented at the College Board Western Regional Meeting, January 1975.

Modu, Christopher C., and Stern, June, *The Stability of the SAT Score Scale*. Princeton, N.J.: Educational Testing Service, 1975 (RB-75).

Munday, Leo A., *Declining Admissions Test Scores*. ACT Research Report No. 71. Iowa City, Iowa: American College Testing Program, February 1976.

National Assessment of Science (1969-73). National Assessment of Educational Progress Report. Denver, Colorado: Education Commission of the States.

National Association of Secondary-School Principals, "Student Attendance and Absenteeism." *The Practitioner*, March 1975.

National Education Association, "Special Feature on Testing (1977)"—reprints of articles by Edwin F. Taylor, Charlotte Darehshori, and Brenda S. Engel. *Today's Education*, March-April 1977.

"Newest National Norms Show—Decline in Scores Continues." *ACTivity*, October 1975, 15 (4), p. 5.

Overview and Analysis of School Mathematics, Grades K—12. Washington, D.C.: Conference Board of the Mathematical Sciences, National Advisory Committee on Mathematical Sciences, 1975.

Peng, Samuel S., "Some Trends in the Entry to Higher Education: A Comparison between NLS and Project TALENT." Paper presented at the annual meeting of the American Psychological Association in Washington, D.C., 1976.

Perry, D., and Swanson, E. O., "Decline in Minnesota College Aptitude Test Scores." In J. Fasold et al., eds., *Decline in Standardized Test Scores: A Widespread Phenomenon*. Salem, Oregon: Oregon Department of Education, 1974.

Pike, Lewis W., and Evans, Franklin, R., *Effects of Special Instruction for Three Kinds of Mathematics Aptitude Items*. College Entrance Examination Board Research Report. New York: College Entrance Examination Board, 1972.

Randhawa, Bikkar S., "Influence of Visual Domain on Score Decline: Some Conjectures." Unpublished paper, 1977.

Reading in America: A Perspective on Two Assessments. National Assessment of Educational Progress Report. Denver, Colorado: Education Commission of the States.

Report on a National Study of the Nature and the Quality of Instructional Materials Most Used by Teachers and Learners. Educational Products Information Exchange Report No. 76, 1977.

Schrader, W. B., *Test Data as Social Indicators*. Statistical Report SR-68-77. Princeton, N.J.: Educational Testing Service, September 1968.

Schrader, W. B., and Hilton, T., *Educational Attainment of American High School Seniors in 1960, 1965, and 1972: Feasibility Study*. Final Report. Project No. NIE-G-74-0050, 1975. Princeton, N.J.: Educational Testing Service, 1975.

Schrader, W. B., and Jackson, R., *Preliminary Report on the 1974 PSAT/NMSQT Norms Study*. Memorandum dated March 24, 1975. Princeton, N.J.: Educational Testing Service.

Start, K. B., "Thirty Years of Reading Standards in England." *Educational Researcher*, 1972, 1 (11), pp. 8-9.

Stewart, E. E., *The Stability of the SAT-Verbal Score Scale*. Research Bulletin RB-66-57, CEEB RDR-66-7. Princeton, N.J.: Educational Testing Service, July 1966.

Student Bulletin, 1975-1976, Admissions Testing Program. New York: College Entrance Examination Board, 1975.

Survey of Curricula Offerings. Massachusetts Department of Education, 1967-68, 1970-71, 1972-73, 1975-76.

Tavris, Carol, "The End of the IQ Slump." *Psychology Today,* April 1976, pp. 69-74.

Television and Children, Priorities for Research. Report of Ford Foundation Conference at Reston, Virginia, November 5-7, 1975.

Testing and Evaluation: New Views. Washington, D.C.: Association for Childhood Education International, 1975.

Thorndike, R. L., "Mr. Binet's Test 70 Years Later." *Educational Researcher,* May 1975, 4 (5), pp. 3-7.

Weinman, Janice J., *Declining Test Scores: A State Study.* Massachusetts: Massachusetts Department of Education, 1977.

White, E. B., "One Man's Meat." *Harper's Magazine,* 1938.

Whitney, Hassler, "Learning: Form or Substance?" Paper prepared for the panel by Dr. Hoover of the Institute for Advanced Study, Princeton, New Jersey, May 11, 1976.

Wilks, S. S., *Scaling and Equating College Board Tests.* Princeton, N.J.: Educational Testing Service, 1961.

Wilson, Sandra, and Wise, Lauress, *The American Citizen: 11 Years After High School.* Palo Alto, California: American Institutes for Research, 1975.

Writing Mechanics (1969-74). National Assessment of Educational Progress Report. Denver, Colorado: Education Commission of the States.

Zajonc, R. B., "Family Configuration and Intelligence." *Science,* April 16, 1976, pp. 227-236.

Zajonc, R. B., "Intellectual Environment and Intelligence." Unpublished paper submitted to the panel. Revised October 1975.

Zajonc, R. B., and Markus, G. B., "Birth Order and Intellectual Development." *Psychological Review,* 1975, 82 (1), pp. 74-88.

Inspection copies of the Scholastic Aptitude Test were made available on a confidential basis to members of the Advisory Panel on Score Decline.

News Reports

Barnes, B., "Area Pupils Attend Special Cram Courses to Prep for SAT." *The Washington Post,* October 18, 1976.

"A Big Test for Test Publishers." *Business Week,* June 27, 1977.

Briggs, B. Bruce, "The Great Classroom Debacle." *The Wall Street Journal,* July 20, 1976.

Bronfenbrenner, Urie, "The Calamitous Decline of the American Family." *The Washington Post,* January 2, 1977.

Cattani, Richard J., "U.S. Colleges on 'Back to Basics Trail.'" *The Christian Science Monitor,* May 12, 1977.

Feinberg, Lawrence, "Teacher Standards Issue Upsets City." *The Washington Post,* May 16, 1977.

Feinberg, Lawrence, " 'Basic' Teaching Methods More Effective, Study Says." *The Washington Post,* June 20, 1977.

Gunther, Max, "How Television Helps Johnny Read." *TV Guide,* September 4, 1976.

Kelch, Kristen, "High School Blends Fundamentals, New Concepts." *The Christian Science Monitor,* October 20, 1976.

King, Wayne, "Stiffer Teacher Test Upsets Blacks in South Carolina." *The New York Times,* June 24, 1977.

Klaidman, Stephen, "Western High Valedictorian Fails owu Entrance Criteria." *The Washington Post*, August 15, 1976.
Landers, Jim, and Meyer, J. Stryker, Series of articles on development and administration of the SAT. *The Sunday Times-Advertiser* and *The Evening Times*, Trenton, N.J., March 28-31, 1976.
Little, D. Richard, "Legacy of the '60's—Declining Quality." *The Christian Science Monitor*, January 17, 1977.
Maeroff, G., "The Missing School Yardstick: Measuring Gains and Losses." *The New York Times*, March 17, 1975.
Malcolm, Andrew H., "Japanese Students Tensely Undergoing Annual Exam Hell." *The New York Times*, February 24, 1977.
McCurdy, Jack, and Speich, Don, "The Decline of American Education." Reprinted from *The Los Angeles Times*, August 15-17, 1976.
Nathan, Linda K., "'Improving' Law School Aptitude Is Big Business." *The New York Times*, November 14, 1976.
Parsons, Cynthia, "SAT + ACT = College Tests in a Mess." *The Christian Science Monitor*, March 29, 1976.
Peterson, I., "College Textbooks Being Simplified to Meet Needs of the Poor Reader." *The New York Times*, November 7, 1974.
Raspberry, William, "A Dilution of School Standards." *The Washington Post*, May 16, 1977.
Rhoda, Andreas de, "Student-Achievement Slump—Is It the Fault of Schools?" *The Christian Science Monitor*, July 26, 1976.
Sowell, Thomas, "New Light on Black I.Q." *The New York Times Magazine*, March 27, 1977
"What TV Does to Kids." *Newsweek*, February 21, 1977.
"Why Johnny Can't Write." *Newsweek*, December 8, 1975.

Sample Questions from the SAT

Verbal Questions

The ability to understand what you read and the extent of your vocabulary are important for successful academic performance in college. The SAT tests these abilities using four types of questions: antonyms and analogies, which yield a vocabulary subscore, and sentence completion and reading comprehension, which yield a reading subscore. The directions that are shown below for each type of question are the same as the ones that appear in the test itself.

Vocabulary

Antonyms (opposites)
Antonyms test the quality and extent of your vocabulary.

Directions: **Each question below consists of a word in capital letters, followed by five lettered words or phrases. Choose the word or phrase that is most nearly opposite in meaning to the word in capital letters. Since some of the questions require you to distinguish fine shades of meaning, consider all the choices before deciding which is best.**

Example:
GOOD: (A) sour (B) bad (C) red (D) hot
(E) ugly Ⓐ ● Ⓒ Ⓓ Ⓔ

Practice Questions:

1. BABBLE: (A) irrigation (B) pollution
(C) meaningful speech (D) useful object
(E) helpful person

8. RECTITUDE: (A) deliberation (B) laziness
(C) prejudice (D) laxity of morals
(E) weakness of intellect

Analogies
Analogies test your understanding of relationships between words and ideas. You are asked to recognize pairs that are similar or parallel in nature.

Directions: **Each question below consists of a related pair of words or phrases, followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.**

Example:
YAWN:BOREDOM:: (A) dream:sleep
(B) anger:madness
(C) smile:amusement (D) face:expression
(E) impatience:rebellion Ⓐ Ⓑ ● Ⓓ Ⓔ

First, establish the relationship between the two capitalized words, considering for each word only the sense that applies. For example, the fact that you yawn when you're sleepy is irrelevant in the example above. Roughly stated, the relationship between the first two words is "a yawn indicates boredom." The correct answer is (C), because "a smile indicates amusement." If more than one of the choices seems to fit the relationship you have established, restate it more precisely. The correct answer to the sample question is more obvious if the relationship is expressed as "a yawn is a movement of facial muscles indicating boredom."

Practice Questions:

10. CHOIR:SINGERS:: (A) victory:soldiers
(B) class:teachers (C) crowd:protestors
(D) challenge:duelists (E) orchestra:musicians

18. BALLAST:STABILITY:: (A) mass:appetite
(B) buoy:steering (C) spice:flavor
(D) grade:education (E) eclipse:clarity

Reading Comprehension

Sentence Completion
This type of question asks you to select words or phrases that are consistent in style and logic with other elements in the sentence.

Directions: Each question below has one or two blank spaces, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words that best fits the meaning of the sentence as a whole.

Example:
Although the publicity has been ——, the film itself is intelligent, well-acted, handsomely produced, and altogether ——.
(A) extensive . . arbitrary
(B) tasteless . . respectable
(C) sophisticated . . amateurish
(D) risqué . . crude
(E) perfect . . spectacular

Ⓐ ● Ⓒ Ⓓ Ⓔ

The correct answer should involve two words that are more or less opposite in meaning, as the word although suggests that the publicity misrepresented the film. Another clue to the correct answer is that the second word should fit in context with the words "intelligent, well-acted, handsomely produced." Choices (A), (D), and (E) are not opposites. Choice (C) can not be the correct answer even though the words in it are nearly opposites, because if the film is intelligent, well-acted, and handsomely produced, it is not amateurish. Also only choice (B), when inserted in the sentence, produces a logical statement.

Practice Questions:

19. Intricately carved and beautifully proportioned, the priceless sculpture was —— the work of a ——.
(A) understandably . . dilettante
(B) indelibly . . forger
(C) demonstrably . . bungler
(D) unmistakably . . master
(E) paradoxically . . perfectionist

Reading Passages

The reading passages are taken from a variety of fields, and reading comprehension is tested at several levels. Some of the questions test your understanding of what has been stated directly; others test your ability to interpret and analyze what you have read. Be sure to read the questions carefully so that you understand exactly what is being asked.

Directions: Read the following passage and then answer the questions on the basis of what is stated or implied in the passage.

The behavioral sciences are making rapid strides in the understanding, prediction, and control of behavior. In important ways we know how to select individuals who will exhibit certain behaviors and to establish conditions in groups which will lead to various predictable group behaviors; in animals our ability to understand, predict, and control goes even further, possibly foreshadowing future steps in relation to man.

If your reaction is the same as mine, then you will have found that the potentials of this young science are somewhat frightening. For all its present immaturity, behavioral science may contain awesome possibilities. If some individual or group had the power to exploit this science, it would be a nightmare of manipulation. Potential troublemakers could be discovered and dealt with before they became such. Morale could be improved or lowered and behavior could be influenced by appeals to motives of which the individual was unconscious. Admittedly this is wild fantasy, but it is not an impossible fantasy.

Some of you may point out that only a few of the findings I have mentioned have actually been put to use in any way that significantly affects society, and that for the most part these studies are important only to the behavioral scientist but have no serious impact on our culture. I agree with this point. The behavioral sciences at the present time are at somewhat the same stage as the physical sciences were several generations ago. For instance in 1900, the public believed the science of aeronautics to be of little importance and did not anticipate the significant effects that aeronautics would have on culture. They preferred to use their common sense, which told them that man could not possibly fly in a contraption which was heavier than air.

However, the public attitude toward physical science is quite different today. The public is ready to believe any prediction the physical scientist might make. When science predicted a satellite would be launched into space, very few voices were raised in disbelief.

There is every reason to believe that the same sequence of events will occur in the behavioral sciences. First, the public ignores or views with disbelief; then, as it discovers that the findings of a science are more dependable than theories based on common sense, it begins to use them; eventually, the widespread use of these findings creates a tremendous demand. Finally, the development of the science spirals upward at an ever-increasing rate. Consequently, even though the findings of the behavioral sciences are not widely used today, there is every likelihood that they will be widely used tomorrow.

Practice Questions:

26. The author suggests that the next change in the public's attitude toward behavioral science will lead the public to
(A) ignore the findings
(B) increase the use of the findings
(C) disbelieve the findings
(D) use these findings against each other
(E) lose interest in the findings

27. The tone of this passage can best be described as
(A) condescending (B) humble (C) insipid
(D) admonitory (E) inspiring

Mathematical Questions

The subject matter prerequisites for the SAT-mathematical questions include arithmetic and do not extend beyond a year of high school algebra and the geometry that is usually taught in the elementary and junior high years. The arithmetic includes the four basic operations of addition, subtraction, multiplication, and division; properties of odd and even integers; percent; and averages. The algebra includes linear equations, simple quadratic equations, factoring, and exponents, but not the quadratic formula, fractional or negative exponents, or logarithms. The geometry includes the properties associated with parallel lines and the informal measurement-related concepts of area, perimeter, volume, the Pythagorean Theorem, and angle measure in degrees. Knowledge of special triangles such as isosceles, equilateral, 30°-60°-90° is also assumed. (See question 20.) Unusual notation is used only when it is explicitly defined for a particular question. (See question 17.)

Certain questions emphasize nonroutine problem-solving approaches. For example, the correct solution to problem 15 . . . can be easily obtained once an appropriate nonroutine approach is discovered, but could be obtained only at the cost of much time and thought if a routine approach were used. When you take the SAT, however, do not spend too much time searching for a nonroutine solution. If you cannot think of such a solution, try a routine approach or go on to the next question.

Two kinds of multiple-choice questions appear in the mathematical portion of the SAT:

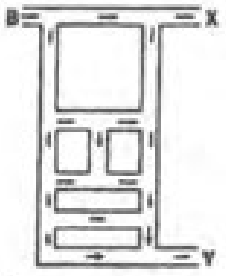
1. Standard multiple-choice questions (approximately two-thirds of the test)

2. Quantitative comparison questions (approximately one-third of the test)

Each of the quantitative comparison questions presents two quantities to be compared, one in Column A and the other in Column B. . . . . In general, this type of question takes less time to answer, involves less reading, and requires somewhat less computation than the usual multiple-choice mathematics question. In deciding on your answer, you must use concepts of greater than (>), less than (<), and equal to (=) to decide which choice is correct. Please analyze carefully example 27, . . . as this illustrates comparisons in which the relationship cannot be determined. . . .

Practice Questions:

1. The number which is one hundred less than one million is
(A) 990,000 (B) 900,900 (C) 999,990
(D) 999,900 (E) 1,000,900



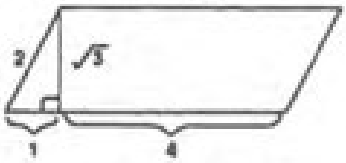
15. The figure above represents a network of one-way traffic lanes. If the traffic divides equally at intersections where there are alternative directions and in one hour 512 cars enter the traffic pattern at point B, how many of these cars will leave via Y?
(A) 128 (B) 192 (C) 256 (D) 320 (E) 384

Question 17 refers to the following definition.

For all positive integers x, $\boxed{x} = x$ If x is even

$\boxed{x} = x + 1$ If x is odd

17. $\boxed{10} + \boxed{21} =$
(A) 38 (B) 39 (C) 40 (D) 41 (E) 42



20. The figure above shows a piece of paper in the shape of a parallelogram with measurements as indicated. If the paper is tacked at its center to a large flat surface and then rotated about its center, the points covered by the paper will be a circular region of diameter
(A) $\sqrt{5}$ (B) 2 (C) 5 (D) $\sqrt{28}$ (E) $\sqrt{39}$

Directions: Each of the following questions consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and on the answer sheet blacken space

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Notes:

1. In certain questions, information concerning one or both of the quantities to be compared is centered above the two columns.

2. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

3. Letters such as x, n, and k stand for real numbers.

4. Since there are only four choices, NEVER MARK (E).

Examples:

	Column A	Column B	Answers
E1.	2×6	$2+6$	● Ⓑ Ⓒ Ⓓ Ⓔ
E2.	x°, y°	$180-x$	y	Ⓐ Ⓑ ● Ⓓ Ⓔ
E3.	$p-q$	$q-p$	Ⓐ Ⓑ Ⓒ ● Ⓔ

$5x+3y=22$

	Column A	Column B
27.	x	y

Answer Key

Question number	*Correct answer*	*Percentage of 450-scorers who answered correctly*
Verbal		
1	C	96
8	D	25
10	E	95
16	C	39
19	D	93
26	B	80
27	D	20
Mathematical		
1	D	90
15	E	22
17	E	47
20	E	20
27	D	39

Advisory Panel on the Scholastic Aptitude Test Score Decline

Willard Wirtz, Chairman, National Manpower Institute, Washington, D.C., *chairman*
Harold Howe II, Vice President, Education and Research, The Ford Foundation, New York, *vice chairman*
Bernard C. Watson, Vice President for Academic Services, Temple University
Ralph W. Tyler, Director Emeritus, Center for Advanced Study in the Behavioral Sciences, Chicago, Illinois
Ledyard R Tucker, Professor of Psychology, Educational Psychology, and in the Center for Advanced Study, University of Illinois at Urbana-Champaign
Vivian H. T. Tom, Teacher of Social Studies, Lincoln High School, Yonkers, New York
Robert L. Thorndike, Professor of Psychology and Education, Teachers College, Columbia University
Barbara Thompson, Superintendent of Public Instruction, State Department of Public Instruction, Madison, Wisconsin
Thomas W. F. Stroud, Associate Professor, Department of Mathematics and Statistics, Queen's University, Kingston, Ontario, Canada
Rosedith Sitgreaves, Professor of Education and Statistics, School of Education, Stanford University
Wilbur Schramm, Distinguished Center Researcher, The East-West Center, Honolulu, Hawaii
Katherine P. Layton, Chairman, Department of Mathematics, Beverly Hills High School, California
Owen B. Kiernan, Executive Secretary, National Association of Secondary-School Principals
H. Thomas James, President and Director, The Spencer Foundation, Chicago, Illinois
Matina S. Horner, President and Dean, Radcliffe College
Edythe J. Gaines, Superintendent of Schools, Hartford Board of Education, Connecticut
Frank W. Erwin, President, Richardson, Bellows, Henry & Company, Inc., Washington, D.C.
Bruce K. Eckland, Professor of Sociology, University of North Carolina at Chapel Hill
Luis C. Cortes, Principal, Bowie High School, El Paso, Texas
Sandra A. Clark, English Department Head, Sammamish High School, Bellevue, Washington
Benjamin S. Bloom, Charles H. Swift Distinguished Service Professor of Education, University of Chicago

Consultants

Edmund J. Farrell, Associate Executive Secretary, National Council of Teachers of English (chairman, College Board English Discipline Committee)
Alfred L. Putnam, Professor of Mathematics, University of Chicago (chairman, College Board Mathematics Discipline Committee)