Research Report No. 2001-5

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Leonard Ramist is a retired ETS program administrator and a current ETS validity study consultant.
Charles Lewis is a distinguished presidential appointee in the research and statistics division at ETS and a professor in the psychology department at Fordham University.
Laura McCamley-Jenkins is a senior research data analyst at ETS.

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The Investigation

The justification for test use, referred to as test validity, involves evaluations of the appropriateness of test content, overall fairness to subgroups, and predictions of success of students in college. While the latter aspect, referred to as predictive validity, is only one of many test aspects to be considered, it is an important aspect. A predictive validity study demonstrates the relationship between the test and other predictors with a criterion of student success (usually in terms of correlations), provides equations to produce predictions, measures error in prediction, indicates how well the test improves prediction, and displays results separately for all relevant student subgroups.

In 1964, the College Board established the Validity Study Service (VSS)—superseded in 1998 by the Admitted Class Evaluation Service (ACES)—for colleges free of charge to determine how well SAT® scores[1], high school record, and other predictors predict the subsequent success of students in college, as measured by any criterion of performance chosen by a college. The criterion chosen by the great majority of the 700 colleges using VSS in about 3,000 studies was freshman grade point average (FGPA). These studies produced correlations between the SAT and high school record with FGPA, provided equations to predict FGPA, measured errors in FGPA prediction, demonstrated how well the SAT improved FGPA prediction over high school record, and displayed results separately for all student subgroups requested by the college.

To develop an understanding of this important, frequently utilized criterion, Ramist, Lewis, and McCamley (1990) analyzed a database of course grades provided by 38 colleges that varied greatly in terms of geography, selectivity, control, and size. The colleges supplied the identifications of all freshmen entering in 1982 and 1985, the courses the students took and the grades the students received in their freshman year, course descriptions, and a measure of high school performance (GPA or rank) for each student. Matching the student identifications against the files of the Admissions Testing Program (ATP) provided the students' SAT, Test of Standard Written English (TSWE)[2], and Achievement Test scores, sex, and Student Descriptive Questionnaire (SDQ) responses, including high school grade point average (HSGPA), whether English is the student's best language, ethnic group, and whether one or more of the student's parents is a college graduate. All courses taken by freshmen were assigned one of 37 categories, based on subject, skills required, and level.

At each college, based on an optimally weighted composite of SAT scores and HSGPA for predicting FGPA, students were categorized as high academic composite (in the upper third), medium academic composite (in the middle third), or low academic composite (in the lower third). Also, based on their SAT mean for 1985, all 38 colleges were categorized as high selectivity (one of the top 13 colleges), medium selectivity (one of the middle 12 colleges), or low selectivity (one of the bottom 13 colleges).

Course Selection and Grading

A good criterion requires comparability from student to student. We used three college-level variables to describe the comparability of FGPA from student to student: (1) course-taking variety, measured by the number of courses accounting for half of all credits taken (a larger number of courses showing greater variety and less comparability of FGPA from student to student); (2) variation of student aptitude levels among courses, measured by the standard deviation of course SAT means (a larger standard deviation of course SAT means showing more variation among courses and less comparability of FGPA from student to student); and (3) appropriateness of average course grade, measured by the correlation between mean course grade and course SAT mean (a lower grade mean-SAT mean correlation showing less appropriateness of grading and less comparability of FGPA from student to student). Each of the three measures were highly correlated with the SAT–FGPA correlation.

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[1] *Through 1993-94 the College Board offered the Admissions Testing Program, which consisted of the Scholastic Aptitude Test (SAT), the Test of Standard Written English (TSWE), and a series of Achievement Tests. The SAT was replaced by the SAT I: Reasoning Test, and the Achievement Tests were replaced by the SAT II: Subject Tests. In this paper, SAT, Achievement Tests, and SAT II (or SAT II: Subject Tests) are sometimes used to refer to both the earlier tests and their replacements.*

[2] *The TWSE was introduced in 1974-75 and was used through 1993-94. It was a 50-question multiple-choice test to assess skills in written English: 35 usage items to test conventions used in standard written English and 15 sentence-correction items to identify unacceptable phrasing and to choose the best way of rephrasing. While the TSWE was not replaced after 1993-94, emphasis for the assessment of writing skills was shifted to the SAT II: Writing Test, which replaced the English Composition Test (ECT), the most popular Achievement Test.*

Comparing 1982 with 1985, all three measures showed reduced comparability of FGPA from student to student. This reduction was primarily at less selective colleges, which offered increased advanced placement, remediation, and multiple levels of mathematics courses to meet student needs. These colleges not only increasingly allowed, but indeed increasingly encouraged, students to take courses most appropriate to their aptitude levels.

At all types of colleges, especially at less selective ones, students with high SAT scores compared to other students at the college tended to select more science and quantitative courses. Professors of science and quantitative courses tended to grade much more strictly than professors of nonscience and nonquantitative courses, taken more frequently by students with lower SAT scores compared to other students at the college. This inappropriateness of average course grade increased from 1982 to 1985, and became so extreme that the correlation between mean course grade and course SAT mean was frequently about .00, and in several cases was negative.

The strictness of the grading of each course was determined by first using HSGPA and SAT scores to predict the FGPA of all students taking the course. The strictness was measured by the average grade mean residual: the difference between the course grade mean and the mean of the predicted FGPAs of the students taking the course.

FGPA as the Criterion

When FGPA is used as the criterion, the correlation between FGPA and SAT scores, the correlation between FGPA and HSGPA, and the multiple correlation for SAT scores and HSGPA to predict FGPA are used as measures of predictive effectiveness. But these correlations were shown to be highly related to all three measures of comparability of FGPA: course-taking variety, variation of student aptitude levels among courses, and appropriateness of average course grade. In general, comparability of grades was so low that a student's average grade mean residual of courses taken was as powerful a predictor of FGPA as SAT scores or HSGPA. In less selective colleges, because of low comparability of grades, the average grade mean residual was by far the best predictor of FGPA.

Comparing SAT scores and HSGPA among the academic composite levels at a given college, HSGPA predicted best at the high academic composite level. SAT scores predicted best and also had the highest incremental value over HSGPA at the low academic composite level, where the most difficult admission decisions are made.

Course Grade as the Criterion

For each of 4,680 courses, course grade was predicted by SAT scores, by HSGPA, and by both. The correlations with course grade were then summarized by the 37 categories of courses based on subject, skills required, and level. Contrary to prior acknowledgments that HSGPA is the best predictor of college grades, SAT scores had higher or equal average correlations with course grade in 23 of the 26 categories with at least 25 courses. The only three categories of courses for which HSGPA predicted course grades better than SAT scores were for foreign language (entry and beyond entry) and regular English. For both SAT scores and HSGPA, the highest correlations with course grades were in quantitative or science, strictly graded courses.

II. The Second Course Grade Study: Student Group Differences

The Investigation

Whereas the first course grade study only categorized students by academic composite, Ramist, Lewis, and McCamley-Jenkins (1994) extended the analyses of how well SAT scores predict college grades to student groups defined in terms of sex, language, and ethnicity. The language groups were English best and English not best language. The ethnic groups were American Indian, Asian American, black, Hispanic, and white.

The database was extended from 38 colleges supplying data on both 1982 and 1985 entering freshmen to 45 colleges supplying data on 1985 entering freshmen. It included 7,786 courses taken by seven or more students, 46,379 students with course grades, and 395,106 course grades. Of the 46,379 students, 3,848 identified themselves as Asian American, 2,475 as black, 1,599 as Hispanic, 184 as American Indian, and 1,156 as English not their best language.

Course Selection and Grading

The patterns of course selection and the difficulty of grading in the courses selected differed greatly among student groups. Quantitative and science courses that were more strictly graded were selected more frequently by students in the high academic composite, males, students for whom English was not their best language, Asian Americans, and

whites. Course grades for these groups tended to be more comparable from student to student.

Nonquantitative courses that were more leniently graded were selected more frequently by students in the low academic composite, females, American Indians, blacks, and Hispanics. Course grades for these groups tended to be less comparable from student to student.

Predictive Effectiveness

The predictors HSGPA, SAT verbal score, and SAT mathematical score were used singly and in combination to predict both the FGPA and the course grade criteria. They were used to predict the FGPA of each of the 45 colleges and the course grade of each of the 4,680 courses. When the predictors were used singly, negative correlations were assumed to be zero: the minimum allowed correlation was zero. When the predictors were used in combination, any predictor with a negative predictive weight was removed (the weight was made to be zero), and the correlation and prediction equations were recalculated based on the other predictor(s).

Nine types of correlations were presented. The correlations were created in three ways: (1) with the FGPA criterion; (2) with the criterion of one specified course grade; and (3) using the correlation between FGPA and the mean of the predicted course grades of the courses chosen by a student. For each of these three ways, correlations were presented in three states of correction. The first state of correction was uncorrected. To make correlations comparable for each student group, college, type of college, and type of course, the second state of correction was to correct for predictor restriction of range, with the correction being to the full SAT-taking group using the Pearson-Lawley multivariate correction. To eliminate the artificial reduction of the correlations due to criterion unreliability, the third state of correction was to correct for criterion unreliability, in addition to predictor restriction of range. For FGPA, the correction for criterion unreliability was based on the Spearman-Brown split-halves method. For one specified course grade, the correction for criterion unreliability was estimated based on the correlation of two terms of course grades in 44 selected courses for which the first part of the course was in one term and the second part was in another term.

For the six types of correlations based on FGPA, the correlations were averaged over all 45 colleges, weighted by the number of students in the relevant student group at the college. For the three types of correlations based solely on one specified course grade, the correlations were averaged over all 4,680 courses with at least seven students from the relevant group, weighted by the number of students in the relevant group in the course.

For all nine types of correlations, the SAT mathematical score was a slightly better predictor than the SAT verbal score. While HSGPA was a slightly better predictor than the combination of SAT scores for all six types of correlations based on FGPA, the combination of SAT scores was a slightly better predictor than HSGPA for the three types of correlations based on one specified course grade.

The highest uncorrected and also corrected correlations were between FGPA and the mean of the predicted course grades of the courses chosen by a student. When the two SAT scores were used as predictors of course grade, the correlation between FGPA and the mean of the predicted course grades, corrected for both predictor restriction of range and criterion reliability, was .65. When HSGPA was used as the predictor of course grade, this correlation was .69. When the SAT scores and HSGPA were used in combination, this correlation was .76. This correlation is probably the most accurate estimate ever achieved of the overall predictive effectiveness of SAT scores and HSGPA because of the large number and variety of colleges, students, and courses, the elimination of predictor restriction of range, the elimination of criterion unreliability, the elimination of the problem of course selection and incomparability of course grades, and the full benefit of multiple courses taken by a student.

If course grades from different courses selected by students in a group are comparable, the FGPA on all courses selected by a student would be a better criterion of freshman-year performance, and easier to predict, than the course grade of one specified course. As a result, the difference between the correlation on the FGPA criterion and the correlation on the criterion for one specified course grade is a good indicator of the comparability of course grades for a student group. This difference showed that comparability of grades was much lower for students in the low academic composite at a college than in the high or middle academic composites. As expected, therefore, for students in the low academic composite, correlations based on the SAT and HSGPA tended to be lower, but the SAT provided a large increment to the correlations based on HSGPA, and the average grade mean residual of selected courses provided a large increment to the correlation with FGPA based on the SAT and HSGPA.

Over- and Underpredictions

For each student group, and also for each type of course, grades and predictions based on an all-student equation were compared for both FGPA and course grade criteria and for SAT and HSGPA predictors, singly and in combination. Grades on average exceeding predictions indicated underpredictions; predictions on average

exceeding grades indicated overpredictions. In general, there were overpredictions for American Indian, black, Hispanic, and male students and underpredictions for English not best language, Asian American, and female students.

Males and Females

Females were more likely than males to take nonquantitative courses, especially foreign language, social sciences and humanities, art/music/theater, English, education, health and nursing, and home economics courses. All of these types of courses were typically more leniently graded than the average course, with most having a positive average grade mean residual of over a quarter of a grade. One exception was biological sciences, where females took more courses, but the grading was stricter than average.

Males were more likely than females to take quantitative courses, especially physical sciences and engineering and mathematical courses at the calculus level or higher. These types of courses on average were typically more strictly graded than the average course.

The mean FGPA was .09 higher for females than males. Course selection accounted for .06 of the .09 difference.

At more selective colleges, course grades were equally comparable among females and males. But at less selective colleges, course grades were more comparable for females.

In general, SAT and HSGPA correlations with FGPA and course grade were higher for females than for males. But there were virtually no sex differences in the high academic composite or at more selective colleges.

Using the prediction equations developed for all students in a course, HSGPA overpredicted course grade for females by an average of .01. SAT scores underpredicted course grade for females by an average of .06, which is less than one-tenth of a standard deviation. When HSGPA and SAT scores were used together, the average underprediction for females was .03, which was reduced to .02 by also using the TSWE score, and was .00 at more selective colleges.

Underprediction for females and overprediction for males was much greater at less selective colleges. At these colleges, females had a FGPA that was one-quarter of a grade higher than for males, even though their SAT total V+M average was 44 points lower. One possible explanation for the underprediction for females and overprediction for males at these colleges was because the males, with a mean FGPA barely above C, were not performing up to the level of their capabilities.

English Best Language

Students for whom English is not their best language tended to select quantitative, strictly grade courses, especially physical sciences or engineering and mathematics at the calculus level or higher. Despite higher SAT mathematical scores and HSGPA, their lower SAT verbal and TSWE scores, with their tough course selection, put them at a competitive disadvantage in terms of predicted FGPA. Nevertheless, they overcame this disadvantage to achieve a higher FGPA than did students for whom English is their best language. Their course grades tended to be underpredicted, especially in quantitative courses. Overall, predictions of FGPA and course grades were more effective among students for whom English is their best language, but the SAT had a higher increment in correlation over HSGPA among students for whom English is not their best language.

Ethnic Groups

American Indian students had the lowest test score correlations with FGPA and course grade, especially for the SAT mathematical score. This was the only group for whom the verbal score was a better predictor than the mathematical score. Their grades were overpredicted in a variety of science, language, English, and mathematics courses: the grades were lower than expected based on HSGPA and SAT scores.

Asian American students tended to select quantitative, strictly graded, competitive courses, with a high proportion of predictive weight on the SAT mathematical scores, especially courses in physical science or engineering and mathematics at the calculus level or higher. Their tough course selection made it more difficult for them to obtain higher grades, but they overcame this liability to achieve a very high FGPA. They obtained higher grades than predicted in mathematics and science. They had the highest SAT and HSGPA correlations with FGPA and course grade, especially for the SAT mathematical score.

Black students tended to select nonquantitative, leniently graded courses, with a high proportion of predictive weight on the SAT verbal score, especially courses in the social sciences or humanities and English. There was a very high standard deviation of course SAT means among their selected courses. The course grades were quite incomparable from student to student. As a result, among all groups, the average grade mean residual provided the largest increment in the correlation with FGPA over HSGPA and the SAT. Also, among ethnic groups, the SAT provided by far the largest correlation increment over HSGPA in predicting either FGPA

or course grade. In general, the course grades were overpredicted, especially in quantitative and science courses: the grades were lower than expected based on HSGPA and SAT scores.

Hispanic students had course grades that were the least comparable of all groups, with better prediction for a single course grade than for the eight-course FGPA. There was a very high standard deviation of course SAT means. Test score correlations with FGPA and course grade were relatively low. In general, course grades were overpredicted: the grades were lower than expected based on HSGPA and SAT scores.

White students had course grades that tended to be more comparable. This was indicated both by a relatively high correlation between course SAT mean and course grade mean and also by a relatively large difference between the SAT and HSGPA multiple correlations for predicting FGPA and for predicting course grade.

III. This Study: Using Achievement Tests/SAT II: Subject Tests to Demonstrate Achievement and Predict College Grades

Achievement Tests/SAT II: Subject Tests

Currently referred to as SAT II: Subject Tests, the one-hour tests in specific subjects administered at the same administrations as the SAT were called Achievement Tests through the 1993-94 testing year. For 1982 and 1985 entering freshmen, the students whose records are included in this study, there were 14 Achievement Tests available in the five general subject areas:

I. English–	English Composition
	(now Writing)
	Literature
II. Mathematics–	Mathematics Level I
	Mathematics Level II
	(now Mathematics Level IIC)
III. History–	American History and
	Social Studies (now U.S. History)
	European History and World
	Culture (now World History)
IV. Science–	Biology
	Chemistry
	Physics
V. Foreign Language–	French
	German
	Hebrew (now Modern Hebrew)
	Latin
	Spanish

These tests were multiple-choice tests with the exception of the December version of the English Composition Test, which was composed of 40 minutes of multiple-choice questions and one 20-minute essay assignment.

Achievement Tests were designed to measure knowledge, and the ability to apply that knowledge, in specific subject areas. Although curriculum-based, they are independent of particular textbooks or methods of instruction. They are especially useful for assessing students whose course preparation and backgrounds vary and for assessing outcomes of courses that students have recently taken.

Achievement Tests/SAT II: Subject Tests are used by colleges for both admission and placement or guidance purposes. Colleges that use these tests typically require a minimum number, often three, and may or may not identify specific required tests.

For admission, the tests can be used individually or combined into an average. Any specific test can be used to assess whether a student meets a particular level of competence. In more formal prediction of college performance, with SAT scores and a measure of high school record, the more popular tests are often used as additional predictors, with or without averaging the scores on the other tests as still another predictor. Alternatively, all scores for a student are averaged into a single index (called Achievement average in this study), on the assumption that a student feels best prepared, has high motivation and interest, and will likely select college courses in these areas.

For placement or guidance, some colleges use scores on these tests in formal mechanisms for determining cutoff levels, to place students into remedial or among multiple levels of courses, or to bypass introductory courses. Some colleges use the scores in discussions with incoming students to help them select courses.

Research on Achievement Tests

As is apparent from *The College Board Technical Handbook for the Scholastic Aptitude Test and Achievement Tests* (Donlon, 1984), most of the research on Achievement Tests involved internal characteristics of the tests, such as scaling, equating, rescaling, difficulty, reliability, speededness, and, more recently,

differential item functioning (DIF). There has been less research on the interpretation of Achievement Test scores in terms of comparative performance, predictive effectiveness, and over- or underpredictions.

Research on comparative performance on Achievement Tests has focused on test score differences from the junior to senior year or after each additional year of study of a foreign language. For sex and ethnic groups, through the College Board's Summary Reporting Service, Achievement Test distributions, as well as SAT means of those taking each Achievement Test, are produced annually and are available on request. But there are no formal comparisons between relative SAT and Achievement Test performance.

Research on the predictive effectiveness of Achievement Tests has been somewhat limited despite 30 years of availability of the College Board's Validity Study (VSS). First, the great majority of colleges did not include Achievement Tests as predictors in their studies. Second, of those that did, there was such great flexibility in how colleges evaluated their Achievement Tests that it is difficult to summarize the results across colleges meaningfully.

Most of the studies using Achievement Tests were admission oriented, with FGPA as the criterion. Many colleges grouped all of their Achievement Tests into one predictor, making it impossible to evaluate any of the individual tests. Other colleges separated out one, two, or three tests, with or without grouping the others into a single predictor. Rarely were tests other than English Composition or Mathematics Level I singled out as separate predictors. Sometimes studies were done by sex, but they were very rarely done for other student groups.

Very few of the studies using Achievement Tests were placement oriented, with course grade as the criterion. For those that were, courses have never been described uniformly in terms of content or level.

Most of what is known about the predictive effectiveness of Achievement Tests is contained in three documents:

- Ramist (1984) contains VSS summaries of correlations of Achievement Tests in predicting FGPA for 1964–1981 and 1977–1981, with all choices for identifying and analyzing Achievement Tests in VSS grouped together. Also, results for the few cases where individual tests were identified in predicting either FGPA or a course grade were summarized: only 20 studies of English Composition Test predictions of English grade, 6 studies of Mathematics Level I predictions of mathematics grade, 3 studies of Spanish predictions of Spanish grade, 1 study of German prediction of German grade, 1 study of Biology prediction of biology grade, and 1 study of Chemistry prediction of chemistry grade. In many cases, the range of scores was highly restricted, but no corrections were attempted. Indication of content or level of these few courses was not possible.
- Burton (1987) used Empirical Bayes methodology to describe the validity of six tests—English Composition, Mathematics Level I, Mathematics Level II, Chemistry, Spanish, and American History and Social Studies—for predicting FGPA, but did not have course data. She called into question the utility of Spanish (and possibly the other foreign language tests) for admission purposes. She found that each of the other tests was as effective as the SAT, but redundant with the SAT, for the prediction of FGPA.
- Morgan (1990) contains average correlations with FGPA for three Achievement Tests—English Composition, Mathematics Level I, and Chemistry—for all colleges in VSS with at least 25 test takers in any of the following three years: 1978, 1981, and 1985. This analysis overcame limitations on whether a college asked for a validity study on Achievement Tests, or on college choice for identifying and analyzing them, by including all the Achievement Test scores from the student SAT records. But the study was limited to FGPA, not course grade, as a criterion, included only three tests, and did not correct for restriction of range.

Research on fairness of Achievement Tests has focused on the identification of specific test items that function differentially by sex or ethnic group. See Harvey (1991) for the American History and Social Studies Test, Pomplun (1991) for the Physics Test, Chiu and Schmitt (1991a) for the English Composition Test, and Chiu and Schmitt (1991b) for the Spanish Test. But no external criterion was used, and, as a result, over- or underpredictions could not be determined.

Purposes of This Study

Recently, there has been increased interest in emphasizing Achievement Tests, as SAT II: Subject Tests, for use in admission and placement. Much information on the proper interpretation and use of Achievement Test scores (and also separate scores on the essay and multiple-choice sections of the English Composition Test) can be obtained from our comprehensive database of categorized course grades for a large number and great variety of colleges, with student groups identified. For each student group:

(1) The percentage of SAT takers who took any Achievement Test and the percentage of Achievement Test takers who took each specific test are determined.

(2) The performance of those who took each Achievement Test is compared with the performance of the same students on the verbal section of the SAT (for English, history, and foreign language tests), the mathematical section of the SAT (for mathematics tests), or the sum of the verbal and mathematical scores on the SAT (for science tests and the average of all of a student's Achievement Test scores).

(3) The predictive effectiveness of each Achievement Test is determined for predicting FGPA, alone and in combination with HSGPA and SAT scores, and for predicting grades in each kind of course.

(4) One aspect of fairness of each Achievement Test for each student group is evaluated in terms of average over- and underpredictions.

Colleges

Course data for 45 colleges were included in the second course grade study. In this third course grade study, data for 6 of the colleges were excluded because of insufficient numbers of Achievement Test takers (all had fewer than 10 entering freshmen in 1985 who took the Achievement Tests). The 39 colleges included are shown in Appendix A.

Analyses were performed for all 39 colleges combined and for separate high, middle, and low thirds of 13 colleges each based on the total SAT V+M mean of 1985 entering freshmen (prior to recentering of the SAT scale). Colleges in the most selective third had an SAT mean of at least 1156. Those in the least selective third had an SAT mean of less than 1087.

Student Groups

The second course grade study defined student groups in terms of academic composite (high, medium, and low), sex (male and female), language (English best and English not best), and ethnic (American Indian, Asian American, black, Hispanic, and white) groups. This third course grade study uses these same student groups plus an additional pair of groups based on whether or not the student is a first-generation college student.

The Student Descriptive Questionnaires for both 1982 and 1985 contained Question 39 on the highest level of education for the student's father and Question 40 on the highest level of education for the student's mother. If the highest level indicated on Questions 39 or 40 was a bachelor's degree or higher, the student was not considered to be a first-generation college student. If the highest level was below a bachelor's degree, the student was considered to be a first-generation college student.

Predictors

The first two course grade studies used the following variables as predictors of FGPA and one specified course grade, and to obtain the correlation between FGPA and the mean of the predicted course grades of the courses chosen by a student:

(1) HSGPA

(2) The SAT verbal score

(3) The SAT mathematical score

(4) The SAT total V+M score

(5) The Test of Standard Written English (TSWE) score

(6) The average grade mean residual (for the FGPA criterion only), which is the difference between the course grade mean and the mean of the predicted FGPAs of the students taking the course, averaged among the courses taken by the student.

In addition to these predictors, in this study each of the 14 Achievement Test variables is used as a predictor. The student-based Achievement Test mean, the mean of the latest scores for each test a student had taken, is also used as a predictor.

The December version of the English Composition Test (ECT) contained an essay, in addition to multiple-choice questions. The essay and multiple-choice sections were scored separately and were also combined into a composite score. The other test administrations contained only multiple-choice questions. As a result, to do analyses pertaining solely to the essay, in addition to the overall ECT score across all administrations, three additional predictors are based solely on the December administration: the essay score, the multiple-choice score, and the total score. For comparison purposes, a fourth additional ECT predictor is based only on non-essay (non-December) ECT administrations.

Most of the higher-scoring students taking an Achievement Test in mathematics took the Mathematics Level II Test; most of the lower-scoring students took the Mathematics Level I Test. As a result, the range of scores on each test is more restricted than that of any other Achievement Test. In addition to separate predictors for the Mathematics Level I and Level II Tests, an additional predictor is defined across these tests: containing either the latest Level I score or the latest Level II score, or an average of the two if a student took both tests.

Course Categories

For the first two course grade studies, courses were categorized into 37 categories based on subject and level. In this study, the most important consideration was to match the Achievement Tests with categories of courses. For this purpose, some of the course categories were not needed because there was no corresponding Achievement Test, and other categories were too broad because they included course work corresponding to more than one Achievement Test.

There are two English Achievement Tests: English Composition (now Writing) and Literature. In the first two course grade studies, and in this one, there are nine English course categories. If possible, English courses were sorted into (a) reading/literature courses (which correspond to the Literature Test) and (b) writing/composition courses (which correspond to the English Composition Test). If not possible, they were merely considered English courses. For all three types—reading/literature, writing/composition, and English—the courses were further categorized as regular, advanced, or remedial, a total of nine English course categories.

There are two mathematics Achievement Tests: Mathematics Level I and Mathematics Level II (now Level IIC). In the first two course grade studies, and in this one, there are five mathematics course categories: advanced mathematics (post calculus), calculus, precalculus, regular mathematics (not in any of the other categories), and remedial mathematics.

There are two history Achievement Tests: American History and Social Studies (now U.S. History) and European History and World Culture (now World History). In the first two course grade studies, all history courses were placed into one course category. For this study, these courses were further categorized as either American history courses or world history courses (including any area outside of the United States).

There are three science Achievement Tests: Biology, Chemistry, and Physics. In the first two course grade studies, there were six science course categories. Science courses were sorted into (a) biological science courses and (b) physical science courses. For both types, the courses were further categorized as advanced, introductory with laboratory or for majors, and introductory with no laboratory and for nonmajors, a total of six science courses. The three biological science course categories correspond to the Biology Test, and are used in this study. But each of the three physical science course categories were further categorized as either chemistry courses (three categories) or physics courses (three categories).

There are five foreign language Achievement Tests: French, German, Hebrew (now Modern Hebrew), Latin, and Spanish. In the first two course grade studies, courses in all of the foreign languages were sorted into two categories: entry level and beyond-entry level. In this study, most of the entry level and beyond-entry level courses were further categorized as French, German, Hebrew, Latin, or Spanish, as appropriate.

Test-Taking Rates

Which student groups of SAT takers are more likely and which are less likely to take Achievement Tests? Which student groups of Achievement Test takers are more likely and which are less likely to take each test?

The second course grade study was on student groups of SAT takers entering college in 1985. The numbers of Achievement Test takers entering college in 1985 in the current study is compared by student group to the numbers of SAT takers in the second study to determine the percentage of SAT takers in each student group who took Achievement Tests. To determine specific test-taking rates for each test among Achievement Test takers, as in most of this study, Achievement Test takers entering college in 1982 and in 1985 are combined. To the extent possible, for most student groups, these data are also shown for SAT II: Subject Test takers entering college in 1998.

Comparative Performance

Which groups of SAT takers on average improve their overall relative standing to prospective colleges by taking a specific Achievement Test and providing a score in their test report, in addition to their SAT scores? Which groups on average lower their relative standing by taking a specific test? In comparing the Achievement average with the SAT, which groups are benefited by the Achievement average and which groups are benefited by the SAT?

Because reading and vocabulary skills are more important than mathematical skills in English, history, and foreign language, the performance of those who took each Achievement Test in these areas is compared with the performance of the same students on the verbal section of the SAT. For the comparison, student group standard scores for the Achievement Test and for the SAT verbal scores are derived. The standard score is defined as the difference between the mean for the student group on the test and the mean for all students on the test, divided by the standard deviation for all students. A positive standard score indicates the group performed better than average; a negative standard score indicates the group performed below average. The Achievement Test/SAT verbal comparison is made by comparing the standard score on the Achievement Test

and the standard score on the verbal section of the SAT for the same students. The groups with a higher (or less negative) standard score for the Achievement Test are benefited more by the Achievement Test than the SAT. The groups with a higher (or less negative) standard score for the SAT are benefited more by the SAT than the Achievement Test.

Because mathematical skills are more important than verbal skills in mathematics, the performance of those who took each mathematics Achievement Test is compared with the performance of the same students on the mathematical section of the SAT. The performance of those who took each science Achievement Test is compared with the performance of the same students on the sum of the verbal and mathematical scores of the SAT (SAT V+M). For an overall Achievement Test performance comparison, the Achievement average is compared with the SAT V+M score.

For all comparisons, to maximize sample size, scores for 1982 and 1985 enrolling freshmen are combined. Because sex and language effects appear to be stronger than effects based on ethnic groups and groups defined by first generation in college, comparisons are made by sex and by English best or not best language within each ethnic group and first or not first generation in college.

Predictive Effectiveness

In the second course grade study, as discussed, nine types of correlations were used to describe predictive effectiveness. They were created in three ways: (1) on the FGPA criterion; (2) on one specified course grade criterion; and (3) on the correlation between the actual FGPA and the mean of the predicted course grades of the courses chosen by a student (predicted FGPA). For each of these three ways, correlations were presented in three states of correction: (1) uncorrected; (2) corrected for predictor restriction of range; and (3) corrected for both predictor restriction of range and criterion unreliability.

In this study, the predictive effectiveness of each Achievement Test is determined for predicting FGPA, alone and in combination with HSGPA and SAT scores, and for predicting grades in each kind of course. To make correlations comparable for each student group, type of college, and type of course, the correlations for FGPA and for one specified course grade are corrected for restriction of range. These corrections are to the full SAT-taking group using the Pearson-Lawley multivariate correction. Only a few uncorrected correlations will be shown, for FGPA. To get a feel for the overall level of correlation that can be achieved, some correlations are corrected for criterion unreliability as well as predictor restriction of range, but, since the correction for criterion unreliability is a constant multiple across student groups, correction for predictor restriction of range is sufficient for student-group and type-of-course comparisons.

As in the second course grade study, the correlations based on FGPA are averaged over all colleges in the study (here 39 colleges), weighted by the number of students in the relevant subgroup at the college. The correlations based solely on one course grade are averaged over all courses or all courses in a specified course category with at least seven students from the relevant group, weighted by the number of students in the relevant group in the course. When predictors are used singly, negative correlations are assumed to be zero. When predictors are used in combination, any predictor with a negative predictive weight is removed (the weight is set to zero), and the correlation and prediction equations are recalculated based on the other predictor(s).

Correlations are derived for the best prediction of the original sample of students. If this sample is not large, especially if combinations of several predictors are used, part of the obtained correlation may be the result of chance variations for that particular sample. There is an expected reduction in the correlation if a derived prediction equation is used on a different sample. This expected reduction in correlation is called shrinkage, and is dependent on the sample size, the original correlation coefficient, and the number of predictors used. The formula is:

$$\text{Correlation corrected for shrinkage} = \sqrt{\frac{((N-1)R^2)-P}{N-1-P}}$$

where N = the number of students
R = the original correlation
P = the number of predictors

In this study, because there are fewer Achievement Test takers than SAT takers and because more predictors are used, all correlations are corrected for shrinkage. Upon the removal of any predictor with a negative weight, the correlation after shrinkage is derived as conservatively as possible: the shrinkage formula is applied to the full set of predictors and also to the reduced set of predictors, with the smaller of the two derived correlations used.

Over- and Underpredictions

For each student group and also each relevant type of course, grades and predictions based on all-student equations are compared for both FGPA and course grade criteria. Achievement Test scores, SAT scores, and HSGPA are used singly and in combination to determine over- and underpredictions. If the mean grade (or FGPA) exceeds the predicted grade (or FGPA), there is

an average underprediction for the student group. If the predicted grade (or FGPA) exceeds the mean grade (or FGPA), there is an average overprediction for the student group. An average underprediction usually disfavors most of the students in the group. An average overprediction usually favors most of the students in the group.

Cautionary Considerations

While most of the current SAT II: Subject Tests are quite similar to the 1981 and 1983 Achievement Tests, it must be kept in mind that changes have been made in some of the tests. Both test and educational changes in the 1980s and 1990s necessitate caution in evaluating the comparative performance and predictive effectiveness data presented in this study. More recent studies are encouraged to confirm or deny evidence based on the data in this study.

If any of the comparative data evidence are to be used in counseling student groups that students like themselves often do comparatively well on any specific Achievement Test, additional care must be taken. It must be made clear that prior test takers probably chose to take the test because they considered themselves well prepared in the subject matter.

It must also be pointed out that while this report provides detailed data on the predictive effectiveness of Achievement Tests for admission and placement, there are important considerations beyond predictive effectiveness. For example, faculty would probably want the content of the test to correspond well with course requirements, to measure educationally important knowledge, skills, and developed abilities, and to be as fair as possible to subgroups of students. In the larger context of admission, use of tests must not only be for maintaining academic standards, identifying students who probably could or probably could not handle the

TABLE 1 (PART 1)

Numbers of Achievement Test Takers in this Study (1982 + 1985), and Percentage of SAT Takers Taking an Achievement Test (1985), by Student Group

Achievement Test Takers in this Study (1982 + 1985)			*1985 SAT Takers*		*1985 Achievement Test Takers*		*Percent of 1985 SAT Takers Taking an Achievement Test*
N	*Percent*	*Student Group*	*N*	*Percent*	*N*	*Percent*	
42,985	100	**ALL STUDENTS**	46,379	100	23,366	100	50
		SEX:					
20,656	48	Males	20,412	48	11,262	48	50
22,329	52	Females	23,967	52	12,104	52	51
		ACADEMIC COMPOSITE:					
14,608	34	High	16,010	35	8,254	35	52
14,206	33	Medium	15,340	33	7,658	33	50
14,171	33	Low	15,029	32	7,454	32	50
		ENGLISH BEST LANGUAGE:					
41,036	97	Yes	44,699	97	22,403	97	50
1,470	3	No	1,156	3	701	3	61
		FIRST GENERATION IN COLLEGE:					
10,017	24	Yes	NA	-	5,212	23	NA
32,243	76	No	NA	-	17,743	77	NA
		ETHNIC GROUP:					
145	0	American Indian	184	0	85	0	46
5,173	12	Asian American	3,848	9	2,841	12	74
1,853	4	Black	2,475	6	1,069	5	43
1,488	4	Hispanic	1,599	4	920	4	58
33,324	79	White	36,743	82	17,887	78	49
		ACADEMIC COMPOSITE BY SEX:					
7,414	17	High/Male	7,988	17	4,241	18	53
7,194	17	High/Female	8,022	17	4,013	17	50
6,669	16	Medium/Male	7,245	16	3,614	15	50
7,537	18	Medium/Female	8,095	17	4,044	17	50
6,573	15	Low/Male	7,179	15	3,407	15	47
7,598	18	Low/Female	7,850	17	4,047	17	52

work at the college, and identifying students who may benefit from advanced placement or remediation, but also for maintaining student diversity in terms of demographic and ethnic mix, areas of study, and artistic, musical, leadership, technical, interpersonal, and athletic talents that are important to a college community.

IV. Test-Taking Rates

Any Achievement Test

Table 1 indicates the numbers of Achievement Test takers in the study, including both 1982 and 1985 entering freshmen, by student group. The total number of Achievement Test takers was 42,985. For 1,470 students (3 percent), English was not their best language. For 10,017 students (24 percent), their parents were not college graduates. There were 145 American Indian students (0.3 percent), 5,173 Asian American students (12 percent), 1,853 black students (4 percent), and 1,488 Hispanic students (4 percent).

Because the second course grade study on SAT takers by student group was based only on 1985, not 1982, entering freshmen, the rates in Table 1 of SAT takers who took any Achievement Test are based on 1985 SAT takers. Overall, 50 percent of the 1985 SAT takers took an Achievement Test.

The highest rates were for Asian American students: 74 percent overall and 77 percent for Asian American students with a high academic composite. Other high rates were for students for whom English is not their best language (61 percent) and Hispanic students (58 percent), especially for Hispanic students for whom English is not their best language (69 percent).

Low rates were for black students (43 percent) and American Indian students (46 percent). The lowest rate was 26 percent for the 42 black students for whom English is not their best language.

Although students with a high academic composite had a slightly higher rate (52 percent) than other

TABLE 1 (PART 2)

Achievement Test Takers in this Study (1982 + 1985)			*1985 SAT Takers*		*1985 Achievement Test Takers*		*Percent of 1985 SAT Taking an Achievement Test*
N	*Percent*	*Student Group*	*N*	*Percent*	*N*	*Percent*	
		ENGLISH BEST LANGUAGE BY SEX:					
19,648	46	Yes/Male	21,526	47	10,749	47	50
21,388	50	Yes/Female	23,173	51	11,654	50	50
765	2	No/Male	630	1	388	2	62
705	2	No/Female	526	1	313	1	60
		FIRST GENERATION IN COLLEGE BY SEX:					
4,766	11	Yes/Male	NA	-	2,439	11	NA
5,251	12	Yes/Female	NA	-	2,773	12	NA
15,528	37	No/Male	NA	-	8,628	38	NA
16,715	40	No/Female	NA	-	9,115	40	NA
		ETHNIC GROUP BY SEX:					
73	0	American Indian/Male	89	0	37	0	42
72	0	American Indian/Female	95	0	48	0	51
2,514	6	Asian American/Male	1,902	4	1,390	6	73
2,659	6	Asian American/Female	1,946	4	1,451	6	75
658	2	Black/Male	918	2	373	2	41
1,195	3	Black/Female	1,557	3	696	3	45
734	2	Hispanic/Male	812	2	460	2	57
754	2	Hispanic/Female	787	2	460	2	58
16,183	39	White/Male	17,941	40	8,727	38	49
17,141	41	White/Female	18,802	42	9,160	40	49
		ENGLISH BEST LANGUAGE BY ACADEMIC COMPOSITE:					
14,211	33	Yes/High	15,614	34	8,031	35	51
13,577	32	Yes/Medium	14,791	32	7,332	32	50
13,248	31	Yes/Low	14,294	31	7,040	30	49
278	1	No/High	262	1	159	1	61
491	1	No/Medium	389	1	245	1	63
701	2	No/Low	505	1	297	1	59

TABLE 1 (PART 3)

Achievement Test Takers in this Study (1982 + 1985)			*1985 SAT Takers*		*1985 Achievement Test Takers*		*Percent of 1985 SAT Taking an Achievement Test*
N	*Percent*	*Student Group*	*N*	*Percent*	*N*	*Percent*	
		ETHNIC GROUP BY ACADEMIC COMPOSITE:					
24	0	American Indian/High	32	0	11	0	34
42	0	American Indian/Medium	52	0	22	0	42
79	0	American Indian/Low	100	0	52	0	52
1,871	4	Asian American/High	1,489	3	1,143	5	77
1,720	4	Asian American/Medium	1,280	3	932	4	73
1,582	4	Asian American/Low	1,079	2	766	3	71
110	0	Black/High	229	1	63	0	28
333	1	Black/Medium	559	1	180	1	32
1,410	3	Black/Low	1,687	4	826	4	49
224	1	Hispanic/High	319	1	147	1	46
433	1	Hispanic/Medium	477	1	254	1	53
831	2	Hispanic/Low	803	2	519	2	65
12,149	29	White/High	13,539	30	6,752	30	50
11,318	27	White/Medium	12,462	28	6,067	27	49
9,857	23	White/Low	10,742	24	5,068	22	47
		ETHNIC GROUP BY ENGLISH BEST LANGUAGE:					
139	0	American Indian/Yes	184	0	81	0	44
1	0	American Indian/No	0	0	0	0	-
4,235	10	Asian American/Yes	3,218	7	2,416	11	75
891	2	Asian American/No	614	1	401	2	65
1,799	4	Black/Yes	2,424	5	1,038	5	43
18	0	Black/No	42	0	11	0	26
1,349	3	Hispanic/Yes	1,497	3	839	4	56
125	0	Hispanic/No	102	0	70	0	69
32,623	79	White/Yes	36,345	81	17,523	78	48
341	1	White/No	322	1	171	1	53

students (50 percent), this was true only for white and Asian American students. For American Indian, Hispanic, and black students, students with a low academic composite had a much higher rate than students with a high academic composite: for American Indian students, 52 percent for the low composite compared to 34 percent for the high composite; for Hispanic students, 65 percent for the low composite compared to 46 percent for the high composite; and for black students, 49 percent for the low composite compared to only 28 percent for the high composite (the second lowest rate among all groups). This pattern may be indicative of the higher frequency of Achievement Test administrations in high schools that tend to have higher college-going rates.

To confirm that the relative differences among subgroups in Achievement Test taking rates are consistent with relative differences nationally and currently, for available subgroups, Table 2 presents Achievement Test

TABLE 2

Percentage of All 977,361 1985 SAT Takers Taking an Achievement Test and Percentage of All 1,180,952 1998 SAT I Takers Taking an SAT II: Subject Test, by Sex and by Ethnic Group

	Sex					
	Male		*Female*		*All Students*	
Ethnic Group	*1985**	*1998*	*1985**	*1998*	*1985**	*1998*
ALL STUDENTS	22%	19%	20%	19%	21%	19%
American Indian	NA	12%	NA	12%	12%	12%
Asian American	NA	41%	NA	43%	39%	42%
Black	NA	8%	NA	9%	9%	8%
Hispanic	NA	17%	NA	18%	17%	17%
White	NA	17%	NA	17%	20%	17%

*1985 percentages are slightly and artificially inflated by some Achievement Test takers who did not take the SAT.

taking rates for all 977,361 1985 entering freshmen who took the SAT and SAT II: Subject Test taking rates for all 1,180,952 1998 entering freshmen who took the SAT I. These rates are substantially lower than those in Table 1 because the students enrolled in the 39 colleges in this study had relatively high rates of Achievement Test taking.

The overall test-taking rate declined from 21 percent of all SAT takers in 1985 to 19 percent in 1998, some of which may be due to including some non-SAT takers in the 1985 totals. Asian American students had by far the highest 1998 SAT: II Subject Test taking rate of 42 percent, the only ethnic group with a rate above the 19 percent national average, and black (8 percent) and American Indian (12 percent) students had the lowest rates. Overall and for each of the ethnic groups there was very little difference in the rates of males and females. These patterns were similar among the 1985 Achievement Test takers.

Specific Achievement Tests

Table 3 shows the percentage of the 42,985 Achievement Test takers in this study (1982 and 1985 combined) who took each test, by student group. It also shows the percentages taking either the Mathematics Level I Test or the Mathematics Level II Test, and, based only on 1985, the percentage taking the English Composition Test with an essay.

Table 4 presents what is referred to as national data (although it really is international) on all 229,663 SAT II: Subject Test takers who graduated in 1998 and, for comparison purposes, on all 203,670 Achievement Test takers who graduated in 1985. It shows the percentage of 1998 SAT II: Subject Test takers and 1985 Achievement Test takers who took each test. The English Composition Test is now the Writing Test, the Math Level II Test is now Math Level IIC (using a calculator), the European and World History Test is now the World History Test, the Hebrew Test is now the Modern Hebrew Test, and the American History and Social Studies Test is now the U.S. History Test. Volumes for the current Math Level I and Math Level IC (using a calculator) Tests were combined. For Spanish, French, and German, volumes for the non-listening and listening tests were combined. For 1998 SAT II takers, percentages are also shown for student subgroups by sex and by ethnic group. There were 1998 tests in three languages that were not provided in 1985: Chinese with Listening, Japanese with Listening, and Italian.

Tables 3 and 4 show that Achievement Test takers in this study in general had higher rates of test taking than the full 1985 Achievement Test taking population. Comparing 1985 and 1998 national data, there were a number of

TABLE 3

Percentage of Achievement Test Takers in this Study (1982 + 1985) Taking Each Test, by Student Group

	Academic Composite			*Sex*		*English Best Language*			*Ethnic Group*					*First Generation College*	
All Students	*High*	*Medium*	*Low*	*Male*	*Female*	*Yes*	*No*	*Achievement Test*	*American Indian*	*Asian American*	*Black*	*Hispanic*	*White*	*Yes*	*No*
98	98	98	97	97	98	98	96	English Comp.	99	98	98	98	98	97	98
75	66	76	82	70	79	75	73	Math I	79	72	81	84	74	79	73
31	29	32	32	36	26	31	30	Am. History	47	41	32	21	29	32	30
27	38	25	17	34	20	26	36	Math II	21	38	16	16	26	22	28
19	21	19	17	18	20	19	13	Biology	13	17	16	9	20	15	20
17	22	16	12	21	13	17	21	Chemistry	8	20	12	8	17	14	18
16	14	16	19	13	19	16	21	Spanish	17	13	18	52	14	19	15
14	14	14	14	8	20	14	12	French	6	9	10	5	15	9	15
10	9	10	11	7	12	10	3	Literature	10	8	15	10	10	9	10
7	10	7	5	12	3	7	12	Physics	3	10	5	4	7	6	8
2	2	2	2	2	2	2	1	German	3	1	1	0.3	2	1	2
2	2	2	2	2	2	2	1	Latin	0.0	2	2	0.3	2	2	2
2	2	2	2	2	1	2	2	Eur. History	2	1	1	1	2	1	2
0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	Hebrew	0.0	0.0	0.0	0.0	0.1	0.1	0.1
27	26	27	28	26	28	27	20	English Comp. with Essay*	31	23	25	22	28	25	27
95	96	94	93	96	93	94	98	Math I or II	95	99	93	97	94	95	94

*Based only on 1985.

TABLE 4

Percentages of All 229,663 1998 SAT II Takers Who Took Each SAT II: Subject Test, by Sex and by Ethnic Group, with an All-Student Comparison of Percentages for the 203,670 Achievement Test Takers in 1985

1985	*1998*								
		Sex			*Ethnic Group*				
All Students	*All Students*	*Male*	*Female*	*SAT II Test*	*American Indian*	*Asian American*	*Black*	*Hispanic*	*White*
93%	90%	89%	91%	English Comp./ Writing	89%	92%	89%	92%	90%
73%	63%	58%	67%	Math I	66%	65%	68%	74%	59%
21%	27%	29%	24%	Am. History	27%	24%	24%	19%	29%
23%	33%	42%	28%	Math II	29%	43%	22%	20%	35%
21%	21%	20%	21%	Biology	18%	20%	15%	10%	21%
18%	20%	25%	17%	Chemistry	18%	26%	15%	10%	20%
13%	13%	10%	16%	Spanish	9%	7%	11%	48%	11%
12%	7%	4%	9%	French	1%	4%	6%	3%	7%
12%	20%	14%	25%	Literature	26%	17%	25%	16%	20%
9%	11%	17%	6%	Physics	9%	15%	8%	6%	10%
2%	1%	1%	1%	German	0.3%	0.3%	0.2%	0.1%	1%
1%	1%	1%	1%	Latin	0.1%	1%	1%	0.3%	1%
2%	3%	4%	2%	Eur. History/ World History	3%	3%	3%	2%	3%
0.2%	0.3%	0.2%	0.4%	Hebrew	0.1%	0.0%	0.5%	0.4%	0.4%
–	2%	2%	2%	Chinese (with Listening)	0.1%	8%	0.1%	0.0%	0.0%
–	0.5%	0.5%	0.5%	Japanese (with Listening)	0.2%	2%	0.1%	0.1%	0.1%
–	0.2%	0.1%	0.3%	Italian	0.0%	0.0%	0.0%	0.2%	0.3%

shifts of test-taking choices. The largest was a 10 percent shift from Math I (73 percent in 1985 to 63 percent in 1998) to Math II (23 percent to 33 percent). There was also a shift from English Composition/Writing (93 percent to 90 percent) to Literature (12 percent to 20 percent). There were increases in history test taking: American History (21 percent to 27 percent) and European/World History (2 percent to 3 percent). In the sciences, while the Biology test-taking rate remained the same (at 21 percent), there were moderate increases in Physics (9 percent to 11 percent) and Chemistry (18 percent to 20 percent). In the languages, while the Spanish test-taking rate remained the same (at 13 percent), there was a shift from French (12 percent to 7 percent) and German (2 percent to 1 percent) to the new language tests of Chinese (2 percent), Japanese (0.5 percent), and Italian (0.2 percent).

As shown in Table 3, students in the high academic composite more frequently chose to take Mathematics Level II (in this study, 38 percent compared to 17 percent for the low composite), Chemistry (22 percent compared to 12 percent for the low composite), Physics (10 percent compared to 5 percent for the low composite), and Biology (21 percent compared to 17 percent for the low composite). Students in the low academic composite more frequently chose to take Mathematics Level I (82 percent compared to 66 percent for the high composite) and Spanish (19 percent compared to 14 percent for the high composite).

Tables 3 and 4 show that males more frequently chose to take the Mathematics Level II, Physics, Chemistry, and American History Tests. Females more frequently chose to take the Mathematics Level I, French, Literature, and Spanish Tests.

For the most part, choices by students in the high academic composite and males corresponded, while choices by students in the low academic composite and females corresponded. Three exceptions were: American History, very popular with males and more popular with students in the low academic composite; Biology, more popular with females and students in the high academic composite; and French, very popular with females, but equally popular among all academic composite groups.

As shown in Table 3, students for whom English is not their best language favored Spanish (21 percent compared to 16 percent for other students), Physics (12 percent compared to 7 percent for other students), and Chemistry (21 percent compared to 17 percent for other students). These students tended to shy away from Literature (3 percent compared to 10 percent for other students), English Composition with an essay (20 percent compared to 27 percent for other students), and Biology (13 percent compared to 19 percent for other students).

Tables 3 and 4 show that American Indian students favored the Math I and Literature Tests. The American Indian students in this study also favored the American History Test. American Indian students tended not to take the French, Chemistry, Math II, Biology, Physics, or Spanish Tests.

Tables 3 and 4 show that Asian American students favored the Math II, Chemistry, and Physics Tests. While not true in current national data, the Asian American students in this study also favored the American History Test. Almost every Asian American student took one of the mathematics tests (99 percent in this study). They tended not to take the Spanish, French, or Literature Tests.

Tables 3 and 4 show that black students favored the Math I and Literature Tests. They tended not to take the Math II, Chemistry, or Biology Tests.

Tables 3 and 4 show that about half of all Hispanic students took the Spanish Test, a rate which was more than three times the rate for all students. They also favored the Math I Test. They tended not to take the Math II, Biology, Chemistry, American History, French, Physics, German, Latin, or Chinese Tests. While Hispanic students in this study tended not to take the English Composition Test with an essay, 1998 Hispanic students did take the Writing Test slightly more frequently than other students.

Tables 3 and 4 show that test-taking patterns of white students paralleled those of all students combined. They tended to take the Math I, Spanish, and Chinese Tests slightly less frequently.

As shown in Table 3, students who were first-generation college students took Mathematics Level I and Spanish more frequently. Students whose parent is a college graduate took French, Mathematics Level II, Biology, and Chemistry more frequently.

Table 5 shows the percentage of Achievement Test takers in this study (1982 and 1985) who took each test, by college SAT mean. Students in more selective colleges more frequently took Chemistry, Mathematics Level II, Biology, French, English Composition with an essay, Physics, Latin, and German. Students in less selective colleges more frequently took American History, Mathematics Level I, Spanish, and Literature.

TABLE 5

Percentage of Achievement Test Takers in this Study (1982 + 1985) Taking Each Test, by College SAT Mean

Achievement Test	*High SAT (1160 +)*	*Medium SAT (1088–1159)*	*Low SAT (Below 1088)*
English Comp.	99	97	97
Math I	68	76	81
Am. History	22	28	44
Math II	36	25	19
Biology	27	17	12
Chemistry	27	14	8
Spanish	15	15	18
French	21	12	8
Literature	9	10	11
Physics	11	7	3
German	3	2	1
Latin	3	1	1
Eur. History	2	2	1
Hebrew	0.1	0.1	0.1
English Comp. with Essay*	33	30	18
Math I or II	94	94	96

*Based only on 1985.

Table 6 summarizes the highest and lowest student group or college type percentages of Achievement Test takers taking each test. The tests are grouped by subject.

For the English tests, as might have been expected, students for whom English is not their best language had relatively low rates. For English Composition overall and also with an essay, students at more selective colleges and American Indian students had high rates. The lowest rate of essay-taking was for students at less selective colleges. Literature was favored most by black students.

The following groups highly favored Mathematics Level I and disfavored Mathematics Level II: Hispanic students, black students, students with a low academic composite, and students at less selective colleges. Conversely, students with a high academic composite and students at more selective colleges favored Mathematics Level II and disfavored Mathematics Level I. Asian American students and students for whom English is not their best language also had high rates for Mathematics Level II and, in addition, had the highest rates of mathematics test taking overall. The lowest rates for mathematics test taking overall were for females and students in the low academic composite.

For American History, American Indian students had the highest test-taking rate, and Hispanic students had

TABLE 6 (PART 1)

Student Groups or College Types of Achievement Test Takers in this Study (1982 + 1985) with High and Low Percentages Taking Each Test

High	*ENGLISH TESTS*	*Low*
More selective colleges (99%) American Indian (99%)	English Composition Test (98%)	English not best language (96%)
More selective colleges (33%) American Indian (31%)	English Composition Test with an Essay (27%)	Less selective colleges (18%) English not best language (20%)
Black (15%)	Literature (10%)	English not best language (3%)
High	*MATHEMATICS TESTS*	*Low*
Hispanic (84%) Low academic composite (82%) Black (81%) Less selective colleges (81%)	Mathematics I (75%)	High academic composite (66%) More selective colleges (68%)
Asian American (38%) High academic composite (38%) More selective colleges (36%) English not best language (36%)	Mathematics II (27%)	Hispanic (16%) Black (16%) Low academic composite (17%) Less selective colleges (19%)
Asian American (99%) English not best language (98%)	Mathematics I or II (95%)	Low academic composite (93%) Female (93%)
High	*HISTORY TESTS*	*Low*
American Indian (47%) Less selective colleges (44%) Asian American (41%) Male (36%)	American History (31%)	Hispanic (21%) More selective colleges (22%) Female (26%)
—	European History (2%)	—
High	*SCIENCE TESTS*	*Low*
More selective colleges (27%)	Biology (19%)	Hispanic (9%) Less selective colleges (12%) English not best language (13%) American Indian (13%)
More selective colleges (27%)	Chemistry (17%)	Less selective colleges (8%) Hispanic (8%) American Indian (8%)
English not best language (12%) Male (12%) More selective colleges (11%)	Physics (7%)	Female (3%) American Indian (3%) Less selective colleges (3%) Hispanic (4%)

the lowest rate. The rate for students at less selective colleges was twice the rate for students at more selective colleges. Asian American students and males also had high rates. There were no unusually high or low student group rates for European History.

For all of the science tests, students at more selective colleges had high rates and students at less selective colleges had low rates. Hispanic and American Indian students also had low rates for all of the science tests. For Physics, males and students for whom English is not their best language had high rates, and females had a low rate.

More than half of all Hispanic students took Spanish, triple the rate of all students, but were less likely than other groups to take any of the other language tests. Asian American students and males were less likely to take Spanish or French. Females had a high rate for French. The highest rate for French, German, and Latin were for students at more selective colleges. Students at less selective colleges had a low rate for French. American Indian students had a relatively high rate for German, but low rates for French and Latin. The highest relative rate for Hebrew was for students in the high academic composite.

TABLE 6 (PART 2)

High	*LANGUAGE TESTS*	*Low*
Hispanic (52%)	Spanish (16%)	Asian American (13%) Male (13%)
More selective colleges (21%) Female (20%)	French (14%)	Hispanic (5%) American Indian (6%) Male (8%) Less selective colleges (8%) Asian American (9%)
More selective colleges (3%) American Indian (3%)	German (2%)	Hispanic (0.3%)
More selective colleges (3%)	Latin (2%)	Hispanic (0.3%) American Indian (0.0%)
High academic composite (0.2%)	Hebrew (0.1%)	American Indian (0.0%) Asian American (0.0%) Black (0.0%) Hispanic (0.0%)

V. Comparative Performance

English Tests

Tables 7-11 show the results of comparisons in performance between an Achievement Test score and an SAT score in addition to a few other comparisons in performance. For all students in a group who took both tests, standard scores are derived and compared. All student groups with differences in the standard scores of at least .05 are shown, with further detail by sex and by English best or not best language.

Table 7 contains two separate comparisons for the full English Composition Test (ECT) score, with the SAT verbal score and with the Test of Standard Written English (TSWE) score. In both cases, the greatest improvement in performance on the ECT was for students for whom English is not their best language, with standard score differences of .23 over the SAT verbal score (from -1.39 to -1.16) and .35 over the TSWE score (from -1.51 to -1.16). Of the three tests, the lowest standard score for students

TABLE 7 (PART 1)

Comparisons of Student Group Performance on English Tests—the English Composition Test (the Full Score, the Essay Score, and the Objective Score), the Verbal Section of the SAT, the Test of Standard Written English, and the Literature Test—Measured by Standard Scores (Group Mean–Total Mean)/ (Total Standard Deviation)

ECT VS. SAT VERBAL					
*Higher ECT Performance***					
Standard Score			*Standard Score Difference (ECT – SAT Verbal)*		
ECT	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
-1.16	-1.39	English Not Best Language	+.23	M +.12 F +.35	— —
+.04	-.06	Female	+.10	— —	EB +.07 ENB +.35
*Lower ECT Performance***					
Standard Score			*Standard Score Difference (ECT – SAT verbal)*		
ECT	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
-.04	+.06	Male	-.10	— —	EB -.11 ENB +.12
-.45	-.38	American Indian	-.07	M -.08 F -.06	EB -.08 ENB *

M = Male EB = English best language. * = Fewer than 25 students with a score on both tests.
F = Female ENB = English not best language. ** = Only groups with a standard score difference of at least .05 are shown.

TABLE 7 (PART 2)

ECT VS. TSWE					
*Higher ECT Performance***					
Standard Score			*Standard Score Difference (ECT – TSWE)*		
ECT	*TSWE*	*Student Group*	*Total*	*By Sex*	*By Language*
-1.16	-1.51	English Not Best Language	+.35	M +.37 F +.35	— —
-.47	-.63	Asian American	+.16	M +.20 F +.12	EB +.09 ENB +.51
*Lower ECT Performance***					
Standard Score			*Standard Score Difference (ECT – TSWE)*		
ECT	*TSWE*	*Student Group*	*Total*	*By Sex*	*By Language*
-.45	-.34	American Indian	-.11	M -.10 F -.32	EB -.12 ENB *
ECT-ESSAY VS. ECT-OBJECTIVE					
*Higher ECT-Essay Performance***					
Standard Score			*Standard Score Difference (ECT-Essay – ECT-Objective)*		
ECT-Essay	*ECT-Objective*	*Student Group*	*Total*	*By Sex*	*By Language*
-.36	-.75	Hispanic	+.39	M +.35 F +.42	EB +.42 ENB +.03
-.45	-.73	Black	+.28	M +.14 F +.34	EB +.27 ENB *
-.23	-.46	Low Academic Composite	+.23	M +.20 F +.25	EB +.23 ENB +.18
-.29	-.51	Asian American	+.22	M +.30 F +.18	EB +.26 ENB -.12
-.20	-.33	First Generation College	+.13	M +.14 F +.13	EB +.15 ENB -.10
*Higher ECT-Objective Performance***					
Standard Score			*Standard Score Difference (ECT-Essay – ECT-Objective)*		
ECT-Objective	*ECT-Essay*	*Student Group*	*Total*	*By Sex*	*By Language*
+.45	+.22	High Academic Composite	-.23	M -.19 F -.27	EB -.23 ENB +.01
+.15	+.09	White	-.06	M -.08 F -.06	EB -.06 ENB +.24
LITERATURE VS. SAT VERBAL					
*Higher Literature Performance***					
Standard Score			*Standard Score Difference (Literature – SAT Verbal)*		
Literature	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
-1.14	-1.34	English Not Best Language	+.20	M -.09 F +.36	— —
-.74	-.83	Black	+.09	M -.15 F +.16	EB +.11 ENB*
+.03	-.05	Female	+.08	— —	EB +.08 ENB +.36
-.43	-.51	Hispanic	+.08	M -.15 F +.20	EB +.09 ENB*
-.45	-.52	Low Academic Composite	+.07	M -.11 F +.16	EB +.08 ENB +.35
-.33	-.39	First Generation College	+.06	M -.12 F +.16	EB +.06 ENB*

TABLE 7 (PART 3)

*Lower Literature Performance***					
Standard Score			*Standard Score Difference (Literature – SAT Verbal)*		
Literature	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
-.06	+.10	Male	-.16	—	EB -.16
				—	ENB -.09
+.48	+.57	High Academic Composite	-.09	M -.22	EB -.09
				F -.01	ENB*

M = Male EB = English best language. * = Fewer than 25 students with a score on both tests.
F = Female ENB = English not best language. ** = Only groups with a standard score difference of at least .05 are shown.

for whom English is not their best language was -1.51 for TSWE, the next lowest was -1.39 for the SAT verbal score, and the least below average was -1.16 for ECT. Comparing the TSWE and the ECT, both had a large number of questions on identifying existing errors in sentences, but this item type comprised 70 percent (35 of 50) of the questions on the TSWE compared to only 44 percent (40 of 90) of the questions on the ECT without an essay. In contrast, an item type comprising 28 percent (25 of 90) of the questions on the ECT that was not on the TSWE was rewriting or rephrasing acceptable sentences to improve sentence structure or word choice or to change emphasis. The relative standard scores suggest that students for whom English is not their best language had the most difficulty on questions identifying existing errors and the least difficulty on questions relating to rewriting or rephrasing.

Females performed better on the ECT than indicated from their SAT verbal scores (by a standard score difference of .10). Asian American students performed better on the ECT than on the TSWE (by a standard score difference of .16).

In both comparisons, American Indian students performed less well on the ECT (by .07 compared with their SAT verbal score and by .11 compared with their TSWE score). Compared with their SAT verbal score, males also performed less well on the ECT.

For the ECT test with an essay, Table 7 compares performance on the two parts of the test: on the essay and on the objective parts. The groups that performed better on the essay were Hispanic students (by .39), black students (by .28), students in the low academic composite (by .23), Asian American students (by .22), and first-generation college students (by .13). The groups that performed better on the objective part were students in the high academic composite (by .23) and white students (by .06).

Table 7 also compares performance on the Literature Test with the SAT verbal score for all students who took both tests. As with the ECT, students for whom English is not their best language performed better on the Literature Test than indicated from their SAT verbal scores, by a standard score difference of .20 (-1.14 compared with -1.34). As shown in Table 4, this group took the Literature Test at about one-third the rate (3 percent) of Achievement Test takers in general (10 percent). Other groups that also performed better on the Literature Test were black students (by .09), who had the highest rate of taking the Literature Test (15 percent), females (by .08), Hispanic students (by .08), students in the low academic composite (by .07), and first-generation college students (by .06). Males performed less well on the Literature Test than indicated from their SAT verbal scores, by .16 (-.06 compared with +.10), and so did students in the high academic composite, by .09.

Mathematics Tests

Table 8 contains comparisons of performance on the Mathematics Level I Test, the Mathematics Level II Test, and a combination of either of the two tests, with the SAT mathematical score. For all three comparisons, the groups that performed best on the mathematics Achievement Tests over what was indicated from their SAT mathematical scores were students for whom English is not their best language (standard score differences of: +.15 for Mathematics Level I, +.08 for Mathematics Level I compared with -.07 for SAT math; +.19 for Mathematics Level II, +.13 for Mathematics Level II compared with -.06 for SAT math; and +.16 for the Mathematics Level I or II combination) and black students (standard score differences of: +.12 for Mathematics Level I, -.79 for Mathematics Level I compared with -.91 for SAT math; +.22 for Mathematics Level II, -.94 for Mathematics Level II compared with -1.16 for SAT math; and +.15 for the Mathematics Level I or II combination). The SAT mathematical sections contain more questions involving the use of mathematical reasoning in the real world than either of the mathematics Achievement Tests, and, as a result, appear to be somewhat more dependent on English language skills.

Asian American students also performed better on the mathematics Achievement Tests in all three comparisons. Hispanic students and students in the low academic composite performed better on the Mathematics Level I Test

TABLE 8 (PART 1)

Comparisons of Student Group Performance on Mathematics Tests—the Combination of Mathematics I and Mathematics II Tests, the Mathematics I Test, the Mathematics II Test, and the Mathematics Section of the SAT—Measured by Standard Scores (Group Mean–Total Mean)/(Total Standard Deviation)

MATHEMATICS LEVEL I VS. SAT MATHEMATICS

*Higher Mathematics Level I Performance***

Standard Score			*Standard Score Difference (Mathematics I– SAT Math)*		
Math I	*SAT M*	*Student Group*	*Total*	*By Sex*	*By Language*
+.08	-.07	English Not Best Language	+.15	M +.11 F +.18	— —
-.79	-.91	Black	+.12	M +.02 F +.18	EB +.12 ENB*
+.17	+.07	Asian American	+.10	M +.06 F +.14	EB +.09 ENB +.19
-.61	-.69	Hispanic	+.08	M +.05 F +.11	EB +.08 ENB +.08
-.47	-.53	Low Academic Composite	+.06	M -.01 F +.11	EB +.05 ENB +.23

*Lower Mathematics Level I Performance***

Standard Score			*Standard Score Difference (Mathematics I– SAT Math)*		
Math I	*SAT M*	*Student Group*	*Total*	*By Sex*	*By Language*
-.60	-.52	American Indian	-.08	M -.08 F -.06	EB -.08 ENB*
+.55	+.60	High Academic Composite	-.05	M -.08 F -.03	EB -.05 ENB -.05
+.22	+.27	Male	-.05	— —	EB -.05 ENB +.11

MATHEMATICS LEVEL II VS. SAT MATHEMATICS

*Higher Mathematics Level II Performance***

Standard Score			*Standard Score Difference (Mathematics II– SAT Math)*		
Math II	*SAT M*	*Student Group*	*Total*	*By Sex*	*By Language*
-.94	-1.16	Black	+.22	M +.07 F +.35	EB +.20 ENB*
+.13	-.06	English Not Best Language	+.19	M +.12 F +.31	— —
-.54	-.63	Low Academic Composite	+.09	M +.01 F +.19	EB +.07 ENB +.06
+.11	+.03	Asian American	+.08	M +.05 F +.14	EB +.06 ENB +.20
-.24	-.32	Female	+.08	— —	EB +.07 ENB +.31

*Lower Mathematics Level II Performance***

Standard Score			*Standard Score Difference (Mathematics II– SAT Math)*		
Math II	*SAT M*	*Student Group*	*Total*	*By Sex*	*By Language*
+.33	+.38	High Academic Composite	-.05	M -.09 F .00	EB -.06 ENB +.06
+.16	+.21	Male	-.05	— —	EB -.06 ENB +.12

TABLE 8 (PART 2)

MATHEMATICS LEVEL I OR II COMBINATION VS. SAT MATHEMATICS					
*Higher Mathematics Level I or II Combination Performance***					
Standard Score			*Standard Score Difference (Math Combination – SAT Math)*		
Math Comb.	*SAT M*	*Student Group*	*Total*	*By Sex*	*By Language*
+.13	-.03	English Not Best Language	+.16	M +.13 F +.19	— —
-.81	-.96	Black	+.15	M +.03 F +.22	EB +.14 ENB*
+.21	+.11	Asian American	+.10	M +.08 F +.13	EB +.09 ENB +.20
-.66	-.74	Hispanic	+.08	M +.02 F +.13	EB +.08 ENB +.08
-.53	-.59	Low Academic Composite	+.06	M -.01 F +.12	EB +.05 ENB +.22
*Lower Mathematics Level I or II Combination Performance***					
Standard Score			*Standard Score Difference (Math Combination – SAT Math)*		
Math Comb.	*SAT M*	*Student Group*	*Total*	*By Sex*	*By Language*
+.76	+.82	High Academic Composite Male	-.06	— —	EB -.06 ENB +.04

M = Male EB = English best language. * = Fewer than 25 students with a score on both tests.
F = Female ENB = English not best language. ** = Only groups with a standard score difference of at least .05 are shown.

and the Mathematics Level I or II combination. Females performed better on the Mathematics Level II Test.

American Indian students performed less well on the Mathematics Level I Test (standard score of -.60) than indicated from their SAT mathematical scores (standard score of -.52). Students in the high academic composite and males also performed less well on both the Mathematics Level I and Level II Tests.

History Tests

Table 9 contains comparisons of performance on the history Achievement Tests—(1) American History and (2) European and World History—with the SAT verbal score. Students for whom English is not their best language performed much better on both of the history tests than indicated from their SAT verbal

TABLE 9 (PART 1)

Comparisons of Student Group Performance on the History Achievement Tests and on the Verbal Section of the SAT (Group Mean–Total Mean)/(Total Standard Deviation)

AMERICAN HISTORY VS. SAT VERBAL					
*Higher American History Performance***					
Standard Score			*Standard Score Difference (American History – SAT Verbal)*		
Amer. History	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
-.93	-1.58	English Not Best Language	+.65	M +.67 F +.63	— —
-.34	-.50	Asian American	+.16	M +.26 F +.06	EB +.05 ENB +.73
+.17	+.05	Male	+.12	— —	EB +.10 ENB +.67
-.44	-.53	Low Academic Composite	+.09	M +.20 F -.04	EB +.06 ENB +.72
-.34	-.40	First Generation College	+.06	M +.10 F -.08	EB +.01 ENB +.77
-.29	-.34	Hispanic	+.05	M +.16 F -.13	EB +.05 ENB +.10

TABLE 9 (PART 2)

*Lower American History Performance***

Standard Score			*Standard Score Difference (American History – SAT Verbal)*		
Amer. History	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
-.22	-.06	Female	-.16	— —	EB -.19 ENB +.63
+.50	+.61	High Academic Composite	-.11	M +.02 F -.29	EB -.12 ENB +.39

EUROPEAN AND WORLD HISTORY VS. SAT VERBAL

*Higher European and World History Performance***

Standard Score			*Standard Score Difference (European/World History – SAT Verbal)*		
Eur. History	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
-.98	-1.74	English Not Best Language	+.76	M* F*	— —
-.30	-.58	Asian American	+.28	M +.43 F +.13	EB +.06 ENB*
+.20	+.02	Male	+.18	— —	EB +.15 ENB*
-.40	-.58	Low Academic Composite	+.18	M +.37 F -.14	EB +.14 ENB*
-.23	-.38	First Generation College	+.15	M +.25 F -.02	EB +.14 ENB*

*Lower European and World History Performance***

Standard Score			*Standard Score Difference (European/World History – SAT Verbal)*		
Eur. History	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
-.36	-.04	Female	-.32	— —	EB -.36 ENB*
+.39	+.53	High Academic Composite	-.14	M +.03 F -.51	EB -.16 ENB*

M = Male EB = English best language. * = Fewer than 25 students with a score on both tests.
F = Female ENB = English not best language. ** = Only groups with a standard score difference of at least .05 are shown.

scores (standard score differences of .65 and .76, respectively). Asian American students, males, students in the low academic composite, and first-generation college students also performed better on both of the history tests.

Females performed less well on both of the history tests than indicated from their SAT verbal scores (by .16 for the American History Test and by .32 for the European and World History Test). Students in the high academic composite also performed less well. As shown in Table 6, females were less likely (26 percent) than males (36 percent) to take the American History Test.

Science Tests

Table 10 contains comparisons of performance on the science Achievement Tests—Biology, Chemistry, and Physics—with the SAT-total (verbal plus mathematical) score. The groups that performed much better on the science tests were black students (by standard score differences of .25 for Biology, .30 for Chemistry, and .33 for Physics), students for whom English is not their best language (by .12 for Biology, .64 for Chemistry, and .71 for Physics), and students in the low academic composite (by .17 for Biology, .20 for Chemistry, and .28 for Physics). Other groups performing better on the science tests than indicated from their SAT scores were Hispanic students (all three science tests), Asian American students (Chemistry and Physics), first-generation college students (Chemistry and Physics), students in the middle academic composite (Chemistry and Physics), and males (Physics). Because Hispanic students took each of the science tests at about half the rate of Achievement Test takers in general, as shown in Table 6, their higher performance appears to be more a result of self-selection than for other groups.

TABLE 10 (PART 1)

Comparisons of Student Group Performance on the Science Achievement Tests and on the SAT V+M, Measured by Standard Scores, (Group Mean–Total Mean)/(Total Standard Deviation)

BIOLOGY VS. SAT V+M					
*Higher Biology Performance***					
Standard Score			*Standard Score Difference (Biology–SAT V+M)*		
Biology	*SAT V+M*	*Student Group*	*Total*	*By Sex*	*By Language*
-.60	-.85	Black	+.25	M +.27 F +.24	EB +.25 ENB*
-.43	-.60	Low Academic Composite	+.17	M +.15 F +.19	EB +.17 ENB +.31
-.65	-.77	English Not Best Language	+.12	M +.10 F +.13	— —
-.52	-.61	Hispanic	+.09	M +.01 F +.16	EB +.09 ENB*
*Lower Biology Performance***					
Standard Score			*Standard Score Difference (Biology–SAT V+M)*		
Biology	*SAT V+M*	*Student Group*	*Total*	*By Sex*	*By Language*
+.39	+.55	High Academic Composite	-.16	M -.20 F -.13	EB -.16 ENB -.31
CHEMISTRY VS. SAT V+M					
*Higher Chemistry Performance***					
Standard Score			*Standard Score Difference (Chemistry–SAT V+M)*		
Chemistry	*SAT V+M*	*Student Group*	*Total*	*By Sex*	*By Language*
-.26	-.90	English Not Best Language	+.64	M +.63 F +.64	— —
-.61	-.91	Black	+.30	M +.29 F +.30	EB +.28 ENB*
-.43	-.63	Low Academic Composite	+.20	M +.19 F +.20	EB +.15 ENB +.86
+.06	-.12	Asian American	+.18	M +.21 F +.12	EB +.03 ENB +.65
-.33	-.44	First Generation College	+.11	M +.11 F +.10	EB +.05 ENB +.73
-.38	-.46	Hispanic	+.08	M +.02 F +.18	EB +.06 ENB*
-.12	-.19	Middle Academic Composite	+.07	M +.07 F +.08	EB +.04 ENB +.61
*Lower Chemistry Performance***					
Standard Score			*Standard Score Difference (Chemistry–SAT V+M)*		
Chemistry	*SAT V+M*	*Student Group*	*Total*	*By Sex*	*By Language*
+.31	+.46	High Academic Composite	-.15	M -.10 F -.23	EB -.17 ENB +.41
+.02	+.07	White	-.05	M -.02 F -.10	EB -.06 ENB +.48

M = Male EB = English best language. * = Fewer than 25 students with a score on both tests.
F = Female ENB = English not best language. ** = Only groups with a standard score difference of at least .05 are shown.

TABLE10 (PART 2)

PHYSICS VS. SAT V+M					
*Higher Physics Performance***					
Standard Score			*Standard Score Difference (Physics–SAT V+M)*		
Physics	*SAT V+M*	*Student Group*	*Total*	*By Sex*	*By Language*
-.26	-.97	English Not Best Language	+.71	M +.80 F +.35	— —
-.81	-1.14	Black	+.33	M +.30 F +.40	EB +.32 ENB*
-.42	-.70	Low Academic Composite	+.28	M +.36 F -.01	EB +.22 ENB +.96
.00	-.27	Asian American	+.27	M +.36 F -.05	EB +.08 ENB +.77
-.28	-.43	First Generation College	+.15	M +.18 F +.03	EB +.09 ENB +.77
-.42	-.56	Hispanic	+.14	M +.16 F*	EB +.11 ENB*
+.13	+.04	Male	+.09	— —	EB +.04 ENB +.80
-.12	-.20	Middle Academic Composite	+.08	M +.18 F -.23	EB +.02 ENB +.73
*Lower Physics Performance***					
Standard Score			*Standard Score Difference (Physics–SAT V+M)*		
Physics	*SAT V+M*	*Student Group*	*Total*	*By Sex*	*By Language*
-.43	-.12	Female	-.31	— —	EB -.33 ENB +.35
+.28	+.46	High Academic Composite	-.18	M -.09 F -.46	EB -.21 ENB +.43
+.04	+.12	White	-.08	M +.02 F -.38	EB -.09 ENB +.62

M = Male EB = English best language. * = Fewer than 25 students with a score on both tests.
F = Female ENB = English not best language. ** = Only groups with a standard score difference of at least .05 are shown.

Students in the high academic composite performed less well on all three science tests than indicated from their SAT scores (by standard score differences of .16 for Biology, .15 for Chemistry, and .18 for Physics). White students also performed less well on the Chemistry and Physics tests. But the largest deficit from what was indicated by SAT performance was for the 3 percent of the females who took the Physics test, a standard score difference of .31 (a standard score of -.43 on the Physics test compared with -.12 on the SAT).

Foreign Language Tests

Table 11 contains comparisons of performance on the foreign language Achievement Tests—Spanish, French, German, Latin, and Hebrew—with the SAT verbal score. Two groups of students had huge benefits by taking the Spanish Test: students for whom English is not their best language, by a standard score difference of 1.82 (+.72 for the Spanish Test compared with -1.10 for the SAT verbal score); and Hispanic students, by a standard score difference of 1.50 (+.84 for the Spanish Test compared with -.66 for the SAT verbal score). For Hispanic students for whom English is not their best language, the standard score difference was a relatively very large 2.58! Two other groups that performed much better on the Spanish Test were first-generation college students (by a standard score difference of .50) and students in the low academic composite (by .46).

The groups that performed least well on the Spanish Test compared with their SAT verbal scores were students in the high academic composite, by a standard score difference of .48 (+.16 for the Spanish Test compared with +.64 for the SAT verbal score), and white students, by a standard score difference of .33 (-.10 for the Spanish Test compared with +.23 for the SAT verbal score). Students with a parent who is

TABLE 11 (PART 1)

Comparisons of Student Group Performance on the Foreign Language Achievement Tests and on the Verbal Section of the SAT, Measured by Standard Scores (Group Mean–Total Mean)/(Total Standard Deviation)

SPANISH VS. SAT VERBAL					
*Higher Spanish Performance***					
Standard Score			*Standard Score Difference (Spanish–SAT Verbal)*		
Spanish	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
+.72	-1.10	English Not Best Language	+1.82	M +1.88 F +1.77	— —
+.84	-.66	Hispanic	+1.50	M +1.50 F +1.53	EB +1.33 ENB +2.55
+.11	-.39	First Generation College	+.50	M +.55 F +.47	EB +.40 ENB +1.99
-.09	-.55	Low Academic Composite	+.46	M +.42 F +.49	EB +.33 ENB +2.13
*Lower Spanish Performance***					
Standard Score			*Standard Score Difference (Spanish–SAT Verbal)*		
Spanish	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
+.16	+.64	High Academic Composite	-.48	M -.49 F -.47	EB -.52 ENB +1.17
-.10	+.23	White	-.33	M -.42 F -.27	EB -.36 ENB +1.71
-.04	+.16	Parent is a College Graduate	-.20	M -.28 F -.16	EB -.29 ENB +1.69
-.60	-.43	Black	-.17	M -.24 F -.15	EB -.20 ENB*
-.46	-.31	American Indian	-.15	M* F*	EB -.30 ENB*
FRENCH VS. SAT VERBAL					
*Higher French Performance***					
Standard Score			*Standard Score Difference (French–SAT Verbal)*		
French	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
+.12	-1.41	English Not Best Language	+1.53	M +1.38 F +1.63	— —
-.14	-.70	Hispanic	+.56	M +.56 F +.56	EB +.42 ENB*
-.22	-.48	Low Academic Composite	+.26	M +.13 F +.31	EB +.18 ENB +1.73
-.06	-.31	Asian American	+.25	M -.01 F + .35	EB +.09 ENB +1.11
-.41	-.62	Black	+.21	M +.06 F +.24	EB +.19 ENB*
-.31	-.48	First Generation College	+.17	M +.16 F +.18	EB +.10 ENB +1.44

a college graduate, black students, and American Indian students also performed less well on the Spanish Test.

The same four groups that performed better on the Spanish Test than indicated from their SAT verbal scores also performed better on the French Test: students for whom English is not their best language (by a standard score difference of 1.53), Hispanic students (by .56), students in the low academic composite (by .26), and first-generation college students (by .17). Asian American students also performed better on the French Test (by .25). While black students who took Spanish did not perform as well as indicated from their SAT verbal scores, black students who

TABLE 11 (PART 2)

*Lower French Performance***

Standard Score			*Standard Score Difference (French – SAT Verbal)*		
French	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
+.26	+.52	High Academic Composite	-.26	M -.33 F -.24	EB -.27 ENB +.83
+.02	+.12	Male	-.10	— —	EB -.17 ENB +1.38
-.01	+.04	English Best Language	-.05	M -.17 F +.01	— —

GERMAN VS. SAT VERBAL

*Higher German Performance***

Standard Score			*Standard Score Difference (German – SAT Verbal)*		
German	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
-.16	-.57	Low Academic Composite	+.41	M +.28 F +.51	EB +.31 ENB*
-.09	-.42	First Generation College	+.33	M +.36 F +.31	EB +.26 ENB*
-.02	-.15	Middle Academic Composite	+.13	M +.12 F +.14	EB +.07 ENB*
+.03	-.05	Female	+.08	— —	EB +.03 ENB*

*Lower German Performance***

Standard Score			*Standard Score Difference (German – SAT Verbal)*		
German	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
+.13	+.52	High Academic Composite	-.39	M -.48 F -.31	EB -.40 ENB*
-.04	+.06	Male	-.10	— —	EB -.18 ENB*
+.02	+.10	Parent is a College Graduate	-.08	M -.20 F +.02	EB -.13 ENB*
-.01	+.05	English Not Best Language	-.06	M -.18 F +.03	— —

LATIN VS. SAT VERBAL

*Higher Latin Performance***

Standard Score			*Standard Score Difference (Latin – SAT Verbal)*		
Latin	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
+.10	-.44	Asian American	+.54	M +.48 F +.57	EB +.46 ENB*
-.27	-.48	Low Academic Composite	+.21	M +.27 F +.15	EB +.19 ENB*
-.15	-.33	First Generation College	+.18	M +.22 F +.16	EB +.17 ENB*
-.01	-.07	Middle Academic Composite	+.06	M +.14 F .00	EB +.05 ENB*

took French performed better than indicated from their SAT verbal scores.

As for the Spanish Test, the group that performed least well on the French Test compared with their SAT verbal scores were students in the high academic composite, by a standard score difference of .26. Males and students for whom English is their best language also performed less well on the French Test.

TABLE 11 (PART 3)

*Lower Latin Performance***

Standard Score			*Standard Score Difference (Latin – SAT Verbal)*		
Latin	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
+.23	+.45	High Academic Composite	-.22	M -.27 F -.18	EB -.23 ENB*
-.01	+.06	White	-.07	M -.04 F -.10	EB -.08 ENB*
+.04	+.09	Parent is a College Graduate	-.05	M -.01 F -.09	EB -.06 ENB*

HEBREW VS. SAT VERBAL

*Higher Hebrew Performance***

Standard Score			*Standard Score Difference (Hebrew – SAT Verbal)*		
Hebrew	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
-.08	-.14	Female	+.06	— —	EB* ENB*

*Lower Hebrew Performance***

Standard Score			*Standard Score Difference (Hebrew – SAT Verbal)*		
Hebrew	*SAT V*	*Student Group*	*Total*	*By Sex*	*By Language*
+.18	+.65	High Academic Composite	-.46	M* F*	EB* ENB*
-.25	+.18	English Best Language	-.43	M* F*	— —
.00	+.14	Parent is a College Graduate	-.14	M* F -.07	EB* ENB*
+.13	+.23	Male	-.10	— —	EB* ENB*
-.04	+.06	White	-.10	M -.10 F -.10	EB* ENB*

M = Male EB = English best language. * = Fewer than 25 students with a score on both tests.
F = Female ENB = English not best language. ** = Only groups with a standard score difference of at least .05 are shown.

German, Latin, and Hebrew are lower-volume tests, and only groups with at least 25 test-takers were eligible to be included as high or low performance groups. For both the German and Latin Tests, first-generation college students and students in the low academic composite performed better than indicated from their SAT verbal score. The group that performed best on the Latin Test compared with their SAT verbal scores were Asian American students, by a standard score difference of .54 (+.10 for the Latin Test compared with -.44 for the SAT verbal score).

Females performed better on the Hebrew Test. The group that performed least well on the German, Latin, and Hebrew Tests were students in the high academic composite.

Average of All Achievement Tests

Table 12 contains comparisons of performance on a student's Achievement average with the student's SAT-total (verbal plus mathematical) score. Two student groups stand out as having substantially higher performance on their Achievement average: Students for whom English is not their best language and Hispanic students. For both groups, the standard score on their Achievement average (-.43 and -.40, respectively) was about half as low as the standard score for their SAT-total (-.82 and -.76, respectively). These groups especially benefitted from their performance on the language tests, but also did relatively well on most of the other tests. Students who performed less well on their Achievement average were students in the high academic composite (primarily on the language tests), American Indian students

TABLE 12

Comparisons of Student Group Performance on the Achievement Average and on the SAT V+M, Measured by Standard Scores (Group Mean–Total Mean)/(Total Standard Deviation)

ACHIEVEMENT AVERAGE VS. SAT V+M

*Higher Achievement Average Performance***

Standard Score			*Standard Score Difference (Ach. Average – SAT V+M)*		
Ach. Average	*SAT V+M*	*Student Group*	*Total*	*By Sex*	*By Language*
-.43	-.82	English Not Best Language	+.39	M +.34 F +.43	—
-.40	-.76	Hispanic	+.36	M +.25 F +.46	EB +.31 ENB +.93
-.55	-.64	Low Academic Composite	+.09	M +.01 F +.17	EB +.07 ENB +.52
-.81	-.88	Black	+.07	M -.03 F +.13	EB +.07 ENB*
-.36	-.42	First Generation in College	+.06	M -.01 F +.12	EB +.04 ENB +.39
-.13	-.18	Female	+.05	— —	EB +.04 ENB +.43

*Lower Achievement Average Performance***

Standard Score			*Standard Score Difference (Ach. Average – SAT V+M)*		
Ach. Average	*SAT V+M*	*Student Group*	*Total*	*By Sex*	*By Language*
+.57	+.66	High Academic Composite	-.09	M -.11 F -.06	EB -.09 ENB +.16
-.56	-.49	American Indian	-.07	M -.10 F -.05	EB -.08 ENB*
+.14	+.19	Male	-.05	— —	EB -.07 ENB +.34

M = Male EB = English best language. * = Fewer than 25 students with a score on both tests.
F = Female ENB = English not best language. ** = Only groups with a standard score difference of at least .05 are shown.

(primarily on Spanish and the ECT), and males (primarily on the English tests).

By Academic Composite

Table 13 summarizes the high and low performance comparisons shown in Tables 7–11 (with standard score differences of at least .05) for the academic composite student groups. As shown, students in the high academic composite had low comparative performance for almost all of the Achievement Tests and students in the low academic composite had almost a mirror-image high comparative performance. This could be expected because in almost all cases an SAT score is the comparative score, and the SAT

TABLE 13 (PART 1)

Performance Comparisons by Academic Composite, Measured by Standard Scores (Group Mean–Total Mean)/(Total Standard Deviation)*

High Academic Composite		*Middle Academic Composite*		*Low Academic Composite*	
High Performance	*Low Performance*	*High Performance*	*Low Performance*	*High Performance*	*Low Performance*
—	Spanish -.48 (SAT V)	German +.13 (SAT V)	—	Spanish +.46 (SAT V)	—
	Hebrew -.46 (SAT V)	Physics +.08 (SAT V+M)		German +.41 (SAT V)	
	German -.39 (SAT V)	Chemistry +.07(SAT V+M)		Physics +.28 (SAT V+M)	
	French -.26 (SAT V)	Latin +.06 (SAT V)		French +.26 (SAT V)	

TABLE 13 (PART 2)

High Academic Composite		*Middle Academic Composite*		*Low Academic Composite*	
High Performance	*Low Performance*	*High Performance*	*Low Performance*	*High Performance*	*Low Performance*
	ECT-Essay -.23 (ECT-Obj.)			ECT-Essay +.23 (ECT-Obj.)	
	Latin -.22 (SAT V)			Latin +.21 (SAT V)	
	Physics -.18 (SAT V+M)			Chemistry +.20 (SAT V+M)	
	Biology -.16 (SAT V+M)			Eur. History +.18 (SAT V)	
	Chemistry -.15 (SAT V+M)			Biology +.17 (SAT V+M)	
	Eur. History -.14 (SAT V)			ACH. AV. +.09 (SAT V+M)	
	Am. History -.11 (SAT V)			Am. History +.09 (SAT V)	
	ACH. AV. -.09 (SAT V+M)			Math II +.09 (SAT M)	
	Literature -.09 (SAT V+M)			Literature +.07 (SAT V)	
	Math I -.05 (SAT M)			Math I +.06 (SAT M)	
	Math II -.05 (SAT M)			Math Combin. +.06 (SAT M)	

* Only standard score differences of at least .05 are shown. The comparative scores used are shown in parentheses.

is used, along with HSGPA, to define the academic composite groups. As a result, there is somewhat of a regression to the mean for the Achievement Test comparisons.

But the standard score differences of .20–.50 on the language tests may be beyond what might be expected by regression to the mean, especially for Spanish. Also, the standard score difference of .15–.30 on the science tests is quite high. These comparisons show that most of the students in the low academic composite who chose to take language or science Achievement Tests performed substantially better than indicated by their SAT scores. The same is true for students in the low academic composite who chose to take the essay in the ECT: their standard score on the essay exceeded their standard score on the objective part of the ECT by .23.

By Sex

Table 14 summarizes the high performance comparisons shown in Tables 7–11 (with standard score differences of at least .05) for males and for females. As shown, males tended to excel in the history tests and in the Physics Test relative to what was indicated by their SAT scores.

But females had a higher Achievement average than what was indicated by their SAT scores. They had especially higher performance on the English tests and on the Mathematics Level II Test, as well as on the German and Hebrew Tests.

TABLE 14

Performance Comparisons by Sex, Measured by Standard Scores (Group Mean–Total Mean)/(Total Standard Deviation)*

Higher Performance for Males	*Higher Performance for Females*
European History +.18 (SAT V)	ECT +.10 (SAT V)
American History +.12 (SAT V)	Literature +.08 (SAT V)
Physics +.09 (SAT V+M)	Math Level II +.08 (SAT M)
	German +.08 (SAT V)
	Hebrew +.06 (SAT V)
	ACH. AV. +.05 (SAT V+M)

*Only standard score differences of at least .05 are shown. The comparative scores used are shown in parentheses.

By English Best Language

Table 15 summarizes the high performance comparisons shown in Tables 7–11 (with standard score differences of at least .05) for students for whom English is and is not their best language, as a whole and with separate Asian American, Hispanic, and white comparisons. Students for whom English is their best language do not have any favorable performance comparisons with a standard score difference of at least .05 for any of the Achievement Tests. Because they make up the great majority of students, their group means are naturally very similar to the total means.

Students for whom English is not their best language have higher performance on every Achievement Test except Latin than what was indicated by their SAT scores. (The only reason Hebrew and German were not listed among the others on Table 13 was because the number of takers of these tests in the study with English not their best language was fewer than 20.) For students for whom English is not their best language, the standard score for the Achievement average was +.39, ranging from +.93 for Hispanic students to +.25 for Asian American students. The greatest differences in performance were in Spanish and

TABLE 15

Performance Comparisons by English Best Language, Measured by Standard Scores (Group Mean–Total Mean)/(Total Standard Deviation)*, With Separate Asian American, Hispanic, and White Comparisons

Higher Performance for English Best Language	*Higher Performance for English Not Best Language (With Separate Asian American, Hispanic, and White Comparisons)*	
NONE	Spanish +1.82 (SAT V)	(AA +.86, H +2.58, W +1.71)
	French +1.53 (SAT V)	(AA +1.10, H –, W +2.01)
	European History +.76 (SAT V)	(AA –, H –, W –)
	Physics +.71(SAT V+M)	(AA +.77, H –, W +.58)
	American History +.65 (SAT V)	(AA +.73, H –, W +.37)
	Chemistry +.64 (SAT V+M)	(AA +.65, H –, W +.52)
	ACH. AV. +.39 (SAT V+M)	(AA +.25, H +.93, W +.45)
	ECT +.35 (TSWE)	(AA +.51, H +.22, W +.03)
	ECT +.23 (SAT V)	(AA +.27, H -.07, W +.24)
	Literature +.20 (SAT V)	(AA –, H –, W –)
	Math Level II +.19 (SAT M)	(AA +.20, H –, W +.06)
	Math Combination +.16 (SAT M)	(AA +.20, H +.08, W +.05)
	Math Level I +.15 (SAT M)	(AA +.19, H +.09, W +.05)
	Biology +.12 (SAT V+M)	(AA -.04, H –, W +.35)

*Only standard score differences of at least .05 are shown. The comparative scores used are shown in parentheses.

French, with respective standard score differences of +1.82 (ranging from +2.58 for Hispanic students to +.86 for Asian American students) and +1.53 (+2.01 for white students, +1.10 for Asian American students, with fewer than 25 Hispanic French takers). Other tests with much higher comparative performance by these students were the history tests and the science tests (more so for Physics and Chemistry, but much less so for Biology).

By Ethnic Group

Table 16 summarizes the high and low performance comparisons shown in Tables 7–11 (with standard score differences of at least .05) for ethnic groups, and also shows the comparisons by sex within ethnic group. With only one exception, Asian American, black, and Hispanic students had only high performance comparisons for Achievement Tests, while American Indian and white students had only low performance comparisons.

American Indian students had somewhat lower standard scores on their Spanish, ECT, and Mathematics Level I Tests than indicated by their SAT scores. Their Achievement average standard score was .07 lower than their SAT-total standard score.

Asian American students had higher standard scores on several of their Achievement Tests than indicated by their SAT scores associated with the Achievement Tests. The largest difference (+.54) was in Latin, compared with the SAT verbal score. But there was very little standard score difference between the Achievement average and the SAT-total scores.

Black students had a .07 higher standard score for their Achievement average than for their SAT-total. The standard score differences were especially high for the science tests (+.33 for Physics, +.30 for Chemistry, and +.25 for Biology), and were also high for the mathematics tests (+.22 for Mathematics Level II and +.12 for Mathematics Level I). They also had higher ECT-Essay standard scores than ECT-Objective standard scores by .28 (.34 for black females and .14 for black males). The only low performance comparison for Achievement Tests by at least .05 was for Spanish (-.17), where black students may have had difficulty competing with the very high scores of Hispanic students.

Hispanic students had a very high standard score difference of +.36 for their Achievement average, primarily because of their huge standard score difference of +1.50 for Spanish. They also had a large difference of +.56 for French. They had other higher performance comparisons in the science tests, Literature, Mathematics Level I, and American History. They also had a high standard score

TABLE 16

Performance Comparisons by Ethnic Group, Measured by Standard Scores (Group Mean–Total Mean)/(Total Standard Deviation)*, With Separate Comparisons by Sex Within Ethnic Group

American Indian		*Asian American*		*Black*		*Hispanic*		*White*	
High Performance	*Low Performance*	*High Performance*	*Low Performance*	*High Performance*	*Low Performance*	*High Performance*	*Low Performance*	*High Performance*	*Low Performance*
—	Spanish -.15 (SAT V) (Male –, Female –)	Latin +.54 (SAT V) (Male +.48, Female +.58)	—	Physics +.33 (SAT V+M) (Male +.22, Female +.53)	Spanish -.17 (SAT V) (Male -.19, x Female -.18)	Spanish +1.50 (SAT V) (Male +1.47, Female +1.53)	—	—	Spanish -.33 (SAT V) (Male -.38, Female -.30)
	ECT -.11 (TSWE) (Male +.07, Female -.29)	Eur. Hist. +.28 (SAT V) (Male +.27, Female +.30)		Chemistry +.30 (SAT V+M) (Male +.30, Female +.29)		French +.56 (SAT V) (Male +.63, Female +.54)			Hebrew -.10 (SAT V) (Male –, Female -.15)
	Math I -.08 (SAT M) (Male -.02, Female -.11)	Physics +.27 (SAT V+M) (Male +.28, Female +.17)		ECT Essay +.28 (ECT-Obj.) (Male +.14, Female +.34)		ECT-Essay +.39 (ECT-Obj.) (Male +.34, Female +.41)			Physics -.08 (SAT V+M) (Male -.07, Female -.07)
	ACH. AV. -.07 (SAT V+M) (Male -.02, Female -.11)	French +.25 (SAT V) (Male +.09, Female +.32)		Biology +.25 (SAT V+M) (Male +.30, Female +.22)		ACH. AV. +.36 (SAT V+M) (Male +.33, Female +.41)			Latin -.07 (SAT V) (Male -.06, Female -.08)
	ECT -.07 (SAT V) (Male +.02, Female -.16)	ECT-Essay +.22 (ECT-Obj.) (Male +.26, Female +.17)		Math II +.22 (SAT M) (Male +.18, Female +.24)		Physics +.14 (SAT V+M) (Male +.07, Female +.12)			ECT-Essay -.06 (ECT-Obj.) (Male -.06, Female -.07)
		Chemistry +.18 (SAT V+M) (Male +.19, Female +.16)		French +.21 (SAT V) (Male +.15, Female +.21)		Biology +.09 (SAT V+M) (Male +.04, Female +.14)			Chemistry -.05 (SAT V+M) (Male -.05, Female -.06)
		ECT +.16 (TSWE) (Male +.17, Female +.15)		Math Combin. +.15 (SAT M) (Male +.10, Female +.16)		Lit. +.08 (SAT V) (Male +.03, Female +.11)			
		Am. Hist. +.16 (SAT V) (Male +.15, Female +.19)		Math I +.12 (SAT M) (Male +.09, Female +.13)		Math Combin. +.08 (SAT M) (Male +.10, Female +.07)			
		Math Combin. +.10 (SAT M) (Male +.11, Female +.10)		Lit. +.09 (SAT V) (Male +.03, Female +.07)		Math I +.08 (SAT M) (Male +.12, Female +.06)			
		Math I +.10 (SAT M) (Male +.10, Female +.10)		ACH. AV. +.07 (SAT V+M) (Male +.05, Female +.07)		Chemistry +.08 (SAT V+M) (Male +.02, Female +.18)			
		Math II +.08 (SAT M) (Male +.10, Female +.07)				Am. Hist. +.05 (SAT V) (Male +.05, Female +.02)			

*Only standard score differences of at least .05 are shown. The comparative scores used are shown in parentheses.

difference of +.39 for their ECT-Essay score over their ECT-Objective score.

White students had low performance comparisons for some of the Achievement Tests. The largest standard score difference of -.33 was in Spanish, due to competition with Hispanic students.

By First Generation in College

Table 17 summarizes the high performance comparisons shown in Tables 7–11 (with standard score differences of at least .05) for students who are and are not the first generation in their family in college. Students with a parent who is a college graduate do not have any favorable comparisons with a standard score difference of at least .05 for any of the Achievement Tests.

Students who are the first generation in college had a .06 higher standard score on their Achievement average than on their SAT-total. The largest standard score differences were in the language tests. Other large differences were in the history tests, Physics, Chemistry, and Literature.

TABLE 17

Performance Comparisons by First Generation in College, Measured by Standard Scores (Group Mean–Total Mean)/(Total Standard Deviation)*

Higher Performance for First Generation in College	*Higher Performance for Not First Generation in College*
Spanish +.50 (SAT V)	NONE
German +.33 (SAT V)	
Latin +.18 (SAT V)	
French +.17 (SAT V)	
Eur. Hist. +.15 (SAT V)	
Physics +.15 (SAT V+M)	
ECT-Essay +.13 (ECT-Obj.)	
Chemistry +.11 (SAT V+M)	
ACH. AV. +.06 (SAT V+M)	
Literature +.06 (SAT V)	
Am. Hist. +.06 (SAT V)	

*Only standard score differences of at least .05 are shown. The comparative scores used are shown in parentheses.

The Largest Achievement Test–Student Group Performance Differences

Table 18 summarizes all Achievement Test–student group performance differences shown in Tables 7–17 of at least .25 of a standard score. It is divided into two parts: differences with higher and with lower Achievement Test scores.

The 10 largest differences were among those with higher Achievement Test scores. Of these, three were 1.50 or higher: on the Spanish and French Tests for students for whom English is not their best language and on the Spanish Test for Hispanics. Students for whom English is not their best language stood out as the primary group with very high performance for Achievement Tests in the performance comparisons: in addition to the Spanish and French Tests, on the history tests, on the Physics and Chemistry Tests, and on the ECT (only when compared with the TSWE). Hispanic students had high performance on the French Test, as well as on the Spanish Test, and on the ECT-Essay when compared with the ECT-Objective section. Asian American students had high performance on the Latin Test, and, to a somewhat lesser extent, on the European History, Physics, and French Tests. Students who were their family's first generation in college had higher performance on the Spanish and German

TABLE 18

The Largest Achievement Test–Student Group Performance Differences, Measured by Standard Scores (Group Mean–Total Mean)/(Total Standard Deviation)*

Higher Achievement Test Performance			
Achievement Test	*Comparative Score*	*Student Group*	*Standard Score Difference*
Spanish	SAT V	Hispanic/ENBL	+2.58
Spanish	SAT V	English not best language	+1.82
French	SAT V	English not best language	+1.53
Spanish	SAT V	Hispanic	+1.50
European History	SAT V	English not best language	+.76
Physics	SAT V+M	English not best language	+.71
American History	SAT V	English not best language	+.65
Chemistry	SAT V+M	English not best language	+.64
French	SAT V	Hispanic	+.56
Latin	SAT V	Asian American	+.54
Spanish	SAT V	First generation college	+.50
Spanish	SAT V	Low academic	+.46
German	SAT V	Low academic	+.41
ECT-Essay	ECT-Objective	Hispanic	+.39
ACH. AV.	SAT V+M	English not best language	+.39
ACH. AV.	SAT V+M	Hispanic	+.36
ECT	TSWE	English not best language	+.35
ECT-Essay	ECT-Objective	Black female	+.34
German	SAT V	First generation college	+.33
Physics	SAT V+M	Black	+.33
Chemistry	SAT V+M	Black	+.30
ECT-Essay	ECT-Objective	Black	+.28
European History	SAT V	Asian American	+.28
Physics	SAT V+M	Low Academic	+.28
Physics	SAT V+M	Asian American	+.27
French	SAT V	Low Academic	+.26
French	SAT V	Asian American	+.25
Biology	SAT V+M	Black	+.25
Spanish	SAT V	High academic	-.48
Hebrew	SAT V	High academic	-.46
Hebrew	SAT V	English best language	-.43
German	SAT V	High academic	-.39
Spanish	SAT V	White	-.33
European History	SAT V	Female	-.32
Physics	SAT V+M	Female	-.30

*Standard score differences of .25 or more are shown.

Tests. Students in the low academic composite had higher performance on the Spanish, German, Physics, and French Tests. Black students had higher performance on all of the science tests and on the ECT-Essay when compared with the ECT-Objective section.

The language test performance of students in the high academic composite stood out among the large performance differences with lower Achievement Test scores: on the Spanish, Hebrew, and German Tests. Also, students for whom English is their best language had lower performance on the Hebrew Test and white students had lower performance on the Spanish Test. Finally, despite benefitting from Achievement Tests in general, females had much lower performance comparisons on the European History and Physics Tests.

VI. Predictive Effectiveness For Admission

Achievement Tests/SAT II: Subject Tests are used for both admission and placement or guidance purposes. For admission, the average of all tests or individual tests can be used with SAT scores, HSGPA, or other predictors to predict FGPA or one specified course grade averaged across all courses.

Average of All Achievement Tests

Table 19 shows average correlations for the predictions of one specified course grade and also of FGPA using SAT scores, HSGPA, and the Achievement Test average, singly and in combination. The correlations are both uncorrected and corrected for restriction of range. To compare SAT takers and Achievement Test takers, SAT and HSGPA correlations are shown for the 1985 SAT takers, using the results from the second course grade study, and for the 1985 Achievement Test takers. For evidence of any possible trend over time, SAT, HSGPA, and Achievement Test correlations are shown for 1982, as well as 1985, Achievement Test takers. SAT correlations in this table and in following tables are multiple correlations of SAT verbal and SAT math scores.

Comparing SAT and HSGPA correlations for 1985 SAT and Achievement Test takers, uncorrected correlations for predicting FGPA were almost identical (uncorrected course grade correlations cannot be compared because they were not produced for Achievement Test takers). But it appears that this similarity was only because Achievement Test takers had more restricted

TABLE 19

Average Correlations for All SAT Takers (1985) and for All Achievement Test Takers (1985 and 1982)

	Predictors								
Type of Correlation and Criterion	*SAT V*	*SAT M*	*SAT*	*HSGPA*	*SAT Increment*	*SAT HSGPA Mult.*	*Ach. Avg.*	*Ach. Av. Increment*	*SAT HSGPA Ach. Mult.*
Uncorrected Correlation									
One specified course grade:									
1985 SAT Takers	.23	.26	.32	.30	+.12	.42	—	—	—
1985 Achievement Test Takers	NA	NA	NA	NA	NA	NA	NA	NA	NA
1982 Achievement Test Takers	NA	NA	NA	NA	NA	NA	NA	NA	NA
FGPA:									
1985 SAT Takers	.30	.31	.36	.39	+.09	.48	—	—	—
1985 Achievement Test Takers	.30	.31	.36	.39	+.08	.47	.40	+.03	.50
1982 Achievement Test Takers	.30	.31	.37	.38	+.10	.48	.40	+.02	.50
Correlations Corrected for Restriction of Range									
One specified course grade:									
1985 SAT Takers	.41	.44	.49	.47	+.10	.57	—	—	—
1985 Achievement Test Takers	.41	.45	.50	.49	+.11	.60	.48	+.01	.61
1982 Achievement Test Takers	.42	.46	.51	.49	+.11	.60	.48	+.02	.62
FGPA:									
1985 SAT Takers	.47	.49	.53	.57	+.06	.63	—	—	—
1985 Achievement Test Takers	.49	.52	.55	.59	+.07	.66	.58	+.01	.67
1982 Achievement Test Takers	.50	.52	.56	.59	+.08	.67	.58	+.01	.68

ranges in SAT scores and HSGPA. When the effects of this restriction in range were removed, correlations were somewhat higher for Achievement Test takers: for the SAT–HSGPA multiple correlation, by .03 (in predicting FGPA, .66 for Achievement Test takers compared to .63 for SAT takers; in predicting course grade, .60 for Achievement Test takers compared to .57 for SAT takers).

As we found in Part 2 for SAT takers, HSGPA correlations were higher than SAT correlations in predicting FGPA for Achievement Test takers, but, for both groups of students, SAT correlations were higher than HSGPA correlations in predicting one specified course grade. Also, for both SAT and Achievement Test takers, the SAT increment in correlation over HSGPA was higher when the criterion was one specified course grade than for FGPA: after correction for restriction in range, .10–.11 for one specified course grade compared with .06–.08 for FGPA. Furthermore, SAT correlations were only .04–.05 higher for FGPA than for one specified course grade, but HSGPA correlations were .10 higher for FGPA than for one specified course grade. These results were very likely due to similarity in high school and college course selection, comprising HSGPA and FGPA.

Just as with HSGPA, Achievement Test average correlations were .10 higher for FGPA than for one specified course grade, twice as much of an increase as for the SAT. In contrast to the SAT, the choice of Achievement Tests that go into the average also appeared to reflect the pattern of course selection comprising HSGPA and FGPA.

Comparing 1982 and 1985 correlations for Achievement Test takers, all differences in correlations were within .01. Therefore, for the remainder of this report, results are combined for 1982 and 1985 Achievement Test takers, a total of 42,985 students.

Table 20 shows average correlations for all Achievement Test takers, 1982 and 1985 combined. Correlations for FGPA are shown in four ways: (1) uncorrected; (2) corrected only for shrinkage; (3) corrected for shrinkage and restriction of range; and (4) corrected for shrinkage, restriction of range, and criterion unreliability. Correlations for course grade are shown in two ways: (1) corrected for shrinkage and restriction of range; and (2) corrected for shrinkage, restriction of range, and criterion unreliability. Single predictors, multiple predictors, and predictor increments are shown for SAT scores, HSGPA, the Achievement Test average, and the average grade mean residual.

Because the results were based on 42,985 students, correlations on all Achievement Test takers were almost identical before and after correction for shrinkage. When the correlations were for individual Achievement Tests or subgroups of students, there were correlation reductions in correcting for shrinkage.

FGPA correlations for SAT verbal and SAT mathematical scores were identical before correction for restriction of range. But due to greater average restriction of range for SAT mathematical scores, correlations corrected for restriction of range were higher for SAT mathematical scores by .02.

Single-predictor correlations were very similar for the SAT, HSGPA, and the Achievement Test average. The Achievement Test average had slightly higher uncorrected FGPA correlations and FGPA correlations corrected only for shrinkage. HSGPA had slightly higher FGPA correlations corrected for restriction of range, as well as for shrinkage. The SAT had slightly higher course grade correlations.

Comparing the multiple correlation for the SAT and Achievement Test average test scores with the correlation for HSGPA, the test scores had a higher course grade correlation (.51 compared to .46 without correction for criterion unreliability, and .63 compared to .57 with correction for criterion unreliability) and also a higher uncorrected FGPA correlation (.41 compared to .38). After correction for restriction of range, the FGPA correlations for test scores and HSGPA were the same (.59 without correction for criterion unreliability and .63 with correction for criterion unreliability).

When HSGPA was combined with SAT scores and with the Achievement Test average, both of the sets of multiple predictors had higher correlations than the test score multiple predictors. For correlations corrected for restriction of range, course grade correlations were highest for the HSGPA–SAT combination (.58, compared with .56 for the HSGPA–Achievement Test average combination and .51 for the SAT–Achievement Test average combination) and FGPA correlations were highest for the HSGPA–Achievement Test average combination (.67, compared with .66 for the HSGPA–SAT combination and .59 for the SAT–Achievement Test average combination).

When all the HSGPA, SAT, and Achievement Test average predictors were used in combination, the multiple correlation was as high as .73 for course grade and .72 for FGPA, when corrected for both restriction of range and criterion unreliability. When the average grade mean residual was also used, the FGPA correlation went up to .79, about as high a correlation with FGPA as one could reasonably expect.

For predicting FGPA, when one of the four predictors was dropped, using three instead of four, and when corrected for restriction of range, the largest increments were lost for HSGPA (.09) and the average grade mean residual (.07), compared to only .01 for the Achievement Test average and .00 for the SAT. If the

TABLE 20

Average Correlations for All Achievement Test Takers (1982 and 1985 Combined)

	Uncorrected	*Corrected Only for Shrinkage*	*Corrected for Shrinkage and Restriction of Range*		*Corrected for Shrinkage, Restriction of Range, and Criterion Unreliability*	
	FGPA	*FGPA*	*Course Grade*	*FGPA*	*Course Grade*	*FGPA*
Single Predictors						
SAT V (V)	.30	.30	.39	.50	.48	.54
SAT M (M)	.30	.30	.42	.52	.52	.56
SAT (S)	.36	.36	.48	.56	.59	.60
HSGPA (H)	.38	.38	.46	.59	.57	.63
Ach. Av. (A)	.40	.40	.46	.58	.57	.62
Z*	.28	.27	NA	.12	NA	.13
Multiple Predictors						
HS	.47	.47	.58	.66	.71	.71
HA	.50	.49	.56	.67	.69	.72
SA	.41	.41	.51	.59	.63	.63
HSZ	.60	.60	NA	.73	NA	.78
HAZ	.61	.61	NA	.74	NA	.79
SAZ	.53	.53	NA	.65	NA	.70
HSA	.50	.50	.59	.67	.73	.72
HSAZ	.62	.62	NA	.74	NA	.79
Increments						
Δ H over SAZ	+.09	+.09	NA	+.09	NA	+.09
Δ S over HAZ	+.01	+.01	NA	.00	NA	.00
Δ A over HSZ	+.02	+.02	NA	+.01	NA	+.01
Δ Z over HSA	+.12	+.12	NA	+.07	NA	+.07
Δ H over SA	+.09	+.09	+.08	+.08	+.10	+.09
Δ S over HA	.00	+.01	+.03	.00	+.04	.00
Δ A over HS	+.03	+.03	+.01	+.01	+.02	+.01
Δ AS over H	+.12	+.12	+.13	+.08	+.16	+.09
Δ H over S	+.11	+.11	+.10	+.10	+.12	+.11
Δ H over A	+.10	+.09	+.10	+.09	+.12	+.10
Δ S over H	+.09	+.09	+.12	+.07	+.14	+.08
Δ S over A	+.01	+.01	+.05	+.01	+.06	+.01
Δ A over H	+.12	+.11	+.10	+.08	+.12	+.09
Δ A over S	+.05	+.05	+.03	+.03	+.04	+.03
Δ V over M	+.06	+.06	+.06	+.04	+.07	+.04
Δ M over V	+.06	+.06	+.09	+.06	+.11	+.06

* Z = Average grade mean residual.

FGPA correlation was not corrected for restriction of range, the largest increment was lost for the average grade mean residual (.12), compared to .09 for HSGPA, .02 for the Achievement Test average, and .01 for the SAT. It is clear that grading strictness is a very important determinant of FGPA.

For predicting course grade, since the prediction is for one specific course grade, grading strictness is not a relevant predictor. When one of the remaining three predictors was dropped, using two instead of three, the largest increment was lost for HSGPA (.08 without and .10 with correction for criterion unreliability), compared to .03 and .04 for the SAT and .01 and .02 for the Achievement Test average. However, when test scores were dropped completely, a larger increment was lost (.13 without and .16 with

correction for criterion unreliability). It is clear that although the SAT and the Achievement Test average are somewhat interchangeable for admission purposes, one or the other is a must.

By Test Subject

Table 21 shows how effectively each of the individual Achievement Tests predict FGPA or one specified course grade averaged across all courses. Correlations corrected for shrinkage and restriction of range are shown for each of the tests, for the Achievement Test average, for the English Composition Test (ECT) with and without an essay, for the essay and objective sections of the ECT, for the increment in correlation attributed to the essay section over the objective section, for the combination of either Math I or Math II Tests, and for the increment in correlation attributed to the Math II Test over the Math I Test.

The essay section of the ECT added only .01 to the course grade correlation (from .33 to .34) over the objective section, and added nothing to the .49 FGPA correlation. In contrast, the objective section added .15 (from .19 to .34) to the course grade correlation and .21 (from .28 to .49) to the FGPA correlation over the essay section. As a result, the fully objective ECT, with more objective questions and without an essay, had a .05 higher course grade correlation (.39 compared to .34) and a .02 higher FGPA correlation (.51 compared to .49) than the ECT with an essay.

The Math II Test had slightly higher correlations than the Math I Test. Use of the combination of Math I and Math II Tests raised both the course grade and FGPA correlations by an increment of .02 (from .42 to .44 for course grade, and from .52 to .54 for FGPA).

Table 22 indicates which of the tests have relatively high and which have relatively low correlations with average course grade and FGPA. The highest correlations were for the mathematics tests, especially the Math II Test (.44 for course grade and .58 for FGPA), and for Chemistry. The other science tests, the English Tests, and the American History Test also had relatively high correlations. The lowest correlations were for all of the language tests, especially Spanish (.14 for course grade and .17 for FGPA), and the European History Test.

TABLE 21

Average Course Grade and FGPA Correlations, Corrected for Shrinkage and Restriction of Range, for Each Achievement Test

	Correlation	
Achievement Test	*Course Grade*	*FGPA*
English Composition	.38	.51
Literature	.33	.48
Mathematics I	.42	.52
Mathematics II	.44	.58
American History	.35	.47
European History	.20	.28
Biology	.36	.51
Chemistry	.41	.58
Physics	.34	.52
Spanish	.16	.17
French	.23	.35
German	.14	.17
Latin	.21	.38
Hebrew	*	.31
Achievement Test average	.46	.58
English Composition:		
Without Essay	.39	.51
With Essay	.34	.49
Essay section	.19	.28
Objective section	.33	.49
Essay increment	+.01	.00
Math I or II	.44	.54
Math II increment	+.02	+.02

*Insufficient number of students.

TABLE 22

High and Low Course Grade and FGPA Correlations, Corrected for Shrinkage and Restriction of Range, by Subject

High Correlations			*Low Correlations*		
Test	*Course Grade*	*FGPA*	*Test*	*Course Grade*	*FGPA*
Ach. average	.46	.58	Spanish	.14	.17
Math II	.44	.58	German	.16	.23
Chemistry	.41	.58	Eur. Hist.	.20	.28
Math I	.42	.52	Hebrew	*	.31
English Comp.	.38	.51	French	.23	.35
Biology	.36	.51	Latin	.21	.38
Physics	.34	.52			
Amer. History	.35	.47			
Literature	.33	.48			

*Insufficient number of students.

By Academic Composite

Table 23 shows the effectiveness for admission of HSGPA, SAT, Achievement Test average, mean course difficulty (average grade mean residual), TSWE, individual Achievement Tests, and components of the ECT for low, medium, and high academic composite groups. The effectiveness is shown in terms of correlations with FGPA, corrected for shrinkage and restriction of range.

In general, the correlations were higher for the high academic composite and lower for the low academic composite. This disparity was especially large for HSGPA, where the high-composite correlation was .75 compared to only .47 for the low-composite group.

Comparing HSGPA, the SAT, and the Achievement Test average, the HSGPA correlations were highest for the high and middle composite groups. But for the low academic composite group, the three correlations were almost identical, slightly higher for the Achievement Test average (.49) and slightly lower for HSGPA (.47). The increment in the multiple correlation by adding Achievement Test average to HSGPA and SAT scores was also slightly higher for the low and middle composite groups (+.02) than for the high composite group (+.01).

A large increment in multiple correlation occurred for the low-composite group when the mean course difficulty was added to HSGPA, SAT scores, and Achievement Test average. Mean course difficulty increased the multiple correlation for the low-composite group by +.11, from .57 to .68, compared to +.07 for the medium-composite group, from .71 to .78, and only +.04 for the high composite group, from .80 to .84. For the high-composite group, comparability of course grades has enabled the correlation with FGPA to be as high as could reasonably be expected. For the low-composite group of Achievement Test takers, as for the low-composite group of SAT takers in the second course grade study, mean course difficulty provided a large amount of information over and above the traditional predictors because of lack of comparability of course grades in the FGPA.

For the individual Achievement Tests, as for the other predictors, there were generally higher correlations for the high-composite group and lower correlations for the low-composite group. Thus, the high comparative performance on most of the Achievement Tests for students in the low composite group, shown in Table 23, generally did not translate into high relative predictive effectiveness. This was especially true for Latin (.44 for the high-composite group, compared to .18 for the low-composite group) and Physics (.55 for the high-composite group and .56 for the medium-composite group, compared to .27 for the low-composite group). Exceptions to this pattern occurred for German, where low-composite correlations were the highest (.37 for the low-composite group, compared to .26 for the high-composite group), and for Literature (.39 for the low-composite group, compared to .40 for the high-composite group), the TSWE (.41 for the low-composite group, compared to .42 for the high-composite group), and ECT with essay (.44 for the low-composite group, compared to .35 for the medium-composite group and .45 for the high-composite group), where correlations for the low and high composite groups were similar.

TABLE 23

FGPA Correlations, Corrected for Shrinkage and Restriction of Range, by Academic Composite

	Academic Composite		
Predictor(s)	*High*	*Medium*	*Low*
HSAZ	.84	.78	.68
HSA	.80	.71	.57
Z increment	+.04	+.07	+.11
HS	.79	.69	.55
A increment	+.01	+.02	+.02
H	.75	.64	.47
A	.67	.57	.49
S	.61	.56	.48
TSWE	.42	.43	.41
English Composition	.56	.49	.44
Literature	.40	.34	.39
Math I	.56	.49	.43
Math II	.65	.50	.45
American History	.55	.43	.39
European History	.31	.26	.21
Biology	.53	.40	.43
Chemistry	.62	.53	.51
Physics	.55	.56	.27
Spanish	.31	.22	.11
French	.38	.24	.24
German	.26	.31	.37
Latin	.44	.29	.18
Hebrew	*	*	*
English Composition:			
Without Essay	.56	.48	.43
With Essay	.45	.35	.44
Essay section	.19	.28	.26
Objective section	.47	.30	.43
Essay increment	-.02	+.05	+.01
Math I or II	.64	.52	.44
Math II increment	+.02	+.03	+.01

H = High school GPA
S = SAT
Z = Mean course difficulty
* = Insufficient number of students
A = Achievement Test average

The low-composite group was the only academic composite group for which the correlation for ECT with essay (.44) was greater than the correlation for ECT without essay (.43). The correlation for the essay portion was higher for the medium (.28) and low (.26) composites, and lower for the high composite (.19). This was true despite the fact that the correlation for the ECT without essay was by far highest for the high-composite group (.56). The increment in correlation for the essay over the objective part was highest (+.05, from .30 to .35) for the medium-composite group, compared to +.01, from .43 to .44, for the low-composite group, and was actually negative, -.02, from .47 to .45, for the high-composite group.

By Sex

Table 24 shows correlations with FGPA, corrected for shrinkage and restriction of range, of HSGPA, SAT, Achievement Test average, mean course difficulty, TSWE, individual Achievement Tests, and components of the ECT by sex. Almost all of the correlations were slightly higher for females. For both males and females, the HSGPA and Achievement Test correlations were the same (.59 for females and .58 for males) and were slightly higher than the SAT correlation (.58 for females and .56 for males).

Among the individual Achievement Tests, two tests on which females received relatively low scores correlated higher with FGPA for females than for males: European History (.42 for females compared with .21 for males) and Physics (.60 for females compared with .51 for males). Two language tests on which females did not receive relatively low scores also correlated higher with female FGPA than with male FGPA: Latin (.43 for females compared with .30 for males) and Spanish (.19 for females compared with .11 for males).

No individual test predicted FGPA better for males than for females. For both mathematics tests, the correlations for males and females were the same (.53 for Level I and .59 for Level II).

On the ECT, the objective section predicted FGPA better for females (.52 for females compared with .46 for males), but, despite no full test predicting better for males, the essay section predicted better for males (.30 for males compared with .27 for females). The increment in correlation for the essay section over the objective section, however, was only +.01 for males (from .46 for the objective section to .47 for the composite). The increment was actually negative for females, -.01, lowering the correlation from .52 for the objective section to .51 for the composite.

TABLE 24

FGPA Correlations, Corrected for Shrinkage and Restriction of Range, by Sex

	Sex	
Predictor(s)	*Male*	*Female*
HSAZ	.74	.76
HSA	.67	.69
Z increment	+.07	+.07
HS	.66	.67
A increment	+.01	+.02
H	.58	.59
A	.58	.59
S	.56	.58
TSWE	.43	.47
English Composition	.49	.52
Literature	.44	.46
Math I	.53	.53
Math II	.59	.59
American History	.48	.49
European History	.21	.42
Biology	.50	.53
Chemistry	.58	.60
Physics	.51	.60
Spanish	.11	.19
French	.33	.35
German	.22	.25
Latin	.30	.43
Hebrew	*	*
English Composition:		
Without Essay	.50	.52
With Essay	.47	.51
Essay section	.30	.27
Objective section	.46	.52
Essay increment	+.01	-.01
Math I or II	.55	.55
Math II increment	+.02	+.02

H = High school GPA * = Insufficient number of students
S = SAT A = Achievement Test average
Z = Mean course difficulty

By English Best Language

Table 25 shows correlations with FGPA, corrected for shrinkage and restriction of range, of HSGPA, SAT, Achievement Test average, mean course difficulty, TSWE, individual Achievement Tests, and components of the ECT by English best language. Students for whom English is their best language had higher correlations for all of the predictors.

Among HSGPA, Achievement Test average, and SAT predictors, students for whom English is their best language had a slightly higher FGPA correlation for HSGPA (.59) and a slightly lower correlation for the SAT (.56). Students for whom English is not their best

language had the reverse: a slightly higher correlation for the SAT (.52) and a slightly lower correlation for HSGPA (.49). For both groups, the Achievement Test correlation was second best. As a result, the biggest difference in FGPA correlations between the groups was for HSGPA (.10) and the smallest difference was for the SAT (.04).

Among the individual Achievement Tests, Table 15 showed that most of the tests resulted in higher comparative performance for students for whom English is not their best language, compared to their SAT scores, especially Spanish and French. But neither of these tests predicted FGPA well for these students: correlations of .19 for Spanish and .22 for French. These two tests provided both the smallest and the largest differences in correlation between students for whom English is and is not their best language: French provided the largest difference (.38 compared to .22) and Spanish provided the smallest difference in that it did not predict FGPA well for either group (.20 compared to .19). Other tests for which the difference in correlations was large were Physics (.52 compared to .38), Biology (.52 compared to .39), and the ECT (.52 compared to .41). The other tests for which the difference in correlations was small were the mathematics tests, especially Math II, which predicted FGPA well for both groups (.58 compared to .57).

TABLE 25

FGPA Correlations, Corrected for Shrinkage and Restriction of Range, by English Best Language

	English Best Language	
Predictor(s)	*Yes*	*No*
HSAZ	.75	.71
HSA	.68	.62
Z increment	+.07	+.09
HS	.66	.60
A increment	+.02	+.02
H	.59	.49
A	.58	.50
S	.56	.52
TSWE	.46	.35
English Composition	.52	.41
Literature	.48	*
Math I	.52	.49
Math II	.58	.57
American History	.48	.40
European History	.26	*
Biology	.52	.39
Chemistry	.59	.51
Physics	.52	.38
Spanish	.20	.19
French	.38	.22
German	.23	*
Latin	.39	*
Hebrew	*	*
English Composition:		
Without Essay	.52	.41
With Essay	.50	.36
Essay section	.29	.24
Objective section	.50	.23
Essay increment	.00	+.13
Math I or II	.54	.53
Math II increment	+.02	+.04

H = High school GPA * = Insufficient number of students
S = SAT A = Achievement Test average
Z = Mean course difficulty

On the ECT, the objective section predicted FGPA much better for students for whom English is their best language (.50) than for students for whom English is not their best language (.23). The essay section predicted FGPA slightly better for students for whom English is their best language (.29), but students for whom English is not their best language were one of the few groups for which the essay section was a better predictor of FGPA (.24) than the objective section (.23). While the increment in correlation for the essay was .00 for students for whom English is their best language (.50 on both the objective section and the composite), it was +.13 for students for whom English is not their best language (from .23 for the objective section to .36 for the composite). This high increment may be partially due to self-selection of the ECT with essay by students who thought that their essay performance would reflect their capabilities better than their performance on the objective section; for those students for whom English is not their best language who selected the ECT without essay, the correlation with FGPA was .41 (higher than the .36 for those who selected the ECT with essay).

Most of the 1,428 Achievement Test takers who identified themselves as students for whom English is not their best language also identified themselves as Asian American (837); other identifications with moderately large numbers were white (293) and Hispanic (83). To determine if there were any ethnic differences among these students, Table 26 displays FGPA correlations for these groups as well as whether English is or is not the student's best language.

The 83 Hispanic Achievement Test takers for whom English is not their best language had a very large increase over HSGPA in FGPA correlation for both SAT and Achievement Test scores. The corrected correlation for HSGPA was .46. SAT scores increased the correlation to .63, an SAT correlation increment of +.17. Achievement Test scores increased the correlation to .75, an Achievement Test correlation increment of +.12 and a test score correlation increment of +.29 (from .46 to .75). The other groups identified in Table

TABLE 26

FGPA Correlations, Corrected for Shrinkage and Restriction of Range, for Asian American, Hispanic, and White Students, for Whom English Is or Is Not Their Best Language

	Asian American		*Hispanic*		*White*	
Predictor(s)	*English Best*	*English Not Best*	*English Best*	*English Not Best*	*English Best*	*English Not Best*
HSAZ	.74	.70	.68	.86	.74	.75
HSA	.67	.63	.58	.75	.66	.57
Z increment	+.07	+.07	+.10	+.11	+.08	+.18
HS	.66	.60	.57	.63	.65	.56
A increment	+.01	+.03	+.01	+.12	+.01	+.01
H	.56	.47	.51	.46	.59	.45
A	.59	.56	.42	.40	.56	.34
S	.57	.55	.45	.50	.53	.41
TSWE	.43	.42	.38	.41	.43	.17
English Composition	.49	.48	.41	.49	.49	.21
Literature	44	*	.34	*	.45	*
Math I	.53	.51	.37	.52	.49	.37
Math II	.58	.55	.47	*	.55	.40
American History	.43	.35	.34	*	.47	.66
European History	*	*	*	*	.29	*
Biology	.41	.47	.29	*	.49	*
Chemistry	.59	.47	.31	*	.55	.05
Physics	.49	.34	.61	*	.51	*
Spanish	.32	.22	.04	.25	.32	*
French	.33	.45	*	*	.36	*
German	*	*	*	*	.23	*
Latin	*	*	*	*	.38	*
Hebrew	*	*	*	*	*	*
English Composition:						
Without Essay	.48	.46	.41	.60	.49	.24
With Essay	.46	.58	.32	*	.47	*
Essay section	.25	.47	.30	*	.25	*
Objective section	.45	.30	.26	*	.47	*
Essay increment	+.01	+.28	+.06	*	.00	*
Math I or II	.56	.57	.40	.53	.51	.34
Math II increment	+.03	+.06	+.03	+.01	+.02	-.03

H = High school GPA * = Insufficient number of students S = SAT
A = Achievement Test average Z = Mean course difficulty

26 had test score increments from +.07 to +.12. For these 83 Hispanic students, the average grade mean residual of the courses taken increased the correlation further, to .86!

Of the 837 Asian American Achievement Test takers for whom English is not their best language, 51 took the ECT with essay. For these students, the essay increment in the FGPA correlation was a huge +.28 (from .30 for the objective section to .58 for the full ECT with essay). The corresponding essay increment for the Asian American ECT takers with essay for whom English is their best language was only +.01 (from .45 to .46). While corresponding data were not available separately for white and Hispanic students for whom English is not their best language, because of insufficient numbers of ECT takers with essay, Table 26 shows that when all students for whom English is not their best language were grouped together, the increment was reduced from +.28 for Asian American students to +.13.

The 293 white students for whom English is not their best language had the largest increment of +.18 in FGPA correlation from the average grade mean residual of courses taken: the other groups identified in Table 26 had increases from +.07 to +.11. These students also had by far the lowest correlations for the ECT (.21 compared to .41–.49 for the other groups) and for the TSWE (.17 compared to .38–.43 for the other groups).

By Ethnic Group

Table 27 shows correlations with FGPA, corrected for shrinkage and restriction of range, of HSGPA, SAT, Achievement Test average, mean course difficulty, TSWE, individual Achievement Tests and components of the ECT by ethnic group. White and Asian American students had the highest correlations for HSGPA, Achievement Test average, and SAT predictors (each group having a multiple correlation of .66 for these predictors) and, for the most part, American Indian students had the lowest correlations (with a multiple correlation of .50 for these predictors). But American Indian students had by far the highest increment in correlation for mean course difficulty: a relatively very large +.26, raising the multiple from .50, the lowest among all ethnic groups, to .76, the highest among all ethnic groups. The other groups had increments for mean course difficulty ranging from +.07 for Asian American students to +.13 for black students, and multiple correlations ranging from .67 for black students to .74 for white students.

TABLE 27

FGPA Correlations, Corrected for Shrinkage and Restriction of Range, by Ethnic Group

	Ethnic Group				
Predictor(s)	*American Indian*	*Asian American*	*Black*	*Hispanic*	*White*
HSAZ	.76	.73	.67	.68	.74
HSA	.50	.66	.54	.58	.66
Z increment	+.26	+.07	+.13	+.10	+.08
HS	.49	.64	.52	.57	.65
A increment	+.01	+.02	+.02	+.01	+.01
H	.45	.55	.42	.50	.59
A	.35	.58	.46	.42	.56
S	.38	.56	.45	.45	.53
TSWE	.18	.40	.36	.36	.43
English Composition	.28	.47	.41	.39	.49
Literature	*	.43	.29	.34	.45
Math I	.44	.53	.36	.38	.49
Math II	*	.58	.50	.48	.55
American History	.19	.41	.37	.35	.47
European History	*	.09	*	*	.31
Biology	*	.43	.30	.31	.49
Chemistry	*	.57	.34	.27	.55
Physics	*	.48	.17	.51	.51
Spanish	*	.29	.28	.06	.30
French	*	.32	.31	.12	.33
German	*	.35	*	*	.24
Latin	*	.34	*	*	.36
Hebrew	*	*	*	*	.32
English Composition:					
Without Essay	.27	.46	.40	.40	.49
With Essay	*	.46	.37	.33	.47
Essay section	*	.23	.17	.29	.25
Objective section	*	.46	.40	.26	.47
Essay increment	*	.00	-.03	+.07	.00
Math I or II	.37	.57	.38	.40	.51
Math II increment	-.07	+.04	+.02	+.02	+.02

H = High school GPA * = Insufficient number of students
S = SAT
A = Achievement Test average
Z = Mean course difficulty

Comparing HSGPA, Achievement Test average, and SAT predictors, the SAT did not have the highest correlation for any of the ethnic groups; it was second best for all groups except for white students, for whom it had the lowest correlation. HSGPA had the highest correlation for American Indian, Hispanic, and white students. Achievement Test average had the highest correlation for Asian American and black students. Asian American and black students also had an increment in correlation for Achievement Test average of +.02, compared to +.01 for the other groups. Since Table 16 showed that on average Asian American and black students performed relatively well on Achievement Tests compared to their SAT scores, Achievement Tests were generally useful for students in these groups to demonstrate their achievement and for colleges to predict their grades. Asian American students had especially high correlations for the Mathematics Tests (.58 for Level II and .53 for Level I) and for Chemistry (.57). While black students had an especially high correlation only for the Mathematics Level II Test (.50), their individual test correlations were reasonably high (for example, .41 for the ECT), not much lower than the correlation for HSGPA (.42).

Table 16 also showed that on average Hispanic students performed very well on Achievement Tests, especially in Spanish and French, compared to their SAT scores. But Table 25 showed that in general Achievement Tests predicted FGPA for Hispanic students less well than for the other groups and also less well than HSGPA or SAT scores. This was especially true for Spanish (correlation of .06) and French (.12). The major exception was for the Hispanic students who took the Physics Test (.51).

Table 16 indicated that American Indian and white students performed less well on Achievement Tests than indicated by their SAT scores. For American Indian students, their Achievement Test average had a low correlation with their FGPA (.35) and, among the few individual tests taken by a sufficient number of students, American History (.19) and ECT (.28) had very low correlations, but Mathematics Level I had a moderately

high correlation (.44). On the other hand, for white students, with the exception of the languages and European History (correlations from .24 to .36), the correlations for all of the tests were at least .45 and ranged up to .55 for Chemistry and Mathematics Level II.

Table 16 showed that black and Hispanic students performed much better on the ECT-essay section than on the ECT-objective section. But in terms of predicting FGPA, there was quite a difference between the two groups. For black students, the correlation for the ECT-objective score was much higher (.40) than the correlation for the ECT-essay score (only .17), and the increment in correlation for the ECT-essay was actually negative, -.03, indicating that prediction was better if the ECT-essay was ignored. For Hispanic students, the correlation for the ECT-essay score was actually higher (.29) than the correlation for the ECT-objective score (.26), and the increment in correlation for the ECT-essay was a very high +.07, raising the correlation from .26 for the ECT-objective score to .33 for the ECT-composite. But the correlation for the ECT without an essay was an even higher .40 for Hispanic students.

When the Mathematics Level II score was combined with Mathematics Level I score, so that either test that a student had taken was used, the increment in the correlation over use of only the Mathematics Level I score was +.04 for Asian American students, from .53 to .57. In contrast, for American Indian students, the increment was a large negative, -.07, reducing the correlation from .44 to .37.

Because almost two-thirds of the black Achievement Test takers were female, Table 28 displays the correlations with FGPA separately for black males and black females, and compares them with those of white males and white females. For both black and white students, almost all of the correlations were slightly higher for females. The Achievement Test and the SAT correlations were identical for both black males (.41) and for black females (.48), and, in both cases, the test score correlations were higher than the correlations for HSGPA (.37 for black males and .43 for black females). While for white students the increment in correlation for course grade difficulty was slightly higher for females (+.08 compared to +.06 for white males), it was much higher for black males (+.17 compared to +.11 for black females), indicating that course selection is a very strong factor in the effectiveness of predicting FGPA for black males. While the ECT-essay increment in correlation was close to .00 for white males (+.01), white females (.00), and black males (-.01), it was very highly negative for black females (-.13), with prediction much better for the objective section of the ECT with essay (.47) than for the full score that includes the essay (.34).

TABLE 28

FGPA Correlations, Corrected for Shrinkage and Restriction of Range, for Black and White Males and Females

	Males		*Females*	
Predictor(s)	*Black*	*White*	*Black*	*White*
HSAZ	.68	.73	.68	.75
HSA	.51	.67	.57	.67
Z increment	+.17	+.06	+.11	+.08
HS	.49	.65	.54	.65
A increment	+.02	+.02	+.03	+.02
H	.37	.59	.43	.58
A	.41	.57	.48	.57
S	.41	.54	.48	.55
TSWE	.27	.42	.38	.44
English Composition	.36	.48	.42	.50
Literature	*	.41	.45	.43
Math I	.31	.51	.38	.50
Math II	.46	.56	.61	.55
American History	.46	.48	.39	.47
European History	*	.30	*	.38
Biology	.20	.47	.25	.50
Chemistry	.20	.54	.39	.57
Physics	.10	.51	*	.56
Spanish	.27	.23	.28	.32
French	*	.31	.33	.32
German	*	.17	*	.24
Latin	*	.25	*	.48
Hebrew	*	*	*	*
English Composition:				
Without Essay	.36	.49	.41	.50
With Essay	.37	.46	.34	.48
Essay section	.07	.27	.17	.23
Objective section	.38	.45	.47	.48
Essay increment	-.01	+.01	-.13	.00
Math I or II	.33	.53	.42	.52
Math II increment	+.02	+.02	+.04	+.02

H = High school GPA * = Insufficient number of students
S = SAT
A = Achievement Test average
Z = Mean course difficulty

By First Generation in College

Table 29 shows correlations with FGPA, corrected for shrinkage and restriction of range, of HSGPA, SAT, Achievement Test average, mean course difficulty, TSWE, individual Achievement Tests, and components of the ECT, by first generation in college for all students, and, to eliminate the effect of ethnic differences, for white students. In comparing "first generation" and "not first generation" for all students and for white students, there were no major differences. Students with a parent who is a college graduate (not

first generation) had higher correlations for all of the predictors.

Among HSGPA, Achievement Test average, and SAT predictors, both groups had the highest correlation for HSGPA, the lowest for the SAT, and a +.01 Achievement Test increment in correlation. Students who are the first generation in their family in college had a slightly higher increment in correlation for mean course difficulty.

Table 17 showed that students who are the first generation in college had higher performance on most of the Achievement Tests, compared to their SAT scores, especially on language tests. But Table 29 shows that correlations for this group between the individual tests and FGPA were consistently lower than for students with a parent who is a college graduate. For both groups, the increment in correlation for the essay section of the ECT, over the objective section, was .00.

TABLE 29

FGPA Correlations, Corrected for Shrinkage and Restriction of Range, by First Generation in College, for All Students and for White Students

	All Students		*White Students*	
Predictor(s)	*First Generation*	*Not First Generation*	*First Generation*	*Not First Generation*
HSAZ	.72	.75	.72	.74
HSA	.63	.68	.62	.67
Z increment	+.09	+.07	+.10	+.07
HS	.62	.67	.61	.66
A increment	+.01	+.01	+.01	+.01
H	.55	.61	.54	.60
A	.53	.58	.51	.56
S	.52	.56	.49	.53
TSWE	.41	.44	.40	.43
English Composition	.46	.51	.45	.49
Literature	.45	.46	.41	.44
Math I	.48	.52	.44	.50
Math II	.52	.58	.45	.55
American History	.45	.47	.42	.47
European History	.00	.28	.15	.25
Biology	.46	.50	.41	.48
Chemistry	.53	.58	.44	.55
Physics	.48	.52	.41	.50
Spanish	.08	.26	.27	.31
French	.32	.36	.27	.33
German	.17	.27	.31	.28
Latin	.17	.38	.48	.34
Hebrew	*	*	*	*
English Composition:				
Without Essay	.46	.51	.45	.50
With Essay	.44	.49	.43	.46
Essay section	.27	.28	.21	.25
Objective section	.44	.49	.44	.46
Essay increment	.00	.00	-.01	.00
Math I or II	.50	.54	.45	.52
Math II increment	+.02	+.02	+.01	+.02

H = High school GPA * = Insufficient number of students
S = SAT
A = Achievement Test average
Z = Mean course difficulty

VII. Predictive Effectiveness for Placement

In addition to their use for admission, Achievement Tests/SAT II: Subject Tests are used for placement and guidance purposes. Individual tests can be used alone or with SAT scores to predict course grades in English, mathematics, history, science, and foreign language courses.

In English Courses

All Students

Table 30 displays average English course grade correlations, corrected for shrinkage and restriction of range, of ECT scores, with and without SAT scores, for all ECT takers in all courses with at least seven ECT takers. Correlations for all ECT scores are grouped together, and also those for the ECT without essay and those for the ECT with essay are shown separately. Correlations are also shown separately for the nine English course categories: advanced, regular, and remedial courses for general English courses, emphasizing both reading (literature) and writing, and also for courses emphasizing either reading or writing. The numbers of students and courses on which the correlations are based are shown.

The correlation of the ECT ranged from .23 for advanced writing to .48 for remedial writing. For all three writing course categories, the ECT correlation exceeded that of the SAT verbal score, but did so for only three of the other six English course categories. But when SAT mathematical scores were combined with SAT verbal scores, the SAT had higher correlations than the ECT for seven of the nine course categories: all except advanced reading and remedial writing. The increment in correlation for the ECT over the SAT ranged from +.03 to +.06 for eight of the course categories, and was +.08 for the advanced writing category.

With 105 students in 11 courses, the advanced writing category was somewhat unusual in that the

TABLE 30

For English Composition Test Takers, Average Course Grade Correlations in English Courses, Corrected for Shrinkage and Restriction of Range

	General English			*Reading/Literature*			*Writing*		
All ECT Takers	*Advanced*	*Regular*	*Remedial*	*Advanced*	*Regular*	*Remedial*	*Advanced*	*Regular*	*Remedial*
Number of students	562	16,329	583	684	7,861	140	105	18,840	989
Number of courses	22	274	30	17	331	8	11	300	18
Correlations:									
ECT	.36	.42	.33	.39	.37	.37	.23	.43	.48
SAT verbal	.39	.41	.32	.32	.38	.39	.17	.41	.42
SAT math	.35	.35	.27	.29	.31	.37	.27	.35	.38
SAT	.44	.44	.36	.35	.42	.46	.29	.44	.46
SAT, ECT	.47	.47	.41	.41	.47	.51	.37	.48	.52
ECT increment	+.03	+.03	+.05	+.06	+.05	+.05	+.08	+.04	+.06
Takers of ECT Without Essay									
Number of students	490	13,333	476	434	6,459	117	85	16,378	794
Number of courses	20	246	30	12	278	8	9	293	17
Correlations:									
ECT	.32	.42	.30	.42	.38	.38	.25	.43	.47
SAT verbal	.35	.41	.32	.38	.39	.43	.19	.41	.41
SAT math	.33	.35	.25	.33	.32	.37	.25	.34	.38
SAT	.39	.44	.35	.40	.43	.48	.27	.44	.45
SAT, ECT	.42	.47	.39	.44	.48	.53	.33	.48	.52
ECT increment	+.03	+.03	+.04	+.04	+.05	+.05	+.06	+.04	+.07
Takers of ECT With Essay									
Number of students	55	2,668	96	205	790	18	0	2,263	172
Number of courses	2	39	2	5	42	2	0	73	3
Correlations:									
ECT	.50	.39	.43	.33	.31	—	—	.39	.55
SAT verbal	.70	.39	.31	.16	.37	—	—	.40	.47
SAT math	.57	.33	.39	.21	.27	—	—	.34	.35
SAT	.74	.42	.41	.24	.39	—	—	.43	.49
SAT, ECT	.74	.45	.52	.34	.44	—	—	.49	.58
ECT increment	.00	+.03	+.11	+.10	+.05	—	—	+.06	+.09
ECT-essay	.17	.21	.29	.18	.20	—	—	.19	.36
ECT-objective	.53	.38	.42	.31	.31	—	—	.38	.52
Essay increment	-.03	+.01	+.01	+.02	.00	—	—	+.01	+.03

correlation of the SAT verbal score was only .17, while it was .32–.42 for all of the other categories. The correlation for the SAT mathematical score was a higher .27. As a result, the correlation for the SAT (.29) was higher than that of the ECT (.23), but, because little of the effectiveness of the SAT was due to the verbal score, the ECT had a high increment of +.08 over the SAT.

For those who took the ECT with essay, the correlation for the essay section was highest (.36) and also the increment in correlation for the essay section over the objective section (+.03) was highest for remedial writing. Comparing the correlations for the ECT with and without essay, the correlations for the ECT with essay were higher for the remedial courses (by .06–.13), but the correlations for the ECT without essay were higher for the regular courses (by .03–.07).

Table 31 shows average course grade correlations for the 415 students who took the Literature test. The average correlation of the Literature score with the grade received in 34 regular reading/literature courses was .31, lower than the correlation of .34 for the SAT, lower than the .38 average correlation for ECT takers in regular reading/literature courses, and one of the lowest correlations among the Achievement Tests.

But the Literature increment in correlation over the SAT was +.09, raising the correlation from .34 to .43 for Literature takers, the highest increment for any Achievement Test that was not a foreign language test. The ECT increment was only +.05, raising the correla-

TABLE 31

For Literature Test Takers, Average Course Grade Correlations in Regular Reading/Literature Courses, Corrected for Shrinkage and Restriction of Range

Number of Students	415
Number of Courses	34
Correlations:	
Literature	.31
SAT verbal	.31
SAT math	.23
SAT	.34
SAT–Literature	.43
Literature increment	+.09

tion from .43 to .48 for the ECT takers. The skills measured by the Literature test may differ more from the skills measured by the SAT than the difference in skills measured by the ECT and SAT.

Academic Composite

Table 32 compares average English course grade correlations for students in the high, middle, and low academic composites of SAT scores and HSGPA. Excluding advanced and remedial courses, it makes comparisons for ECT takers in general English courses, ECT takers and Literature takers in reading/literature courses, and ECT takers and takers of ECT with essay in writing courses.

For all three types of English courses, while the ECT correlation for the low composite group was about average, the ECT increment over the SAT was the smallest among the academic composite groups: +.04 for general English and for writing and +.07 for reading/literature. The correlation increment for the ECT with essay of +.04 for the low academic composite was also by far the smallest among the academic groups (even though the correlation was slightly higher).

While the ECT correlation was only highest for the high academic composite in writing courses, the ECT correlation increment was highest for the high academic composite in all three types of English courses: +.11 for writing, +.09 for reading/literature (the same as for the middle composite group), and +.07 for general English. For the ECT with essay, the ECT correlation of .45 and the ECT increment over the SAT of +.14 were also the highest for the high academic composite.

In writing courses, the ECT increment was most differentiated by academic composite. It ranged from +.11 for the high composite, to +.07 for the middle composite, to +.04 for the low composite.

Only for the high composite group was the ECT-essay increment over the ECT-objective section positive (+.01).

TABLE 32

For Academic Composite Groups of ECT and Literature Test Takers, Average English Course Grade Correlations, Corrected for Shrinkage and Restriction of Range*

	Academic Composite		
	High	*Middle*	*Low*
ECT Takers in General English Courses			
Number of students	4,120	5,091	5,274
Number of courses	79	80	84
Correlations:			
ECT	.37	.43	.39
SAT verbal	.38	.43	.38
SAT math	.31	.38	.34
SAT	.40	.46	.41
SAT–ECT	.47	.51	.45
ECT increment	+.07	+.05	+.04
ECT Takers in Reading/Literature Courses			
Number of students	2,109	1,917	1,643
Number of courses	118	117	92
Correlations:			
ECT	.29	.36	.29
SAT verbal	.27	.41	.30
SAT math	.24	.36	.26
SAT	.31	.44	.34
SAT–ECT	.40	.53	.41
ECT increment	+.09	+.09	+.07
ECT Takers in Writing Courses			
Number of students	5,315	5,970	6,326
Number of courses	173	181	191
Correlations:			
ECT	.40	.31	.36
SAT verbal	.37	.31	.36
SAT math	.34	.27	.30
SAT	.41	.34	.39
SAT–ECT	.52	.41	.43
ECT increment	+.11	+.07	+.04
Takers of ECT with Essay in Writing Courses			
Number of students	517	579	684
Number of courses	22	25	27
Correlations:			
ECT	.45	.30	.39
SAT verbal	.33	.29	.39
SAT math	.28	.25	.33
SAT	.36	.32	.43
SAT–ECT	.50	.45	.47
ECT increment	+.14	+.13	+.04
ECT–essay	.23	.11	.17
ECT–objective	.44	.31	.40
Essay increment	+.01	-.01	-.01
Literature Takers in Reading/Literature Courses			
Number of students	45	52	50
Number of courses	5	5	5
Correlations:			
Literature	.22	.28	.43
SAT verbal	.00	.11	.19
SAT math	.07	.13	.12
SAT	.07	.14	.20
SAT–Literature	.29	.29	.48
Literature increment	+22	+.15	+.28

*Excluding advanced and remedial courses.

For the middle and low composite groups, the ECT-essay increment was -.01. Therefore, the high relative performance for the low composite group on the ECT-essay over the ECT-objective section, as shown in Table 13, was not associated with better predictive effectiveness of the ECT-essay section for placement into writing courses.

For each of the academic composite groups, there were only five reading/literature courses with 7 or more Literature takers, the minimum for a correlation. These courses included 45–52 Literature takers for each of the groups. The Literature correlation was highest for the low composite group. The increment in correlation for the Literature test over the SAT in reading/literature courses was also highest for the low composite group: +.28, compared to only +.07 for the ECT of the low composite group. The high relative performance for the low composite group on the Literature Test over the SAT, as shown in Table 13, was associated with better predictive effectiveness for placement into reading/literature courses.

Sex

Table 33 compares average English course grade correlations by sex. Excluding advanced and remedial courses, it makes comparisons for ECT takers in general English courses, ECT takers and Literature takers in reading/literature courses, and ECT takers and takers of ECT with essay in writing courses.

Females had higher ECT correlations in all three types of English courses, but the ECT increment over the SAT was only higher for females in writing courses (+.04 compared to +.03 for males): it was the same as for males in reading/literature courses (+.04) and higher for males in general English courses (+.04 compared to +.02 for females). Higher relative performance on the ECT over the SAT by females, as shown in Table 14, was associated with higher ECT correlations but not necessarily with higher ECT increments over the SAT.

Although females had a slightly higher correlation in writing courses for the ECT with essay (.40 compared to .38 for males) and the same correlation for the ECT-essay section (.19), males had a higher increment for the ECT with essay over the SAT (+.07 compared to +.04 for females). Males also had a +.01 essay increment over the objective section, while females had a negative increment of -.01.

For the Literature test, females had both a much higher correlation in reading/literature courses (.35 compared to .23 for males) and also a much higher increment in correlation for the Literature test over the SAT (+.10 compared to +.02 for males). Higher relative performance by females on the Literature test, as shown in Table 14, was associated with better predictive effectiveness for females in reading/literature courses: both higher correlations and higher correlation increments.

TABLE 33

For Male and Female ECT and Literature Test Takers, Average English Course Grade Correlations, Corrected for Shrinkage and Restriction of Range*

	Male	*Female*
ECT Takers in General English Courses		
Number of students	6,254	8,976
Number of courses	107	155
Correlations:		
ECT	.41	.43
SAT verbal	.39	.44
SAT math	.34	.39
SAT	.42	.48
SAT–ECT	.46	.50
ECT increment	+.04	+.02
ECT Takers in Reading/Literature Courses		
Number of students	2,797	4,122
Number of courses	147	230
Correlations:		
ECT	.32	.38
SAT verbal	.34	.40
SAT math	.29	.34
SAT	.39	.45
SAT–ECT	.43	.49
ECT increment	+.04	+.04
ECT Takers in Writing Courses		
Number of students	9,175	9,232
Number of courses	193	273
Correlations:		
ECT	.40	.43
SAT verbal	.40	.42
SAT math	.34	.39
SAT	.44	.47
SAT–ECT	.47	.51
ECT increment	+.03	+.04
Takers of ECT with Essay in Writing Courses		
Number of students	1,078	945
Number of courses	36	43
Correlations:		
ECT	.38	.40
SAT verbal	.39	.42
SAT math	.31	.38
SAT	.42	-.48
SAT–ECT	.49	-.52
ECT increment	+.07	+.04
ECT–essay	.19	.19
ECT–objective	.37	.41
Essay increment	+.01	-.01
Literature Takers in Reading/Literature Courses		
Number of students	50	188
Number of courses	6	15
Correlations:		
Literature	.23	.35
SAT verbal .	.23	.33
SAT math	.29	.26
SAT	.40	.36
SAT–Literature	.42	.46
Literature increment	+.02	+.10

*Excluding advanced and remedial courses.

English Best Language

Table 34 compares average English course grade correlations by English best or not best language. Excluding advanced and remedial courses, it makes comparisons for ECT takers in general English courses, ECT takers and Literature takers in reading/literature courses, and ECT takers and takers of the ECT with essay for writing courses. There were not enough students for whom English is not their best language to make comparisons for ECT takers in reading/literature courses, takers of ECT with essay in writing courses, and Literature takers in reading/literature courses.

Among ECT takers, students for whom English is their best language had higher ECT correlations (by .12 in both general English courses, .42 to .30, and writing courses, .43 to .31). But students for whom English is not their best language had higher ECT increments over the SAT, especially in general English courses (+.10 compared to +.03). Therefore, the higher relative performance on the ECT by students for whom English is not their best language, as shown in Table 15, was associated with higher ECT increments for predictive effectiveness.

Ethnic Group

Table 35 compares average English course grade correlations by ethnic group. Excluding advanced and remedial courses, it makes comparisons for ECT takers in general English courses, ECT takers and Literature takers in reading/literature courses, and ECT takers and takers of ECT with essay in writing courses.

There were not enough American Indian ECT takers to make any of the comparisons. There were also not enough Literature takers in reading/literature courses for any ethnic group other than white students, so it was not possible to have any ethnic group comparisons for Literature.

In general, the ECT correlations in all three types of courses were higher for white (.39, .35, and .40) and Asian American (.36, .41, and .32) students, and were lower for black (.28, .29, and .31) students. Hispanic students had the highest ECT correlation (.42 for 382 students) in general English courses, but the lowest in writing (.22 for 301 students) and in reading/literature (.13 for 41 students) courses.

While the ECT increment over the SAT was .00 for 41 Hispanic students in three reading/literature courses, it was an average +.04 for 382 Hispanic students in 13 general English courses, and was the highest, +.09, for the 301 Hispanic students in 32 writing courses. While the ECT increment was an average +.04 for black students in general English and writing courses, it was a huge +.26 for 64 black students in five reading/literature courses.

TABLE 34

For English Best and English Not Best Language Groups of ECT and Literature Takers, Average English Course Grade Correlations, Corrected for Shrinkage and Restriction of Range*

	English Best Language	*English Not Best Language*
ECT Takers in General English Courses		
Number of students	15,772	259
Number of courses	269	18
Correlations:		
ECT	.42	.30
SAT verbal	.41	.24
SAT math	.35	.21
SAT	.44	.31
SAT–ECT	.47	.41
ECT increment	+.03	+.10
ECT Takers in Reading/Literature Courses		
Number of students	7,666	–
Number of courses	328	–
Correlations:		
ECT	.37	–
SAT verbal	.38	–
SAT math	.31	–
SAT	.42	–
SAT–ECT	.47	–
ECT increment	+.05	–
ECT Takers in Writing Courses		
Number of students	18,152	98
Number of courses	294	10
Correlations:		
ECT	.43	.31
SAT verbal	.41	.41
SAT math	.34	.30
SAT	.44	.45
SAT–ECT	.47	.50
ECT increment	+.04	+.05
Takers of ECT with Essay in Writing Courses		
Number of students	2,202	–
Number of courses	73	–
Correlations:		
ECT	.40	–
SAT verbal	.40	–
SAT math	.33	–
SAT	.43	–
SAT–ECT	.49	–
ECT increment	+.06	–
ECT–essay	.20	–
ECT–objective	.39	–
Essay increment	+.01	–
Literature Takers in Reading/Literature Courses		
Number of students	399	–
Number of courses	33	–
Correlations:		
Literature	.29	–
SAT verbal .	.30	–
SAT math	.22	–
SAT	.33	–
SAT–Literature	.40	–
Literature increment	+.07	–

*Excluding advanced and remedial courses.

TABLE 35

By Ethnic Group, Average English Course Grade Correlations, Corrected for Shrinkage and Restriction of Range*

	American Indian	*Asian American*	*Black*	*Hispanic*	*White*
ECT Takers in General English Courses					
Number of students	7	962	357	382	13,708
Number of courses	1	27	21	13	250
Correlations:					
ECT	–	.36	.28	.42	.39
SAT verbal	–	.32	.32	.41	.38
SAT math	–	.28	.33	.32	.31
SAT	–	.35	.41	.44	.40
SAT–ECT	–	.41	.45	.48	.44
ECT increment	–	+.06	+.04	+.04	+.04
ECT Takers in Reading/ Literature Courses					
Number of students	0	348	64	41	6,374
Number of courses	0	16	5	3	292
Correlations:					
ECT	–	.41	.29	.13	.35
SAT verbal	–	.41	.10	.21	.36
SAT math	–	.39	.13	.29	.28
SAT	–	.47	.14	.33	.39
SAT–ECT	–	.51	.40	.33	.44
ECT increment	–	+.04	+.26	.00	+.05
ECT Takers in Writing Courses					
Number of students	0	1,683	667	301	14,316
Number of courses	0	110	46	32	257
Correlations:					
ECT	–	.32	.31	.22	.40
SAT verbal	–	.31	.32	.20	.39
SAT math	–	.28	.28	.20	.31
SAT	–	.38	.38	.28	.41
SAT–ECT	–	.44	.42	.37	.45
ECT increment	–	+.06	+.04	+.09	+.04
Takers of ECT with Essay in Writing Courses					
Number of students	0	79	37	0	1,623
Number of courses	0	9	4	0	35
Correlations:					
ECT	–	.27	.02	–	.35
SAT verbal	–	.24	.42	–	.37
SAT math	–	.28	.38	–	.28
SAT	–	.31	.51	–	.38
SAT–ECT	–	.40	.51	–	.43
ECT increment	–	+.09	.00	–	+.05
ECT–essay	–	.09	.15	–	.19
ECT–objective	–	.28	.16	–	.35
Essay increment	–	-.01	-.14	–	.00
Literature Takers in Reading/Literature Courses					
Number of students	0	0	0	0	329
Number of courses	0	0	0	0	29
Correlations:					
Literature	–	–	–	–	.25
SAT verbal	–	–	–	–	.27
SAT math	–	–	–	–	.23
SAT	–	–	–	–	.31
SAT–Literature	–	–	–	–	.40
Literature increment	–	–	–	–	+.09

*Excluding advanced and remedial courses.

In general English courses, the highest ECT increment was +.06 for Asian American students. In writing courses, it also was +.06. In reading/literature courses, it was +.04. The relatively higher performance of Asian American students on the ECT, as shown in Table 16, was associated with high ECT increments, as well as high ECT correlations.

The 79 Asian American students with ECT with essay in nine writing courses had an ECT increment of +.09, but their essay increment over the objective section was negative, -.01. Not only did the 37 black students with ECT with essay in four writing courses have an ECT increment of .00, they had a negative essay increment of -.14. For Hispanic students, there were not enough ECT takers with essay in any single course for correlation comparisons.

For Asian American and black students, their relatively high performance on the essay section, as shown in Table 16, was not associated with positive essay increments in correlation over the objective section. For Hispanic students, their relatively high performance on the essay section, as is also shown in Table 16, could not be evaluated in terms of predictive effectiveness because there was no course with at least seven Hispanic students who took the ECT with essay.

First Generation in College

Table 36 compares average English course grade correlations by first generation in college. Excluding advanced and remedial courses, it makes comparisons for ECT takers in general English courses, ECT takers and Literature takers in reading/literature courses, and ECT takers and takers of ECT with essay in writing courses. There were not enough Literature takers who were the first generation in college and who took reading/literature courses for Literature comparisons.

The ECT correlations were about the same for the two groups: slightly higher for first-generation students in general English (.42 compared to .41) and reading/literature (.36 compared to .35) courses, and slightly higher for students whose parents were college graduates in writing (.42 to .35) courses. ECT increments were higher for first-generation students in reading/literature (+.07 compared to +.05) and writing (+.05 compared to +.04) courses, and were the same for general English courses (+.03).

For the ECT with essay, the ECT correlation and the ECT increment were higher for first-generation students, but the essay increment over the objective section was negative, -.02. Higher relative performance for first-generation students on the essay, as shown in Table 17, was not associated with higher predictive effectiveness.

TABLE 36

By First Generation in College, Average English Course Grade Correlations, Corrected for Shrinkage and Restriction of Range*

	First Generation in College	*Not First Generation in College*
ECT Takers in General English Courses		
Number of students	3,841	11,500
Number of courses	73	203
Correlations:		
ECT	.42	.41
SAT verbal	.41	.40
SAT math	.34	.34
SAT	.44	.43
SAT–ECT	.47	.46
ECT increment	+.03	+.03
ECT Takers in Reading/Literature Courses		
Number of students	855	5,979
Number of courses	57	265
Correlations:		
ECT	.36	.35
SAT verbal	.36	.36
SAT math	.30	.29
SAT	.42	.40
SAT–ECT	.49	.45
ECT increment	+.07	+.05
ECT Takers in Writing Courses		
Number of students	3,852	14,062
Number of courses	176	264
Correlations:		
ECT	.35	.42
SAT verbal	.34	.37
SAT math	.29	.34
SAT	.38	.44
SAT–ECT	.43	.48
ECT increment	+.05	+.04
Takers of ECT with Essay in Writing Courses		
Number of students	214	1,731
Number of courses	13	57
Correlations:		
ECT	.46	.37
SAT verbal	.49	.37
SAT math	.38	.30
SAT	.52	.41
SAT–ECT	.62	.47
ECT increment	+.10	+.06
ECT–essay	.21	.20
ECT–objective	.43	.37
Essay increment	-.02	.00
Literature Takers in Reading/Literature Courses		
Number of students	14	266
Number of courses	2	21
Correlations:		
Literature	–	.28
SAT verbal .	–	.33
SAT math	–	.25
SAT	–	.38
SAT–Literature	–	.43
Literature increment	–	+.05

*Excluding advanced and remedial courses.

High and Low Correlations Among Student Groups

Table 37 displays the highest and lowest correlations and increments among student groups for predictive effectiveness of English course grades. The correlations shown are for the ECT, the ECT and the SAT multiple, the ECT increment over the SAT, the ECT-essay, the essay increment over the objective section, the Literature Test, Literature and the SAT, and the Literature increment over the SAT.

For general English courses, the highest ECT and ECT–SAT correlations were for the middle academic composite (.43 and .51). The lowest ECT–SAT correlations were for students for whom English is not their best language and Asian American students (.41). But while their overall predictive effectiveness was relatively low, students for whom English is not their best language had the highest ECT increment of +.10. Females had the lowest of +.02.

For reading/literature courses, Asian American students had the highest ECT correlation (.41) and the middle academic composite had the highest ECT–SAT correlation (.53). The highest ECT increment by far, of +.26, was for the 64 black students who took the ECT and a reading/literature course. The 41 Hispanic students who took reading/literature courses (with at least six others) had the lowest ECT correlation (.13), the lowest ECT–SAT correlation (.33), and the lowest ECT increment (.00).

For writing courses, Hispanic students also had the lowest ECT correlation (.22) and ECT–SAT correlation (.37). The highest ECT correlation was for students for whom English is their best language (.43). High academic composite students had both the highest ECT–SAT correlation (.52) and also the largest ECT increment (+.11). Males had the smallest ECT increment (+.03).

With respect to the essay in writing courses, the high academic composite had the highest ECT-essay correlation (.23) and also one of the three positive essay increments of +.01. The other groups with a +.01 essay increment were males and students for whom English is their best language. The 79 Asian American students who took the ECT with essay and a writing course (with at least 6 others) had the lowest essay correlation (.09). The 37 black students who took the ECT with essay and a writing course (with at least 6 others) had the most negative essay increment of -.14.

The highest Literature correlation (.43) and Literature–SAT correlation (.48), and also the highest Literature increment of +.28 were for the 50 students in the low academic composite who took the Literature Test and also a reading/literature course (with at least six other students). In a reversal of some of their high ECT correlations,

TABLE 37

High and Low English Course Grade Correlations, Corrected for Shrinkage and Restriction of Range, Among Student Groups

Achievement Test	*Type of Courses and Correlation*	*High*		*Low*	
ECT	***General English:***				
	ECT	.43	Middle Academic	.28	Black
	ECT–SAT	.51	Middle Academic	.41	English not best language
				.41	Asian American
	ECT increment	+.10	English not best language	+.02	Female
	Reading/Literature:				
	ECT	.41	Asian American	.13	Hispanic (41 students)
	ECT–SAT	.53	Middle Academic	.33	Hispanic (41 students)
	ECT increment	+.26	Black (64 students)	.00	Hispanic (41 students)
	Writing:				
	ECT	.43	English best language	.22	Hispanic
	ECT–SAT	.52	High academic	.37	Hispanic
	ECT increment	+.11	High academic	+.03	Male
	ECT–essay	.23	High academic	.09	Asian American (79 students)
	Essay increment	+.01	High academic	-.14	Black (37 students)
		+.01	Male		
		+.01	English best language		
Literature	***Reading/Literature:***				
	Literature	.43	Low academic (50 students)	.22	High academic
	Literature–SAT	.48	Low academic (50 students)	.29	High academic
	Literature increment	+.28	Low academic (50 students)	+.02	Male

the high academic composite group had the lowest Literature correlation (.22) and Literature–SAT correlation (.29). Males had the lowest Literature increment of +.02.

In Mathematics Courses

All Students

Table 38 displays average mathematics course grade correlations, corrected for shrinkage and restriction of range, of Mathematics Level I and Mathematics Level II scores, and the combination of Mathematics Level I or Mathematics Level II scores, with and without SAT scores, in all courses with at least seven students taking the indicated test(s). Correlations are shown separately for the five mathematics course categories: advanced math, calculus, precalculus, regular math, and remedial math. There was an insufficient number of Mathematics Level II takers in remedial math courses for correlations.

The 14 correlations for the mathematics Achievement Tests ranged from .39 (for mathematics combination in remedial courses) to .55 (for the mathematics combination in calculus courses). These correlations tended to be higher than those for English placement, and were indeed among the highest over all Achievement Tests. All 14 were at least as high as those for the SAT mathematical score. But when the SAT verbal scores were combined with the SAT mathematical scores, more than half of the correlations were higher for the SAT.

The increment in correlation for the mathematics Achievement Tests over the SAT ranged from +.04 to +.06 for 10 of the 14 correlations. This increment was generally higher for the lower levels of courses: +.08 for Mathematics Level I in remedial math, +.08 for the mathematics combination in remedial math, +.09 for Mathematics Level II in precalculus, and +.12 for Mathematics Level II in regular math (compared to +.04 to +.06 in calculus and advanced math courses). For all five types of courses, the Mathematics Level II increment was at least as high as the increments for Mathematics Level I and the mathematics combination. In general, the increments

TABLE 38

For Mathematics I or II Test Takers, Average Course Grade Correlations in Mathematics Courses, Corrected for Shrinkage and Restriction of Range

	Advanced Math	*Calculus*	*Precalculus*	*Regular Math*	*Remedial Math*
Mathematics I Takers					
Number of students	3,200	28,239	3,347	4,562	290
Number of courses	101	478	90	144	14
Correlations:					
Math I	.50	.52	.47	.49	.41
SAT verbal	.34	.35	.29	.33	.22
SAT math	.49	.49	.46	.49	.36
SAT	.50	.50	.48	.51	.41
SAT–Math I	.56	.55	.52	.55	.49
Math increment	+.06	+.05	+.04	+.04	+.08
Mathematics II Takers Courses					
Number of students	4,561	11,158	171	515	7
Number of courses	147	261	13	31	1
Correlations:					
Math II	.52	.52	.40	.51	–
SAT verbal	.36	.32	.25	.34	–
SAT math	.50	.47	.39	.43	–
SAT	.51	.49	.41	.47	–
SAT–Math II	.57	.55	.50	.59	–
Math II increment	+.06	+.06	+.09	+.12	–
Mathematics I or II Takers					
Number of students	7,074	37,032	3,555	5,147	302
Number of courses	170	521	94	153	14
Correlations:					
Math Combination (I or II)	.52	.55	.47	.50	.39
SAT verbal	.37	.36	.30	.34	.25
SAT math	.52	.51	.47	.50	.38
SAT	.53	.52	.48	.51	.43
SAT–Math Combination	.57	.57	.53	.55	.51
Math Combination increment	+.04	+.05	+.05	+.04	+.08

were higher for the mathematics courses than for the English courses, but lower than for foreign language, science, or history courses.

Academic Composite

Table 39 displays average calculus course grade correlations for the Mathematics Level I and Level II combination and SAT scores, corrected for shrinkage and restriction of range, by student groups of academic composite, sex, English best language, ethnicity, and first generation in college. Among the academic composite groups, the high academic composite group had the highest correlation (.57) for the mathematics combination and the lowest academic com-

TABLE 39

Average Calculus Course Grade Correlations, Corrected for Shrinkage and Restriction of Range, by Student Group

	Academic Composite			*Sex*		*English Best Language*		*Ethnic Group*					*First Generation in College*	
	High	*Middle*	*Low*	*Male*	*Female*	*Yes*	*No*	*Amer. Indian*	*Asian Amer.*	*Black*	*Hispanic*	*White*	*Yes*	*No*
Number of Students	13,249	11,923	9,368	19,939	15,841	34,930	1,287	0	5,601	874	942	27,367	8,207	27,256
Number of Courses	324	274	229	354	351	516	71	0	124	50	46	495	202	470
Correlations:														
Math Combination	.57	.48	.45	.54	.54	.55	.50	—	.53	.34	.38	.53	.50	.55
SAT verbal	.40	.33	.28	.35	.35	.36	.29	—	.33	.19	.24	.35	.30	.36
SAT math	.53	.45	.41	.50	.51	.51	.43	—	.49	.30	.34	.49	.46	.51
SAT	.55	.46	.42	.51	.52	.52	.46	—	.50	.32	.37	.50	.47	.52
SAT–Math Combination	.62	.53	.49	.56	.57	.57	.57	—	.57	.39	.45	.56	.53	.57
Math Combination increment	+.07	+.07	+.07	+.05	+.05	+.05	+.11	—	+.07	+.07	+.08	+.06	+.06	+.05

posite group had the lowest correlation (.45). For each composite, the correlation for the SAT was almost as high as the correlation for the mathematics combination. The incremental correlation over the SAT for the mathematics combination was the same (+.07) for each of the academic composite groups. The high relative performance for the low academic composite group on the mathematics Achievement Tests over the SAT, as shown in Table 13, was associated with a correlation increment over the SAT that was as high as those of the high and middle academic composite groups.

Sex

Table 39 shows that both the correlation for the Mathematics Level I or II combination (.54) and the increment in the correlation over SAT scores (+.05) in calculus courses were identical for males and females.

English Best Language

Table 39 shows that students for whom English is their best language had a higher correlation for the Mathematics Level I or II combination (.55) than did students for whom English is not their best language (.50). But the increment in correlation for the Mathematics I or II combination was much higher for students for whom English is not their best language (+.11 compared with +.05). The higher relative performance on the mathematics Achievement Tests for students for whom English is not their best language, as shown in Table 15, was associated with higher incremental predictive effectiveness.

Ethnic Group

Table 39 shows that Asian American and white students had a higher correlation (.53) for the combination of Mathematics Level I and II scores, while Hispanic (.38) and black (.34) students had lower correlations. There were not enough American Indian students in any one class for a correlation computation. In terms of the incremental predictive effectiveness over the SAT of the Mathematics combination, each of the four ethnic groups with correlations had approximately the same level of increment: with Hispanic students a little higher (+.08) and white students a little lower (+.06). The high relative performance of Hispanic, Asian American, and black students on the mathematics Achievement Tests, as shown in Table 16, was associated with slightly larger correlation increments.

First Generation in College

Table 39 shows that students whose parents were college graduates had a higher correlation for the Mathematics Level I or II combination (.55) than first-generation college students (.50). But first-generation students had a slightly higher increment in correlation (+.06 compared to +.05).

High and Low Correlations Among Student Groups

Table 40 displays the highest and lowest correlations and increments among student groups for predictive effectiveness of calculus course grades. The correlations shown are for the Mathematics Level I or II combination, without and with the SAT, and the Mathematics combination increment over the SAT.

The highest correlations for the Mathematics combination and for the Mathematics combination with the SAT were for the high academic composite (.57 and .62); the lowest were for black students (.34 and .39). The highest increment for the Mathematics combination (+.11) was for students for whom English is not their best language, while the lowest increment (+.05) was for students for whom English is their best language, students whose parents are college graduates, males and females.

TABLE 40

High and Low Calculus Course Grade Correlations, Corrected for Shrinkage and Restriction of Range, Among Student Groups

Achievement Test	*Type of Course and Correlation*	*High*		*Low*	
Mathematics Combination	Calculus:				
	Mathematics Combination	.57	High academic	.34	Black
	Mathematics Combination–SAT	.62	High academic	.39	Black
	Mathematics Combination increment	+.11	English not best language	+.05	English best language
				+.05	Not first generation
				+.05	Male
				+.05	Female

In History Courses

All Students

Table 41 displays average American history course grade correlations, corrected for shrinkage and restriction of range, of American History Test takers, with and without SAT scores, in all courses with at least seven test takers. There was an insufficient number of World History Test takers in world history courses for correlations.

For 840 students in 61 courses, the correlation of .30 for the American History Test was slightly higher than the correlation for the SAT verbal score (.29) but, after the inclusion of the SAT mathematical score, was lower than that of the SAT (.35). The American History Test correlation of .30 and the .41 correlation for the combination of SAT scores and the American History Test were well below corresponding correlations of English Achievement Tests for placement into English courses, mathematics Achievement Tests for placement into mathematics courses, and science Achievement Tests for placement into science courses. But the increment in correlation of the American History Test over the SAT (+.06) was slightly higher than corresponding increments for the English and mathematics Achievement Tests.

TABLE 41

For American History and World History Test Takers, Average Course Grade Correlations in History Courses, Corrected for Shrinkage and Restriction of Range

	American History Courses	*World History Courses*
American History Takers		
Number of students	840	
Number of Courses	61	
Correlations:		
American History	.30	
SAT verbal	.29	
SAT math	.25	
SAT	.35	
SAT–American History	.41	
American History increment	+.06	
World History Takers:		
Number of Students		0
Number of Courses		0
Correlations:		
World History		–
SAT verbal		–
SAT math		–
SAT		–
SAT–World History		–
World History increment		–

Academic Composite

Table 42 displays average American history course grade correlations for the American History Test and SAT scores, corrected for shrinkage and restriction of range, by student groups of academic composite, sex, English best language, ethnicity, and first generation in college. Students in the low academic composite took the American History Test and American history courses in sufficient numbers (254) for correlations to be computed in 24 courses: for the middle academic composite, there were only 110 students in 11 courses, and for the high academic composite, there were only 30 students in 4 courses.

The middle academic composite had a relatively high correlation of .46 for the American History Test, compared to .27 and .26 for the high and low academic composites, respectively. This group also had a relatively high correlation of .54 for the combination of the American History Tests and SAT scores, compared to .34 and .35 for the high and low academic composites.

The high composite (.27 compared to .15), as well as the middle composite (.46 compared to .36), had American History Test correlations that were well above those for SAT scores. But the low academic composite had an American History Test correlation (.26) that was below even the SAT verbal score correlation (.27) as well as that of the full SAT (.31). The American History increment for the low academic composite was +.04, compared to very large increments of +.19 and +.18 for the high and middle academic composites, respectively. The relatively high performance on the American History Test for the low academic composite, as shown in Table 13, was not associated with high predictive effectiveness.

Sex

Table 42 shows that females had slightly higher correlations than males for the American History Test (.33 compared to .30), the SAT (.37 compared to .33), and the combination of the American History Test and the SAT (.45 compared to .41). But both females and males had the same correlation increment of +.08.

English Best Language

Table 42 shows that there was an insufficient number for correlations of students for whom English is not their best language who took the American History Test and also an American History course.

Ethnic Group

Table 42 shows that there were insufficient numbers for correlations of American Indian, Asian American,

TABLE 42

Average American History Course Grade Correlations, Corrected for Shrinkage and Restriction of Range, by Student Group

	Academic Composite			*Sex*		*EnglishBest Language*		*Ethnic Group*					*First Generation in College*	
	High	*Middle*	*Low*	*Male*	*Female*	*Yes*	*No*	*Amer. Indian*	*Asian Amer.*	*Black*	*Hispanic*	*White*	*Yes*	*No*
Number of Students	30	110	254	417	155	812	0	0	9	0	0	677	83	540
Number of Courses	4	11	24	37	15	60	0	0	1	0	0	52	9	44
Correlations:														
American History	.27	.46	.26	.30	.33	.30	–	–	–	–	–	.31	.25	.27
SAT verbal	.13	.27	.27	.26	.31	.29	–	–	–	–	–	.31	.37	.30
SAT math	.10	.27	.20	.25	.29	.25	–	–	–	–	–	.28	.21	.25
SAT	.15	.36	.31	.33	.37	.35	–	–	–	–	–	.37	.45	.36
SAT–American History	.34	.54	.35	.41	.45	.41	–	–	–	–	–	.44	.50	.41
Am. History increment	+.19	+.18	+.04	+.08	+.08	+.06	–	–	–	–	–	+.07	+.05	+.05

black, or Hispanic students who took the American History Test and also an American History course.

First Generation in College

Table 42 shows that the American History correlation was slightly higher for students who are not first generation in college (.27 compared to .25), but the correlation for the combination of American History and SAT scores was higher for students who are first generation (.50 compared to .41). The American History increment was the same (+.05) for both first-generation students and students whose parents went to college.

High and Low Correlations Among Student Groups

Table 43 displays the highest and lowest correlations and increments among student groups for predictive effectiveness of American History course grades. The correlations shown are for the American History Test, the American History Test with the SAT, and the American History Test increment over the SAT.

The middle academic composite group had the highest American History correlation (.46) and the highest correlation for the American History Test with the SAT (.54). Despite the high academic composite group having the lowest correlation for the American History Test with the SAT (.34), it had the highest American History Test increment over the SAT (+.19). The low academic composite group had the lowest American History Test increment over the SAT (+.04). The lowest American History Test correlation was .25 for students who are the first generation in college.

In Science Courses

All Students

Table 44 displays average science course grade correlations, corrected for shrinkage and restriction of range, for Biology, Chemistry, and Physics Test takers, with and without SAT scores, in all courses with at least seven students taking the indicated test. For each of the sciences, correlations are shown separately for advanced courses, beginning college-level courses with a lab, and beginning college-level courses without a lab.

For each kind of course (advanced, lab, and no lab), the highest correlations were for the Chemistry Test. For each science test, the grades in advanced courses were easiest to predict. The Chemistry Test had a relatively very high correlation of .60 with the advanced chemistry course grade for 696 students in 28 courses.

TABLE 43

High and Low American History Course Grade Correlations, Corrected for Shrinkage and Restriction of Range, Among Student Groups

Achievement Test	*Type of Course and Correlation*	*High*		*Low*	
American History	American History:				
	American History	.46	Middle academic	.25	First generation in college
	American History–SAT	.54	Middle academic	.34	High academic
	American History increment	+.19	High academic	+.04	Low academic

TABLE 44

For Biology, Chemistry, and Physics Test Takers, Average Course Grade Correlations for Science Courses, Corrected for Shrinkage and Restriction of Range

	Biology		
Biology Test Takers	*Advanced*	*Lab*	*No Lab*
Number of Students	968	2,497	830
Number of Courses	13	104	50
Correlations:			
Biology	.50	.45	.40
SAT verbal	.47	.42	.39
SAT math	.50	.49	.46
SAT	.54	.53	.51
SAT–Biology	.58	.59	.57
Biology increment	+.04	+.06	+.06
	Chemistry		
Chemistry Test Takers	*Advanced*	*Lab*	*No Lab*
Number of students	696	4,447	1,540
Number of courses	28	157	37
Correlations:			
Chemistry	.60	.47	.52
SAT verbal	.46	.38	.43
SAT math	.63	.48	.59
SAT	.65	.51	.60
SAT–Chemistry	.73	.57	.65
Chemistry increment	+.08	+.06	+.08
	Physics		
Physics Test Takers	*Advanced*	*Lab*	*No Lab*
Number of students	246	2,065	334
Number of courses	16	70	6
Correlations:			
Physics	.59	.38	.49
SAT verbal	.42	.29	.41
SAT math	.53	.41	.46
SAT	.56	.43	.49
SAT–Physics	.71	.49	.53
Physics increment	+.15	+.06	+.04

In all cases, the SAT mathematical score predicted course grade better than the SAT verbal score, especially in chemistry and physics courses. The combination of verbal and mathematical scores predicted course grade better than the Biology and Chemistry Tests and about the same as the Physics Test.

When combined with SAT scores, the Chemistry and Physics Tests produced relatively very high correlations for predicting a single course grade in advanced courses: the SAT and Chemistry Test produced a .73 correlation in advanced chemistry, and the SAT and Physics Test produced a .71 correlation in advanced physics. The incremental correlation for the Physics Test over the SAT for advanced physics courses was +.15. While the most difficult course grade to predict was physics with lab, the correlations were still moderately high: .38 for the Physics Test, .43 for the SAT, and .49 for both.

In general, the science test correlations were about the same level as mathematics and higher than English, history, and foreign language correlations. But when the SAT was combined with the science test, the correlations were higher than for mathematics, as well as for English, history, and foreign language correlations.

Academic Composite

Table 45 displays average correlations with grades in biology, chemistry, and physics courses, with lab, for Biology, Chemistry, Physics, and SAT scores, corrected for shrinkage and restriction of range. They are shown for student groups of academic composite, sex, English best language, ethnicity, and first generation in college.

The Achievement Test correlations for the academic composites ranged from .50 for the Physics Test in the middle composite group to .31 for the Biology Test in the middle composite group. When SAT scores were used with the Achievement Tests, all correlations were in the high range of .50–.62. The highest increment in correlation over the SAT was +.14 for the Biology Test in the high academic composite group; the lowest was +.04 for the Physics Test in the high academic composite group.

As shown in Table 13, the low academic composite group had high relative performance on all three science tests. This was associated with high correlation increments over the SAT of +.11 for the Chemistry Test and +.09 for the Biology Test, but a more moderate +.05 for the Physics Test.

Sex

Table 45 shows that females had a much higher correlation for the Biology Test (.47) than males (.32), a somewhat higher correlation for the Chemistry Test (.47 compared to .42), and a slightly lower correlation for the Physics Test (.33 compared to .34). When the Achievement Test was used with the SAT, females had a higher Biology correlation (.60 compared to .51) and slightly higher correlations for Chemistry (.56 compared to .55) and Physics (.49 compared to .48).

Females had higher correlation increments over the SAT than males for Chemistry (+.10 compared to +.06) and Physics (+.09 compared to +.07), and the same as males for Biology (+.05). The higher relative performance of males in Physics, as shown in Table 14, was not associated with a higher correlation increment for them.

English Best Language

Table 45 shows that there were insufficient numbers for correlations of students for whom English is not their best

TABLE 45

Average Biology, Chemistry, and Physics, with Lab, Course Grade Correlations, Corrected for Shrinkage and Restriction of Range, by Student Group

	Academic Composite			*Sex*		*English Best Language*		*Ethnic Group*					*First Generation in College*	
	High	*Middle*	*Low*	*Male*	*Female*	*Yes*	*No*	*Amer. Indian*	*Asian Amer.*	*Black*	*Hispanic*	*White*	*Yes*	*No*
Biology Test for Biology with Lab														
Number of Students	749	627	532	887	1,315	2,416	0	0	104	15	0	1,969	288	1,875
Number of Courses	54	47	41	57	68	104	0	0	8	2	0	85	27	89
Correlations:														
Biology	.41	.31	.42	.32	.47	.45	–	–	.30	–	–	.43	.51	.43
SAT verbal	.36	.44	.35	.34	.44	.41	–	–	.38	–	–	.39	.40	.39
SAT math	.37	.46	.48	.43	.49	.48	–	–	.51	–	–	.44	.50	.45
SAT	.42	.53	.50	.46	.55	.53	–	–	.60	–	–	.48	.57	.50
SAT–Biology	.56	.61	.59	.51	.60	.58	–	–	.69	–	–	.55	.65	.55
Biology increment	+.14	+.08	+.09	+.05	+.05	+.05	–	–	+.09	–	–	+.07	+.08	+.05
Chemistry Test for Chemistry with Lab														
Number of students	2,049	1,066	526	2,698	1,299	3,964	182	0	844	69	23	2,883	831	3,187
Number of courses	103	58	34	116	74	150	18	0	44	7	3	131	49	136
Correlations:														
Chemistry	.39	.47	.44	.42	.47	.46	.41	–	.51	.27	–	.41	.43	.47
SAT verbal	.32	.42	.31	.37	.32	.39	.39	–	.39	.24	–	.36	.31	.39
SAT math	.41	.50	.41	.46	.43	.48	.46	–	.53	.31	–	.43	.41	.50
SAT	.44	.53	.43	.49	.46	.51	.51	–	.54	.40	–	.47	.43	.53
SAT–Chemistry	.52	.62	.54	.55	.56	.57	.62	–	.62	.45	–	.53	.53	.59
Chemistry increment	+.08	+.09	+.11	+.06	+.10	+.06	+.11	–	+.08	+.05	–	+.06	+.10	+.06
Physics Test for Physics with Lab														
Number of students	1,027	446	227	1,711	203	1,829	61	0	320	0	37	1,445	295	1,527
Number of courses	45	24	14	65	14	61	6	0	23	0	4	56	15	58
Correlations:														
Physics	.35	.50	.38	.34	.33	.37	—	—	.28	—	—	.36	.43	.34
SAT verbal	.31	.35	.44	.27	.20	.30	—	—	.22	—	—	.28	.38	.24
SAT math	.44	.42	.53	.40	.38	.42	—	—	.33	—	—	.39	.51	.39
SAT	.46	.45	.57	.41	.40	.43	—	—	.35	—	—	.41	.55	.39
SAT–Physics	.50	.54	.62	.48	.49	.49	—	—	.43	—	—	.48	.57	.46
Physics increment	+.04	+.09	+.05	+.07	+.09	+.06	—	—	+.08	—	—	+.07	+.02	+.07

language who took the Biology or Physics Tests and also a biology or physics course with lab. But there was a sufficient number who took the Chemistry Test and a chemistry course with lab.

Students for whom English is their best language had a higher correlation for the Chemistry Test (.46 compared to .41), but, when the SAT was used with the Chemistry Test, students for whom English is not their best language had a higher correlation (.62 compared to .57).

The increment in correlation for the Chemistry Test over the SAT was higher for students for whom English is not their best language (+.11 compared to +.06). Their very high relative performance on the Chemistry Test, as shown in Table 15, was associated with a large increase in predictive effectiveness.

Ethnic Group

Table 45 shows that there were insufficient numbers for correlations of American Indian or Hispanic students who took any of the science tests and courses, or of black students who took the Biology or Physics Tests. When the science test was used alone, white students had the highest correlations for Biology (.43) and Physics (.36), and Asian American students had the highest correlation for Chemistry (.51). When SAT scores were used with the science tests, Asian American students had the highest correlations for Biology (.69) and Chemistry (.62), and white students had the highest correlation for Physics (.48).

The correlation increments over the SAT were very slightly higher for Asian American students in all three sciences: Biology (+.09), Chemistry (+.08), and Physics (+.08). The

higher relative performance of Asian American students in Physics and Chemistry, as shown in Table 16, was associated with slightly higher correlation increments. Black students had a slightly lower increment of +.05 in Chemistry.

First Generation in College

Table 45 shows that when a science test alone was used, students who are the first generation in college had higher correlations with course grade for the Biology Test (.51 compared to .43) and Physics Test (.43 compared to .34) and a lower correlation for the Chemistry Test (.43 compared to .47). The same was true when SAT scores were used with the science test: students who are the first generation in college had higher correlations for Biology Test (.65 compared to .55) and Physics Test (.57 compared to .46) and a lower correlation for the Chemistry Test (.53 compared to .59).

Students who are the first generation in college had a higher correlation increment for the Chemistry Test (+.10 compared to +.06) and the Biology Test (+.08 compared to +.05), and a lower increment for the Physics Test (+.02 compared to +.07). Their higher relative performance on the Chemistry and Physics Tests, as shown in Table 17, was associated with a higher increment for the Chemistry Test but not for the Physics Test.

High and Low Correlations Among Student Groups

Table 46 displays the highest and lowest correlations and increments among student groups for predictive effectiveness of science course grades. The correlations shown are for the Biology, Chemistry, and Physics Tests, without and with the SAT, and the increments for each test over the SAT.

Asian American students had the highest correlation for the Chemistry Test, without (.51) and with (.62) the SAT, but the lowest correlation for the Physics Test, without (.28) and with (.43) the SAT. For the Biology Test, they had the lowest correlation (.30) without the SAT and the highest (.69) with the SAT.

For the only science with enough students to compute correlations for them, black students had the lowest Chemistry correlations and increment. They were .27 without the SAT, .45 with the SAT, and a +.05 Chemistry increment.

Students in the middle academic composite had the highest Physics Test correlation (.50) and the highest Physics Test increment (+.09). They also had the highest correlation for the Chemistry Test with the SAT (.62). The low academic composite had the highest Chemistry Test increment (+.11) and the highest Physics Test correlation with the SAT (.62). The high academic composite had the highest Biology Test increment (+.14).

Males had the lowest Biology Test correlation with the SAT (.51) and the lowest Biology Test increment (+.05). Females also had the lowest Biology Test increment of +.05, but they had the highest Physics Test increment of +.09.

First-generation college students had the highest Biology Test correlation without the SAT (.51), but a quite low Physics Test increment of +.02. Students who

TABLE 46

High and Low Science Course Grade Correlations, Corrected for Shrinkage and Restriction of Range, Among Student Groups

Achievement Test	*Type of Course and Correlation*	*High*		*Low*	
Biology	Biology:				
	Biology	.51	First generation in college	.30	Asian American
	Biology–SAT	.69	Asian American	.51	Male
	Biology Increment	+.14	High academic composite	+.05	Male
		+.05	Female		
		+.05	English best language		
		+.05	Not first generation		
Chemistry	Chemistry:				
	Chemistry	.51	Asian American	.27	Black
	Chemistry–SAT	.62	Middle academic composite	.45	Black
		.62	English not best language		
		.62	Asian American		
	Chemistry increment	+.11	Low academic composite	+.05	Black
		+.11	English not best language		
Physics	Physics:				
	Physics	.50	Middle academic composite	.28	Asian American
	Physics–SAT	.62	Low academic composite	.43	Asian American
	Physics increment	+.09	Middle academic composite	+.02	First generation in college
		+.09	Female		

are not the first-generation in college had a relatively low Biology Test increment (+.05).

Students for whom English is their best language also had a relatively low Biology Test increment (+.05). Students for whom English is not their best language had a high Chemistry Test increment of +.11.

In Language Courses

All Students

Table 47 displays average French and Spanish course grade correlations, corrected for shrinkage and restriction of range, of French and Spanish Test takers, with and without SAT scores, in all courses with at least seven students taking the indicated test. Correlations are shown separately for entry-level courses and for courses beyond entry-level. There were insufficient numbers of German, Hebrew, and Latin Test takers in courses with at least seven test takers to produce correlations.

The correlations for both the French and Spanish Tests (.30–.37) were higher than for the SAT verbal score (.23–.28). Interestingly, on the whole, the correlation for the SAT mathematical score (.25–.41) was higher than the SAT verbal correlation. When the SAT mathematical score was combined with the SAT verbal score, the SAT correlations (.33–.44) were higher than the Achievement Test correlations. Compared with the other Achievement Tests, the French and Spanish Test correlations were on the lowest level, comparable to those of American History and Literature.

Despite relatively low correlations, the predictive capabilities of the French and Spanish Tests were relatively independent of those of the SAT, resulting in relatively very large correlation increments over the SAT. When the French or Spanish Test was combined with the SAT, the correlations increased more than for most of the other Achievement Tests. They were still somewhat low (.46–.55), but were higher than for American History and Literature. The correlation increments were well above those of all the other Achievement Tests, especially for the Spanish Test (+.15 for entry-level and +.16 for beyond entry-level).

The correlations for entry-level courses were higher than those for beyond entry-level, without and with the SAT. But the correlation increment over the SAT was about the same for both types of courses.

TABLE 47

For French and Spanish Test Takers, Average Course Grade Correlations in Entry-Level and Beyond Entry-Level Courses, Corrected for Shrinkage and Restriction of Range

	French		*Spanish*	
	Beyond Entry-Level	*Entry-Level*	*Beyond Entry-Level*	*Entry-Level*
French				
Number of students	2,366	441		
Number of Courses	144	30		
Correlations:				
French	.30	.37		
SAT verbal	.27	.23		
SAT math	.28	.41		
SAT	.35	.44		
SAT–French	.46	.55		
French increment	+.11	+.11		
Spanish				
Number of students			1,646	664
Number of courses			118	51
Correlations:				
Spanish			.31	.33
SAT verbal			.28	.27
SAT math			.25	.30
SAT			.33	.36
SAT–Spanish			.48	.52
Spanish increment			+.15	+.16

Academic Composite

Table 48 displays average correlations with grades in beyond entry-level French and Spanish courses, for French, Spanish, and SAT scores, corrected for shrinkage and restriction of range. They are shown for student groups of academic composite, sex, English best language, ethnicity, and first generation in college.

For both French and Spanish Tests, test correlations, without and with the SAT, and SAT correlations were lower for the lower academic composite group. The high academic composite group had relatively very large correlation increments over the SAT of +.21 for French and +.19 for Spanish.

The correlations for the middle academic composite were quite different for French and Spanish. For French courses, the French Test correlation (.36) exceeded the SAT correlation (.27), and the correlation increment over the SAT was a relatively very large +.24. For Spanish courses, the SAT correlation (.41) exceeded the Spanish correlation (.27), and the correlation increment over the SAT was a more moderate +.10.

The very high relative performance for the low composite group in Spanish and French, as shown in Table 13, was not associated with correlation increments that were high (+.17 for French and +.11 for Spanish) compared with the other academic composite groups. But these increments were still quite high compared with other Achievement Tests.

TABLE 48

Average Beyond Entry-Level French and Spanish Course Grade Correlations, Corrected for Shrinkage and Restriction of Range, by Student Group

	Academic Composite			*Sex*		*English Best Language*		*Ethnic Group*					*First Generation in College*	
	High	*Middle*	*Low*	*Male*	*Female*	*Yes*	*No*	*Amer. Indian*	*Asian Amer.*	*Black*	*Hispanic*	*White*	*Yes*	*No*
French Test for beyond entry-level French														
Number of students	421	503	429	184	1,803	2,255	0	0	0	8	0	2,091	54	1,913
Number of courses	42	47	39	19	122	135	0	0	0	1	0	133	6	128
Correlations:														
French	.31	.36	.21	.37	.30	.30	–	–	–	–	–	.31	.41	.29
SAT verbal	.27	.21	.13	.27	.27	.27	–	–	–	–	–	.26	.21	.27
SAT math	.26	.22	.15	.17	.29	.28	–	–	–	–	–	.29	.16	.29
SAT	.33	.27	.17	.32	.36	.35	–	–	–	–	–	.34	.31	.35
SAT–French	.54	.51	.34	.49	.47	.47	–	–	–	–	–	.47	.51	.47
French increment	+.21	+.24	+.17	+.17	+.09	+.12	–	–	–	–	–	+.13	+.20	+.12
Spanish Test for beyond entry-level Spanish														
Number of students	174	237	249	215	962	1,561	0	0	0	0	0	1,188	116	1,053
Number of courses	19	26	23	24	77	112	0	0	0	0	0	85	14	85
Correlations:														
Spanish	.31	.27	.15	.19	.33	.31	–	–	–	–	–	.34	.33	.32
SAT verbal	.26	.33	.23	.25	.28	.28	–	–	–	–	–	.27	.23	.30
SAT math	.27	.37	.17	.19	.30	.26	–	–	–	–	–	.26	.22	.31
SAT	.32	.41	.27	.32	.38	.34	–	–	–	–	–	.35	.29	.39
SAT–Spanish	.51	.51	.38	.41	.52	.48	–	–	–	–	–	.49	.55	.50
Spanish increment	+.19	+.10	+.11	+.09	+.14	+.14	–	–	–	–	–	+.14	+.26	+.11

Sex

Usually females have higher correlations than males of tests with grades. Table 46 shows that this holds true for Spanish courses beyond entry-level: the Spanish Test has a correlation of .33 for females compared to .19 for males. But for the 184 males who took a French course beyond entry-level, the French Test correlation was higher than for females, both without the SAT (.37 compared to .30) and with the SAT (.49 compared to .47). The SAT correlation was higher than the Achievement Test correlation for females in French courses (.36 compared to .30), males in Spanish courses (.32 compared to .19), and females in Spanish courses (.38 compared to .33), but not for males in French courses (.37 for the French Test compared to .32 for the SAT). The French increment in correlation over the SAT was higher for males (+.17 compared to +.09); the Spanish increment was higher for females (+.14 compared to +.09).

English Best Language

Table 48 shows that there were insufficient numbers for correlations of students for whom English is not their best language who took the French or Spanish Tests and also a beyond-entry level French or Spanish course.

Ethnic Group

Table 48 shows that there were insufficient numbers for correlations of American Indian, Asian American, black, or Hispanic students who took the French or Spanish Test and a beyond-entry French or Spanish course.

First Generation in College

Table 48 shows that when the language test alone was used, students who are the first generation in college had higher correlations with course grade for the French Test (.41 compared to .29) and for the Spanish Test (.33 compared to .32). The same was true when SAT scores were used with the language test: .51 compared to .47 for the French Test and .55 compared to .50 for the Spanish Test.

Students who are first generation in college also had much higher correlation increments over the SAT: +.20 compared to +.12 for the French Test, and +.26 compared to +.11 for the Spanish Test. The much higher relative performance in the Spanish and French Tests for these students, as shown in Table 15, was associated with higher predictive effectiveness.

TABLE 49

High and Low French and Spanish Course Grade Correlations, Corrected for Shrinkage and Restriction of Range, Among Student Groups

Achievement Test	*Type of Course and Correlation*	*High*		*Low*	
French	French:				
	French	.41	First generation in college	.21	Low academic composite
	French–SAT	.54	High academic composite	.34	Low academic composite
	French Increment	+.24	Middle academic composite	+.09	Female
Spanish	Spanish:				
	Spanish	.34	White	.15	Low academic composite
	Spanish–SAT	.55	First generation in college	.38	Low academic composite
	Spanish increment	+.26	First generation in college	+.09	Male

High and Low Correlations Among Student Groups

Table 49 displays the highest and lowest correlations and increments among student groups for predictive effectiveness of language course grades. The correlations shown are for the French and Spanish Tests, without and with the SAT, and the increments for each test over the SAT.

Students in the low academic composite had the lowest correlations for both the French and Spanish Tests, both without the SAT (.21 for French and .15 for Spanish) and with the SAT (.34 for French and .38 for Spanish). Students in the high academic composite had the highest correlation for French with the SAT (.54). Students in the middle academic composite had the highest French increment (+.24).

Students who are the first generation in college had the highest French correlation without the SAT (.41), Spanish correlation with the SAT (.55), and Spanish increment (+.26).

Females had the smallest French increment of +.09, while males had the smallest Spanish increment of +.09. White students had the highest Spanish correlation without the SAT (.34).

VIII. Over- and Underpredictions

To evaluate whether a student group in general is over- or underpredicted for admission, the mean actual FGPA for students in each student group is compared with the mean predicted FGPA for those students using the all-student FGPA prediction equation. To evaluate whether a student group in general is over- or underpredicted for placement, the mean grade for students in each student group in courses comprising relevant course categories is compared with the mean predicted grade for those students using the all-student course grade prediction equations for those courses.

If the mean actual FGPA (or mean grade) exceeds the mean predicted FGPA (or mean predicted grade), there is an average underprediction for the student group, which usually disfavors more than half of the students in the group because they perform better than indicated by their predictions. If the mean predicted FGPA (or mean predicted grade) exceeds the mean actual FGPA (or mean grade), there is an average overprediction for the student group, which usually favors more than half of the students in the group because they perform less well than indicated by their predictions.

For sex and ethnic groups, over- and underpredictions for admission are shown using the prediction equation for the FGPA of all students. Overpredictions are displayed as negatives, and underpredictions are displayed as positives, using three single predictors—HSGPA (labeled H), Achievement Test average (labeled A), and TSWE (labeled T)—and four sets of multiple predictors: SAT V and SAT M (labeled S); HSGPA, SAT V, and SAT M (labeled HS); HSGPA, SAT V, SAT M, and Achievement average (labeled HSA); and HSGPA, SAT V, SAT M, Achievement Test average, and mean course difficulty, which is average course grade mean residual (labeled HSAZ). The effect of the Achievement Test average, the difference in over- or underprediction between HSA and HS, is shown as the "A increment". The effect of the mean course difficulty, the difference in over- and underpredictions between HSAZ and HSA, is shown as the "Z increment."

For all groups—academic composite, sex, English best language, ethnic group, and first generation in college—over- and underpredictions for placement are shown using the prediction equations for course grades of all students. Overpredictions are displayed as negatives, and underpredictions are displayed as positives using single predictors for each of the Achievement

Tests in related course categories. In addition to data on all types of the ECT grouped together, data are shown separately for the ECT without essay, the ECT with essay, the essay section alone, the objective section of the ECT with essay alone, and the essay increment (the difference between the ECT with essay and the objective section). In addition to data on the Math I and Math II Tests separately, data are shown for the tests combined and for the Math II increment (the difference between the combined result and the Math I result).

By Academic Composite

Table 50 presents over- and underpredictions for each Achievement Test in predicting course grade in relevant course categories, by academic composite, using the prediction equation for all students in the course. They show very large underpredictions for the high composite group and overpredictions for the low composite. The only exceptions were for Latin and European History, which showed no over- or underpredictions for any of the groups, German, which showed almost no over- or underpredictions, and Literature, which demonstrated only about one-third of the typical results.

Use of the essay with the objective section increased by .01 the underprediction for the high composite group and the overprediction for the low composite group. It also eliminated .02 of the .04 underprediction for the middle composite group.

Use of the Math II Test with Math I had no effect on the overprediction for the low composite group, but reduced the underprediction of the high composite group by .01. It also eliminated the .02 underprediction for the middle composite group.

TABLE 50

Average Over- (-) and Underpredictions (+) (Actual–Predicted) for Each Achievement Test in Predicting Course Grade in Relevant Course Categories, by Academic Composite, Using the Prediction Equation for All Students in the Course

Achievement Test	*Course Categories*	*Academic Composite*		
		High	*Middle*	*Low*
English Composition	Regular English*	+.12	+.02	-.13
Literature	Regular Reading/Lit.	+.03	+.02	-.05
Mathematics I	Calculus	+.18	+.02	-.23
Mathematics II	Calculus	+.13	-.02	-.25
American History	American History	+.09	+.01	-.06
European History	European History	.00	.00	.00
Biology	Biology	+.18	-.02	-.21
Chemistry	Chemistry	+.12	-.05	-.24
Physics	Physics	+.09	-.05	-.23
Latin	Latin	.00	.00	.00
Hebrew	Hebrew	—	—	—
French	French	+.11	+.02	-.12
German	German	.00	+.01	-.01
Spanish	Spanish	+.13	+.02	-.10
English Composition:				
Without essay	Regular English*	+.11	+.02	-.12
With essay	Regular English*	+.13	+.02	-.13
Essay section	Regular English*	+.16	+.03	-.16
Objective section	Regular English*	+.12	+.04	-.12
Essay increment	Regular English*	+.01	-.02	-.01
Math I or II	Calculus	+.17	.00	-.23
Math II increment	Calculus	-.01	-.02	.00

* Includes regular English, writing, and reading/literature courses, but not advanced or remedial courses.

By Sex

The second course grade study on SAT takers (Table 8) showed that for females there was underprediction of their FGPA by +.09 using the SAT alone, by +.02 using HSGPA alone, and by +.03 using the TSWE alone. Table 51 shows that for female Achievement Test takers there was somewhat lower underprediction of their FGPA: +.06 using the SAT alone, +.05 using the Achievement average alone, +.01 using HSGPA alone, and +.01 using TSWE alone.

Using SAT scores with HSGPA, there was underprediction for female Achievement Test takers of +.04, compared to +.06 for female SAT takers. When the Achievement Test average was combined with SAT scores and HSGPA, underprediction for female Achievement Test takers was reduced by .01, from +.04 to +.03. When the average course difficulty was also used, the underprediction for females was reduced by an additional .02, from +.03 to +.01.

TABLE 51

Average Over- (-) and Underpredictions (+) (Actual–Predicted) of FGPA by Sex, Using the Prediction Equation for All Students

	Sex	
	Male	*Female*
Number of Students	20,648	22,325
Predictor(s)		
HSAZ	-.01	+.01
HSA	-.03	+.03
Z increment	+.02	-.02
HS	-.04	+.04
A increment	+.01	-.01
H	-.01	+.01
A	-.06	+.05
S	-.07	+.06
TSWE	-.01	+.01

H = High school GPA
S = SAT
A = Achievement Test average
Z = Mean course difficulty (average grade mean residual)

Thus, with use of HSGPA, test scores, and average course difficulty, there was almost no underprediction for female Achievement Test takers (only +.01). For female SAT takers, there was underprediction of +.03. The reason for the difference may be mostly due to the relatively high selectivity of colleges requiring Achievement Tests. In the second study, the underprediction for female SAT takers in more selective colleges (original SAT mean of 1121+) was also approximately +.01 (Table 18 of the second study shows this for HSGPA and SAT score prediction of the course grade criterion, which does not require average course difficulty as a predictor).

Of all the Achievement Tests, Table 52 shows that only one test produced an underprediction of course grade for females which was greater than the +.05 underprediction of FGPA for the Achievement Test average—+.08 for Mathematics Level I—and that only one other test resulted in the same underprediction— +.05 for Mathematics Level II. Three tests produced an underprediction for females of only +.01: Literature, Physics, and French. Four tests resulted in no under- nor overprediction: European History, Chemistry, Latin, and German. One test produced an overprediction of course grade for females: by -.01 for Biology.

Both the essay and objective sections of the ECT with essay, and also the ECT without essay, produced the same underprediction for females of +.03. The essay increment over the objective section produced no effect on the amount of underprediction.

TABLE 52

Average Over- (-) and Underpredictions (+) (Actual–Predicted) for Each Achievement Test in Predicting Course Grade in Relevant Course Categories, by Sex, Using the Prediction Equation for All Students in the Course

Achievement Test	*Course Categories*	*Sex*	
		Male	*Female*
English Composition	Regular English*	-.04	+.03
Literature	Regular Reading/Lit.	-.02	+.01
Mathematics I	Calculus	-.07	+.08
Mathematics II	Calculus	-.03	+.05
American History	American History	-.03	+.04
European History	European History	.00	.00
Biology	Biology	+.01	-.01
Chemistry	Chemistry	.00	.00
Physics	Physics	.00	+.01
Latin	Latin	.00	.00
Hebrew	Hebrew	—	—
French	French	-.04	+.01
German	German	.00	.00
Spanish	Spanish	-.06	+.03
English Composition:			
Without essay	Regular English*	-.04	+.03
With essay	Regular English*	-.05	+.03
Essay section	Regular English*	-.04	+.03
Objective section	Regular English*	-.04	+.03
Essay increment	Regular English*	-.01	.00
Math I or II	Calculus	-.06	+.07
Math II increment	Calculus	+.01	-.01

* Includes regular English, writing, and reading/literature courses, but not advanced or remedial courses.

By English Best Language

Table 53 shows that for subjects involving mathematics there was substantial underprediction of course grade for Achievement Test takers for whom English is not their best language:

Physics	+.27
Mathematics Level I	+.19
Mathematics Level II	+.19
Chemistry	+.17

In addition, there was moderate underprediction in French (+.07).

TABLE 53

Average Over- (-) and Underpredictions (+) (Actual–Predicted) for Each Achievement Test in Predicting Course Grade in Relevant Course Categories, by English Best Language, Using the Prediction Equation for All Students in the Course

Achievement Test	*Course Categories*	*English Best Language*	
		Yes	*No*
English Composition	Regular English*	.00	+.01
Literature	Regular Reading/Lit.	.00	—
Mathematics I	Calculus	-.01	+.19
Mathematics II	Calculus	-.01	+.19
American History	American History	.00	-.07
European History	European History	.00	—
Biology	Biology	.00	-.20
Chemistry	Chemistry	-.01	+.17
Physics	Physics	-.02	+.27
Latin	Latin	.00	—
Hebrew	Herew	—	—
French	French	.00	+.07
German	German	.00	—
Spanish	Spanish	.00	+.03
English Composition:			
Without essay	Regular English*	.00	-.01
With essay	Regular English*	.00	+.06
Essay section	Regular English*	.00	-.01
Objective section	Regular English*	.00	+.01
Essay increment	Regular English*	.00	+.04
Math I or II	Calculus	-.01	+.20
Math II increment	Calculus	.00	+.01

* Includes regular English, writing, and reading/literature courses, but not advanced or remedial courses.

As shown in Table 15, students for whom English is not their best language had high performance on these tests compared with their SAT scores. Their course grades in these subjects were on average even higher than predicted by these higher test scores. SAT takers for whom English is not their best language had even larger underpredictions, based on SAT scores and HSGPA, of their grades in quantitative courses (as shown in Table 21 of the second course grade study).

While for two of the science tests (Physics and Chemistry) there was substantial underprediction for students for whom English is not their best language, for the Biology Test there was substantial overprediction of -.20. There was also moderate overprediction of -.07 for the American History Test. In these subjects, students for whom English is not their best language performed less well than predicted by their test scores.

For the ECT, the slight underprediction of +.01 for students for whom English is not their best language includes a moderate overprediction of -.07 for 100 students in regular reading/literature courses and a moderate underprediction of +.04 for 450 students in regular writing courses (data not shown in Table 53). These data suggest that students for whom English is not their best language perform better than expected in writing courses but obtain lower grades than expected in reading/literature courses.

For ECT without essay, there was a slight overprediction of -.01 for students for whom English is not their best language. But for ECT with essay there was a moderate underprediction of +.06, +.05 of which was accounted for by the additive effect of the essay section. When the essay was taken in the ECT for these students, it contributed to underprediction of their English course grade. But use of the essay section itself, without the objective section, produced an overprediction of -.01.

By Ethnic Group

Table 54 shows that each of the predictors HSGPA, Achievement Test average, SAT scores, and TSWE score rather substantially overpredicted the FGPA of black and American Indian Achievement Test takers (from -.23 to -.41), especially the TSWE score. The same was true for Hispanic students, but to a lesser extent for the TSWE score and especially the SAT scores (-.14).

Each of the test score predictors underpredicted FGPA for white students by +.02, and HSGPA underpredicted it by +.04. For Asian American students, each of the test score predictors underpredicted FGPA (by +.04 to +.11), but HSGPA overpredicted it (by -.02): when HSGPA and SAT scores were used together, there was no under- or overprediction.

TABLE 54

Average Over- (-) and Underpredictions (+) (Actual–Predicted) of FGPA by Ethnic Group, Using the Prediction Equation for All Students

	Ethnic Group				
	American Indian	*Asian American*	*Black*	*Hispanic*	*White*
Number of Students	145	5,172	1,853	1,488	33,314
Predictor(s)					
HSAZ	-.29	+.05	-.14	-.14	+.01
HSA	-.30	+.01	-.17	-.17	+.02
Z increment	+.01	+.04	+.03	+.03	-.01
HS	-.21	.00	-.18	-.13	+.02
A increment	-.09	+.01	+.01	-.04	.00
H	-.27	-.02	-.34	-.25	+.04
A	-.23	+.05	-.26	-.23	+.02
S	-.27	+.04	-.27	-.14	+.02
TSWE	-.33	+.11	-.41	-.23	+.02

H = High school GPA A = Achievement Test average
S = SAT Z = Mean course difficulty (average grade mean residual)

For SAT takers, Table 8 of the second course grade study showed similar results for black, American Indian, Hispanic, and white students. But for Asian American SAT takers, there was an overprediction of +.02 using HSGPA, not an underprediction, as well as overpredictions for test scores.

When Achievement Test average was used with HSGPA and SAT scores, it increased the overprediction for American Indian students (by -.09) and for Hispanic students (by -.04), but had little effect on the other ethnic groups. When average course difficulty was also included, it increased underprediction for Asian American students from +.01 to +.05, and decreased overprediction by +.03 (-.17 to -.14) for both black and Hispanic students.

For American Indian students, Table 55 shows under- or overprediction only for the three tests with 10 or more test takers. As for the Achievement Test average predicting FGPA, there were large overpredictions of course grade for Math I (-.27) and ECT scores (-.21). But for the 33 American Indian students who took the Math II Test and then a calculus course, there was a slight underprediction of +.01.

For black students, there were large overpredictions of course grade for all of the tests, especially science and math, ranging from -.16 to -.47, except for American History (+.01) and Literature (-.08). For Hispanic students, there were moderate overpredictions, ranging from -.03 to -.12, except for American History (+.03).

Linn (1983a, 1983b) has suggested that overpredictions for black students, and for any other group, such as American Indian and Hispanic students, selected

TABLE 55

Average Over- (-) and Underpredictions (+) (Actual–Predicted) for Each Achievement Test in Predicting Course Grade in Relevant Course Categories, by Ethnic Group, Using the Prediction Equation for All Students in the Course

		Ethnic Group				
Achievement Test	*Course Categories*	*American Indian*	*Asian American*	*Black*	*Hispanic*	*White*
English Composition	Regular English*	-.21	+.02	-.21	-.11	+.01
Literature	Regular Reading/Lit.	—	.00	-.08	-.06	+.01
Mathematics I	Calculus	-.27	+.09	-.26	-.09	.00
Mathematics II	Calculus	+.01	+.16	-.36	-.11	-.02
American History	American History	—	-.05	+.01	+.03	+.01
European History	European History	—	—	—	—	.00
Biology	Biology	—	-.01	-.40	-.03	+.02
Chemistry	Chemistry	—	+.11	-.37	-.08	-.01
Physics	Physics	—	+.12	-.47	-.11	-.02
Latin	Latin	—	—	—	—	.00
Hebrew	Hebrew	—	—	—	—	—
French	French	—	+.09	-.19	-.10	.00
German	German	—	.00	—	—	.00
Spanish	Spanish	—	+.07	-.16	-.07	+.02
English Composition:						
Without essay	Regular English*	-.19	+.03	-.20	-.12	+.02
With essay	Regular English*	-.21	-.02	-.23	-.05	+.01
Essay section	Regular English*	-.26	-.06	-.25	-.15	+.03
Objective section	Regular English*	-.22	-.02	-.25	-.07	+.02
Essay increment	Regular English*	+.01	.00	+.02	+.02	-.01
Math I or II	Calculus	-.24	+.12	-.26	-.09	-.01
Math II increment	Calculus	+.03	+.03	.00	.00	-.01

* Includes regular English, writing, and reading/literature courses, but not advanced or remedial courses.

with less weight given to traditional predictors and at a higher rate than the majority of applicants (when there is equal performance on traditional predictors), may be a statistical artifact of affirmative action. In such cases, if the majority group is selected on the basis of additional factors used with test scores and HSR (as is usually the case), the prediction lines for all students and the majority group, for test scores and HSR, become less steep than the prediction lines for the unselected group of potential students and for groups selected at higher rates because of affirmative action. The prediction lines for groups selected as a result of affirmative action tend to be lower as well as steeper, throughout the range of relevant predictor values, than the lines for the majority group of selected students or for all selected students, thereby accounting for overpredictions, especially for lower-scoring minority students. Linn shows that the more additional factors considered in the selection process and the greater the difference in selection rates between majority and minority groups, the greater the overprediction for minority groups.

Of course, there are also important social, as well as statistical, factors that could account for lower than predicted performance for black, American Indian, and Hispanic students at predominantly white colleges. Since they are related to group membership and affect the FGPA and average grade criteria, these factors produce a higher prediction line intercept for all students and the majority group than for minority groups, which would also account for overpredictions of minority students, as discussed in Linn (1984) and Humphreys (1986).

For Asian American students, there were small to moderate underpredictions, ranging from +.02 to +.16, except for American History (-.05), ECT with essay (-.02), Biology (-.01), Literature (.00), and German (.00). For white students, there were either no over- or underpredictions, as might be expected for a majority group, or small underpredictions, ranging from +.01 to +.02, except for Math II (-.02), Physics (-.02), and Chemistry (-.01).

The essay section of the ECT had only very small effects on the amount of under- or overpredictions of the ECT-objective section. It slightly reduced overpredictions for black students (from -.25 to -.23) and for Hispanic students (from -.07 to -.05).

Table 56 shows that for over- and underpredictions

TABLE 56

Average Over- (-) and Underpredictions (+) (Actual–Predicted) of FGPA by Sex and Ethnic Groups, Using the Prediction Equation for All Students

	Ethnic Group									
	American Indian		*Asian American*		*Black*		*Hispanic*		*White*	
	Male	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*
Number of Students	73	72	2,514	2,658	658	1,195	734	754	16,176	17,138
Predictor(s)										
HSAZ	-.07	-.36	+.05	+.05	-.17	-.12	-.19	-.13	.00	+.02
HSA	-.23	-.31	-.02	+.03	-.22	-.14	-.23	-.14	-.01	+.05
Z increment	+.16	-.05	+.07	+.02	+.05	+.02	+.04	+.01	+.01	-.03
HS	-.21	-.21	-.03	+.04	-.25	-.14	-.20	-.06	-.02	+.06
A increment	-.02	-.10	+.01	-.01	+.03	.00	-.03	-.08	+.01	-.01
H	-.23	-.33	-.02	-.02	-.36	-.33	-.28	-.23	.00	+.05
A	-.27	-.19	+.01	+.09	-.34	-.22	-.30	-.16	-.04	+.08
S	-.31	-.23	-.01	+.08	-.38	-.21	-.24	-.05	-.05	+.09
TSWE	-.29	-.36	+.13	+.10	-.45	-.39	-.27	-.19	.00	+.04

H = High school GPA
S = SAT
A = Achievement Test average
Z = Mean course difficulty (average grade mean residual)

of FGPA there were not great sex by ethnic group effects other than what may have been expected from separate sex and ethnic group effects. For example, for black students, the only ethnic group with substantially different numbers of females (1,195) and males (658), there were moderately or very large underpredictions for females, almost but not quite as large as for males.

The only large sex by ethnic group effect was for American Indian students. Without consideration of courses taken, American Indian males (N = 73) and females (N = 72) had similarly large overpredictions. But most of the overprediction for American Indian males (.16 of .23) appears to be as a result of the stricter grading level of their chosen courses, while that was not true for American Indian females.

By First Generation in College

Table 57 shows that the course grades of students who are the first generation in college are overpredicted by Biology (-.04), ECT (-.03), Math II (-.03), American History (-.03), and Chemistry (-.03), but are underpredicted by Physics (+.04) and Spanish (+.03). The essay section of the ECT reduces the overprediction of the objective section by .02 (from -.06 to -.04).

TABLE 57

Average Over- (-) and Underpredictions (+) (Actual–Predicted) for Each Achievement Test in Predicting Course Grade in Relevant Course Categories, by First Generation in College, Using the Prediction Equation for All Students in the Course

		First Generation in College	
Achievement Test	*Course Categories*	*Yes*	*No*
English Composition	Regular English*	-.03	+.01
Literature	Regular Reading/ Literature	.00	.00
Mathematics I	Calculus	.00	.00
Mathematics II	Calculus	-.03	+.01
American History	American History	-.03	+.01
European History	European History	.00	.00
Biology	Biology	-.04	+.01
Chemistry	Chemistry	-.03	+.01
Physics	Physics	+.04	-.01
Latin	Latin	.00	.00
Hebrew	Hebrew	—	—
French	French	-.01	+.01
German	German	+.01	.00
Spanish	Spanish	+.03	-.01
English Composition:			
Without essay	Regular English*	-.03	+.01
With essay	Regular English*	-.04	+.01
Essay section	Regular English*	-.04	+.02
Objective section	Regular English*	-.06	+.02
Essay increment	Regular English*	+.02	-.01
Math I or II	Calculus	-.01	.00
Math II increment	Calculus	-.01	.00

*Includes regular English, writing, and reading/literature courses, but not advanced or remedial courses.

IX. Differences Among Colleges

Predictive Effectiveness for Admission

Table 58 compares average FGPA correlations, corrected for shrinkage and restriction of range, for colleges with relatively higher (1160 or higher on the old SAT scale), medium (1088–1159), and lower (below 1088) SAT means. Colleges with higher SAT means had somewhat higher correlations for HSGPA, SAT scores, and Achievement Test average. Among these three predictors, for colleges with higher SAT means, the highest correlation was for the Achievement Test average (.63); for colleges with medium and low SAT means, the highest was for HSGPA (.59 and .55, respectively). For all three college groups, the correlation for the Achievement Test average was .02 higher than the correlation for the SAT.

TABLE 58

Average FGPA Correlations for All Achievement Test Takers, by College SAT Mean, Corrected for Shrinkage and Restriction of Range

	High SAT (1160 +)	*Medium SAT (1088–1159)*	*Low SAT (Below 1088)*
Single Predictors			
SAT V (V)	.54	.48	.46
SAT M (M)	.57	.50	.48
SAT (S)	.61	.53	.52
HSGPA (H)	.62	.59	.55
Ach. Av. (A)	.63	.55	.54
Z*	.10	.09	.17
Multiple Predictors			
HS	.71	.65	.62
HA	.72	.66	.63
SA	.64	.56	.55
HSZ	.76	.72	.71
HAZ	.77	.72	.71
SAZ	.69	.62	.64
HSA	.72	.66	.63
HSAZ	.78	.73	.72
Increments			
ΔH over SAZ	+.09	+.11	+.09
ΔS over HAZ	+.01	+.01	+.01
ΔA over HSZ	+.02	+.01	+.01
ΔZ over HSA	+.06	+.07	+.09
ΔH over SA	+.08	+.10	+.08
ΔS over HA	.00	.00	.00
ΔA over HS	+.01	+.01	+.01
ΔAS over H	+.10	+.07	+.08
ΔH over S	+.10	+.12	+.10
ΔH over A	+.09	+.11	+.09
ΔS over H	+.09	+.06	+.07
ΔS over A	+.01	+.01	+.01
ΔA over H	+.10	+.07	+.08
ΔA over S	+.03	+.03	+.03
ΔV over M	+.04	+.03	+.04
ΔM over V	+.07	+.05	+.06

* Z = Average grade mean residual.

Among the three college groups, the correlation increments were almost all the same. Over the other predictors, including average grade mean residual of courses taken, the Achievement Test average had an increment of +.02 for the colleges with higher SAT means, and +.01 for colleges with medium and low SAT means. For all three groups, the SAT had an increment of +.01. Without the average grade mean residual, for all three groups the increment for Achievement Test average was +.01, and the increment for the SAT was .00. With regard to test score information only, for all three groups, the Achievement Test average had an increment of +.03 over the SAT, and the SAT had an increment of +.01 over the Achievement Test average.

Although colleges with higher SAT means had higher correlations for the three main predictors, colleges with low SAT means had a higher correlation (.17) for the average grade mean residual. Because of greater disparity of grading practices at colleges with lower SAT means, there was a greater relationship between grading difficulty and FGPA. At colleges with lower SAT means, the correlation increment over the other predictors was as high for the average grade mean residual (+.09) as it was for HSGPA.

Predictive Effectiveness for Placement

Table 59 compares average English course grade correlations, corrected for shrinkage and restriction of range, for colleges with relatively higher, medium, and lower SAT means. The ECT was about equally effective in predicting English course grade for all three college groups, for general English, reading/literature, and writing courses.

The ECT with an essay was less effective for the 400 students in seven writing courses at colleges with medium SAT means (correlation of .28 and incremental correlation over the SAT of +.02) than for colleges with relatively high SAT means (correlation of .43 and increment of +.07) or with relatively low SAT means (correlation of

.35 and increment of +.06). But the essay section score itself was about equally effective in all three groups of colleges (correlations of .18–.20 and correlation increment over the ECT-objective section of +.01 or +.02).

TABLE 59

Average English Course Grade Correlations, by College SAT Mean, Corrected for Shrinkage and Restriction of Range

	High SAT (1160 +)	*Medium SAT (1088–1159)*	*Low SAT (Below 1088)*
ECT Takers in General English Courses			
Number of students	2,872	10,889	2,568
Number of courses	132	55	87
Correlations:			
ECT	.39	.44	.40
SAT verbal	.39	.42	.39
SAT math	.33	.36	.34
SAT	.44	.44	.44
SAT–ECT	.49	.47	.48
ECT increment	+.05	+.03	+.04
ECT Takers in Reading/Literature Courses			
Number of students	3,908	2,636	1,317
Number of courses	187	79	65
Correlations:			
ECT	.38	.35	.39
SAT verbal	.40	.36	.39
SAT math	.32	.30	.30
SAT	.44	.40	.43
SAT–ECT	.48	.44	.47
ECT increment	+.04	+.04	+.04
ECT Takers in Writing Courses			
Number of students	8,800	3,316	6,724
Number of courses	57	40	203
Correlations:			
ECT	.48	.38	.38
SAT verbal	.47	.36	.37
SAT math	.39	.31	.31
SAT	.49	.38	.40
SAT–ECT	.52	.42	.45
ECT increment	+.03	+.04	+.05
Takers of ECT with Essay in Writing Courses			
Number of students	1,361	400	502
Number of courses	21	7	45
Correlations:			
ECT	.43	.28	.35
SAT verbal	.42	.35	.36
SAT math	.34	.27	.36
SAT	.44	.36	.45
SAT–ECT	.51	.38	.51
ECT increment	+.07	+.02	+.06
ECT–essay	.20	.18	.18
ECT–objective	.44	.27	.33
Essay increment	+.01	+.01	+.02
Literature Takers in Reading/Literature Courses			
Number of students	189	166	60
Number of courses	18	10	6
Correlations:			
Literature	.27	.26	.58
SAT verbal	.31	.24	.51
SAT math	.27	.15	.30
SAT	.36	.25	.54
SAT–Literature	.45	.32	.66
Literature increment	+.09	+.07	+.12

With a correlation of .58 and a correlation increment over the SAT of +.12, the Literature Test was especially effective in predicting the reading/literature course grade of the 60 students in six courses at colleges with a relatively low SAT mean. In comparison, the correlations and correlation increments were .26 and +.07 at colleges with a medium SAT mean and .27 and +.09 at colleges with a relatively high SAT mean.

Table 60 compares average calculus course grade correlations. The calculus course grade was somewhat more predictable for colleges with a relatively high SAT mean and was somewhat less predictable for colleges with a relatively low SAT mean, for both the Mathematics Achievement Tests (.56 compared to .51) and the SAT (.54 compared to .48). The increment in correlation for the Mathematics Achievement Test combination was +.05 or +.06 for all three groups of colleges.

Table 61 compares average American history course grade correlations. In contrast to calculus, the American History course grade was less predictable at

TABLE 60

Average Calculus Course Grade Correlations, by College SAT Mean, Corrected for Shrinkage and Restriction of Range

	High SAT (1160 +)	*Medium SAT (1088–1159)*	*Low SAT (Below 1088)*
Number of Students	12,686	15,488	8,858
Number of Courses	269	104	148
Correlations:			
Math Combination	.56	.55	.51
SAT verbal	.38	.35	.33
SAT math	.53	.51	.47
SAT	.54	.52	.48
SAT Math Combination	.59	.57	.54
Math Combination increment	+.05	+.05	+.06

colleges with a relatively high SAT mean, for the American History Test (.23 compared to .33–.34 for the other college groups), the SAT (.29 compared to .37), or both (.35 compared to .42–.46). The increment in correlation for the American History Test over the SAT was higher in colleges with a relatively low SAT mean (+.09) than for the other college groups (+.05 or +.06).

Table 62 compares average biology, chemistry, and physics, with lab, course grade correlations. Colleges with a relatively low SAT mean had the highest increments in correlation over the SAT for each of the science tests: +.09 for the Chemistry Test, compared to +.07 for colleges with a medium SAT mean and +.05 for colleges with a relatively high SAT mean; +.10 for the Biology Test, compared to +.05 for the other two groups; and, especially, +.22 for the Physics Test, compared to +.05 for the other two groups. For the 209 students in 14 physics courses at colleges with a relatively low SAT mean, the correlation between the SAT and the physics course grade was only .31, lower than for the other science tests and groups of colleges (.39–.57), but was raised to .53 when the Physics Test was used with the SAT.

Table 63 compares average beyond entry-level French and Spanish course grade correlations. Despite the fact that the SAT predicted French and Spanish course grades better than the French and Spanish Achievement Tests at colleges with a relatively high SAT mean and colleges with a medium SAT mean, the French and Spanish Test increments over the SAT were still a high +.11 to +.13. At colleges with a relatively low SAT mean, the French and Spanish Tests predicted French and Spanish course grades better than the SAT. At these colleges, the French Test increment over the SAT of +.12 was similar to the increments for the other college groups, but the Spanish Test increment over the SAT was a very high +.25 (an SAT/Spanish Test multiple correlation of .43, compared to .18 for the SAT alone).

TABLE 61

Average American History Course Grade Correlations, by College SAT Mean, Corrected for Shrinkage and Restriction of Range

	High SAT (1160 +)	*Medium SAT (1088–1159)*	*Low SAT (Below 1088)*
Number of students	217	396	227
Number of courses	18	22	21
Correlations:			
American History	.23	.34	.33
SAT verbal	.21	.32	.31
SAT math	.25	.25	.26
SAT	.29	.37	.37
SAT–Am. History	.35	.42	.46
Am. History increment	+.06	+.05	+.09

TABLE 62

Average Biology, Chemistry, and Physics, with Lab, Course Grade Correlations, by College SAT Mean, Corrected for Shrinkage and Restriction of Range

	High SAT (1160 +)	*Medium SAT (1088–1159)*	*Low SAT (Below 1088)*
Biology Test for Biology with Lab			
Number of students	1,093	1,067	337
Number of courses	45	34	25
Correlations:			
Biology	.45	.48	.40
SAT verbal	.44	.41	.40
SAT math	.51	.47	.43
SAT	.56	.52	.49
SAT–Biology	.61	.57	.59
Biology increment	+.05	+.05	+.10
Chemistry Test for Chemistry with Lab			
Number of students	1,506	1,943	998
Number of courses	61	49	47
Correlations:			
Chemistry	.42	.47	.52
SAT verbal	.36	.36	.42
SAT math	.48	.45	.55
SAT	.50	.45	.57
SAT–Chemistry	.55	.54	.66
Chemistry increment	+.05	+.07	+.09
Physics Test for Physics with Lab			
Number of students	648	1,208	209
Number of courses	20	36	14
Correlations:			
Physics	.45	.32	.45
SAT verbal	.38	.26	.15
SAT math	.51	.38	.30
SAT	.53	.39	.31
SAT–Physics	.58	.44	.53
Physics increment	+.05	+.05	+.22

Over- and Underpredictions

Table 51 displayed average over- and underpredictions of FGPA by sex. Using predictors HSGPA, SAT scores, Achievement Test average, and average grade mean residual of courses taken to predict FGPA, Table 51 showed average underprediction for females and overprediction for males of .01.

Table 64 displays average over- and underpredictions of course grade, instead of FGPA, by sex, for the three college groups. Predicting course grade, instead of

TABLE 63

Average Beyond Entry-Level French and Spanish Course Grade Correlations, by College SAT Mean, Corrected for Shrinkage and Restriction of Range

	High SAT (1160 +)	*Medium SAT (1088–1159)*	*Low SAT (Below 1088)*
French Test for beyond entry-level French			
Number of students	1,150	971	245
Number of courses	74	53	17
Correlations:			
French	.31	.30	.27
SAT verbal	.30	.25	.19
SAT math	.32	.27	.19
SAT	.38	.33	.23
SAT–French	.49	.46	.35
French increment	+.11	+.13	+.12
Spanish Test for beyond entry-level Spanish			
Number of students	656	805	185
Number of courses	52	55	11
Correlations:			
Spanish	.28	.33	.33
SAT verbal	.27	.31	.14
SAT math	.28	.24	.16
SAT	.36	.35	.18
SAT–Spanish	.49	.48	.43
Spanish increment	+.13	+.13	+.25

FGPA, makes it unnecessary to use average grade mean residual as a predictor. Using predictors HSGPA, SAT scores, and Achievement Test average to predict course grade, Table 64 shows that average underprediction for females and overprediction for males were .02 for colleges with relatively low SAT means, .01 for colleges with medium SAT means, and .00 for colleges with relatively high SAT means.

For each of the groups, the increment in over- or underprediction when the Achievement Test average was added to HSGPA and SAT scores was .00. Using single predictors, among the three college groups, there were similar overpredictions for females using HSGPA (-.01 to -.02) and the TSWE score (-.01) and there were similar underpredictions for females using SAT scores (+.03 to +.04) and Achievement Test average (+.01 to +.02).

Table 65 shows over- and underpredictions by sex for each Achievement Test in predicting course grade in relevant course categories, by college SAT mean. For most of the Achievement Tests, differences among college groups were small. The sciences were an exception: for colleges with relatively low SAT means, underpredictions for females were highest (+.13 for Physics, +.06 for Chemistry, and +.02 for Biology); for colleges with relatively high SAT means, there were overpredictions for females (-.03 for Chemistry, -.02 for Biology, and -.01 for Physics). One other exception was an overprediction for females of -.03 for the Literature Test at colleges with relatively low SAT means, compared with underpredictions of +.03 at colleges with a medium SAT mean and +.01 at colleges with a relatively high SAT mean.

Table 66 shows over- and underpredictions by ethnic group for each Achievement Test in predicting course grade in relevant course categories, by college SAT mean. The main pattern that stands out is that overpredictions for black students in the sciences were especially large at colleges with relatively high SAT means: -.70 for Physics, -.54 for Biology, and -.41 for Chemistry.

TABLE 64

Average Over- (-) and Underpredictions (+) (Actual–Predicted) of Course Grade by Sex, by College SAT Mean, Using the Course Prediction Equation for All Students

	High SAT (1160 +)		*Medium SAT (1088–1159)*		*Low SAT (Below 1088)*	
	Male	*Female*	*Male*	*Female*	*Male*	*Female*
Number of Students	51,324	46,922	58,978	62,476	35,517	44,493
Predictor(s):						
HSA	.00	.00	-.01	+.01	-.02	+.02
HS	.00	.00	-.01	+.01	-.02	+.02
A increment	.00	.00	.00	.00	.00	.00
H	+.02	-.02	+.03	-.02	+.02	-.01
A	-.01	+.01	-.02	+.02	-.02	+.02
S	-.03	+.03	-.05	+.04	-.04	+.04
TSWE	+.01	-.01	+.01	-.01	+.01	-.01

H = High School GPA
S = SAT
A = Achievement Test average

TABLE 65

Average Over- (-) and Underpredictions (+) (Actual–Predicted) for Each Achievement Test in Predicting Course Grade in Relevant Course Categories, by Sex, by College SAT Mean, Using the Prediction Equation for All Students in the Course

		High SAT (1160 +)		*Medium SAT (1088–1159)*		*Low SAT (Below 1088)*	
Achievement Test	*Course Categories*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*
English Composition	Regular English*	-.03	+.03	-.05	+.04	-.04	+.03
Literature	Regular Reading/Lit.	-.02	+.01	-.08	+.03	+.07	-.03
Mathematics I	Calculus	-.07	+.08	-.07	+.08	-.07	+.07
Mathematics II	Calculus	-.03	+.05	-.04	+.07	-.03	+.06
American History	American History	-.01	+.01	-.04	+.06	-.04	+.04
European History	European History	.00	—	.00	.00	—	—
Biology	Biology	+.02	-.02	+.01	-.01	-.03	+.02
Chemistry	Chemistry	+.02	-.03	-.01	+.02	-.03	+.06
Physics	Physics	.00	-.01	.00	+.03	-.02	+.13
Latin	Latin	—	—	—	—	—	—
Hebrew	Hebrew	—	—	—	—	—	—
French	French	+.02	.00	-.09	+.02	-.12	+.02
German	German	.00	.00	.00	.00	+.01	.00
Spanish	Spanish	-.06	+.04	-.06	+.02	-.06	+.02
English Composition:							
Without essay	Regular English*	-.03	+.02	-.05	+.04	-.04	+.03
With essay	Regular English*	-.03	+.04	-.05	+.03	-.04	+.03
Essay section	Regular English*	-.04	+.04	-.04	+.02	-.04	+.03
Objective section	Regular English*	-.03	+.04	-.05	+.03	-.04	+.02
Essay increment	Regular English*	.00	.00	.00	.00	.00	+.01
Math I or II	Calculus	-.05	+.05	-.06	+.08	-.06	+.07
Math II increment	Calculus	+.02	.00	+.01	.00	+.01	.00

* Includes regular English, writing, and reading/literature courses, but not advanced or remedial courses.

X. Summary

English Tests

The ECT was taken by virtually all Achievement Test takers (98 percent) in this study, about a quarter of which took it with an essay. The Literature Test was taken by 10 percent of the Achievement Test takers. The comparable 1998 national percentages for SAT II: Subject Test takers were higher for the Literature Test (20 percent) and lower for the Writing Test (90 percent).

Compared with use of the other Achievement Tests for admission, there was relatively high predictive effectiveness for both the ECT (correlations of .38 for predicting course grade and .51 for predicting FGPA) and the Literature Test (correlations of .33 and .48). The ECT without essay had higher correlations than the ECT with essay for predicting both course grade (by .05) and for predicting FGPA (by .02).

In using the ECT with essay for admission, the essay increment in correlation over the objective section was almost nonexistent (+.01 for course grade and .00 for FGPA). In contrast, the objective section increment in correlation over the essay was +.15 for course grade and +.21 for FGPA.

To predict English course grade for placement, in general, when both SAT verbal and SAT mathematical scores were used together, the SAT had higher correlations than the ECT. In writing courses, the ECT had higher correlations than the SAT verbal score, when used without the mathematical score.

The ECT with essay was most useful for predicting the course grade of remedial English courses (higher correlations than the ECT without essay by .06 – .13). The ECT without essay was more useful in regular English courses (higher correlations than the ECT with essay by .03 – .07).

Overall, for writing course grade, the essay increment in correlation over the objective section was only +.01. For students in the middle or lower academic composite groups, the increment was -.01.

For placement into reading/literature courses, the Literature Test had a relatively low correlation with course grade (.31), compared with placement

TABLE 66

Average Over- (-) and Underpredictions (+) (Actual–Predicted) for Each Achievement Test in Predicting Course Grade in Relevant Course Categories, by Ethnic Group, by College SAT Mean, Using the Prediction Equation for All Students in the Course

		American Indian			*Asian American*			*Black*			*Hispanic*			*White*		
Achievement Test	*Course Categories*	*High SAT*	*Med. SAT*	*Low SAT*	*High SAT*	*Med. SAT*	*Low SAT*	*High SAT*	*Med. SAT*	*Low SAT*	*High SAT*	*Med. SAT*	*Low SAT*	*High SAT*	*Med. SAT*	*Low SAT*
English Composition	Regular English*	-.25	-.21	-.06	+.03	.00	+.05	-.21	-.25	-.18	-.11	-.06	-.10	+.01	+.02	+.01
Literature	Regular Reading/Lit.	—	—	—	+.06	+.02	—	-.05	—	—	.00	—	—	.00	+.01	+.02
Mathematics I	Calculus	-.35	-.35	-.20	+.07	+.13	+.05	-.45	-.09	-.22	-.11	-.15	-.02	+.02	-.02	.00
Mathematics II	Calculus	—	-.49	+.50	+.16	+.18	+.06	-.34	-.34	-.41	-.24	-.08	-.11	-.01	-.04	-.04
American History	American History	—	—	—	—	-.17	+.06	-.20	+.15	+.09	—	+.06	—	+.02	+.01	-.01
European History	European History	—	—	—	—	—	—	—	—	—	—	—	—	.00	.00	.00
Biology	Biology	—	—	—	-.04	-.03	+.03	-.54	-.25	-.24	+.05	-.06	-.11	+.03	+.01	+.01
Chemistry	Chemistry	—	—	—	+.11	+.11	+.12	-.41	-.31	-.21	-.12	-.03	-.25	+.02	-.03	-.07
Physics	Physics	—	—	—	-.03	+.20	+.04	-.70	-.31	—	+.22	-.17	-.07	+.01	-.04	-.02
Latin	Latin	—	—	—	—	—	—	—	—	—	—	—	—	.00	—	—
Hebrew	Hebrew	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
French	French	—	—	—	+.07	+.16	-.01	-.19	-.32	+.06	-.04	-.26	.00	+.01	-.01	.00
German	German	—	—	—	—	.00	—	—	—	—	—	—	—	.00	.00	.00
Spanish	Spanish	—	—	—	+.10	+.03	+.12	-.13	-.22	-.14	-.05	-.10	-.05	+.02	+.02	+.01
English Composition:																
Without essay	Regular English*	-.24	-.20	-.12	+.04	.00	+.04	-.19	-.25	-.18	-.10	-.18	-.08	+.01	+.02	+.02
With essay	Regular English*	—	—	-.14	-.03	-.08	+.07	-.30	-.25	-.12	-.19	+.09	-.22	+.02	+.01	+.02
Essay section	Regular English*	—	—	-.19	-.07	-.09	-.01	-.29	-.27	-.20	-.17	-.05	-.30	+.02	+.02	+.07
Objective section	Regular English*	—	—	-.14	-.02	-.08	+.04	-.31	-.26	-.20	-.19	+.08	-.26	+.02	+.01	+.04
Essay increment	Regular English*	—	—	.00	-.01	.00	+.03	+.01	+.01	+.08	.00	+.01	+.04	.00	.00	-.02
Math I or II	Calculus	-.26	-.44	-.09	+.12	+.16	+.08	-.39	-.13	-.26	-.13	-.13	-.03	+.01	-.03	-.01
Math II increment	Calculus	—	-.09	+.11	+.05	+.03	+.03	+.06	-.04	-.04	-.02	+.02	-.01	-.01	-.01	-.01

* Includes regular English, writing, and reading/literature courses, but not advanced or remedial courses.

correlations obtained by other Achievement Tests. But the correlation increment over the SAT of +.09 was the highest for any non-language Achievement Test. The Literature Test was especially useful at colleges with relatively low SAT means, and worked best for students in the low academic composite regardless of the college SAT mean.

While their performance on all English or verbal tests was relatively low, students for whom English is not their best language performed better on the ECT than on the SAT verbal section, and, in turn, better on the SAT verbal section than on the TSWE. While only 3 percent of the Achievement Test takers for whom English is not their best language took the Literature Test, those who did also performed better on it than on the SAT verbal section.

While the higher relative performance on the ECT for students for whom English is not their best language was not associated with higher correlations with English course grade for these students, it was associated with a higher ECT increment in correlation over the SAT. Among all student groups, these students had the highest ECT increment of +.10 for general English courses.

Females also had higher relative performance on the ECT and on the Literature Test than on the SAT verbal section. While females did have higher ECT correlations with English grade, the higher ECT scores did not result in a higher ECT increment over the SAT than for males. But the higher relative performance on the Literature Test was associated both with a much higher correlation with reading/literature course grade and also a much higher increment in correlation over the SAT.

A student group with higher relative performance on the ECT that was associated with both a higher ECT correlation with English course grade and also a higher ECT increment over the SAT was Asian American students.

Both Hispanic and black students who took the ECT with essay performed much better on the essay section than on the objective section. While there were insufficient numbers of students taking the same class to evaluate prediction of writing course grade for Hispanic students, there were sufficient numbers of black students taking the same course to indicate that their high relative performance on the essay was not associated with a higher essay increment in correlation over the objective section: the increment was a large negative (-.14) for 37 students in writing courses.

Mathematics Tests

At least one of the two mathematics Achievement Tests was taken by 95 percent of the Achievement Test takers in this study: 75 percent taking Mathematics Level I and 27 percent taking Mathematics Level II, with 7 percent taking both. Mathematics Level II was more likely taken for a college with a relatively high SAT mean. The 1998 national percentages for SAT II: Subject Test takers indicated a shift from Mathematics Level I (from 73 percent in 1985 to 63 percent in 1998) to Mathematics Level II (from 23 percent in 1985 to 33 percent in 1998).

For admission, Mathematics Level II had the highest correlations of all the Achievement Tests: .44 with course grade and .58 with FGPA. Mathematics Level I had the second (for course grade) and third (for FGPA) highest correlations. Use of the Mathematics Level I or II combination increased the correlations by .02 over those for Mathematics Level I used alone.

For placement, the mathematics Achievement Tests had higher correlations with mathematics course grades than the SAT mathematical score. The placement correlations were among the highest of all the Achievement Tests, especially at colleges with relatively high SAT means.

When the SAT verbal score was used with the SAT mathematics score, the SAT had slightly higher correlations with the mathematics course grade than the mathematics Achievement Tests. The increments in correlation over the SAT for the mathematics Achievement Tests were +.04 to +.06, higher than for English placement, but lower than for foreign language, science, and history placement.

Test-taking rates for the mathematics Achievement Tests were highest for Asian American students and students for whom English is not their best language, in both cases especially for the Mathematics Level II Test. Compared with their performance on the SAT mathematics section, these groups of students performed very well on the mathematics Achievement Tests. Associated with their high relative performance, students for whom English is not their best language also had the highest correlation increment of +.11 over the SAT, for mathematics course grade, among all student groups. Despite high relative performance on the mathematics Achievement Tests, their actual mathematics grades were substantially higher than predicted: the error in prediction on average was an underprediction of +.19, along with the sciences among the largest underpredictions for these students.

Females had lower mathematics test-taking rates than males. Among all of the Achievement Tests, the most underprediction for females in using the test to predict the course grade in the subject area was for the mathematics tests: +.08 for Mathematics Level I and +.07 for the Mathematics Level I and II combination.

Students in the high academic composite had higher mathematics test-taking rates, especially for Mathematics Level II, than students in the low academic composite. Compared with their SAT scores, students in the high academic composite performed less well on these tests. But their correlations with mathematics course grade were the highest among all student groups.

Black students were more likely to take the Mathematics Level I Test than the Level II test. Compared with their performance on the SAT mathematics section, they performed relatively well on the mathematics Achievement Tests. While the correlation with mathematics course grade for these students was the lowest among all student groups, the correlation increment above the SAT mathematical score was above average.

History Tests

Almost one-third of all the Achievement Test takers in this study took the American History Test (31 percent). The correlations for admission of .35 for course grade and .47 for FGPA were approximately in the middle among all Achievement Tests: slightly lower than those for mathematics, science, and English tests, and much higher than those for foreign language tests.

Only 2 percent of all the Achievement Test takers in this study took the European History and World Culture Test. The correlations for admission of .20 for course grade and .28 for FGPA were among the lowest of all the Achievement Tests.

For placement, the correlation between the American History Test and American history course grade was .30. While it was slightly above the correlation of .29 for the SAT verbal score, it was well below the correlation of .35 when both the SAT scores were used. The American History Test correlation was lower at colleges with relatively high SAT means (.23) than at colleges with medium or low SAT means (.33 – .34).

Without and with SAT scores, the placement correlations for the American History Test were well below correlations for English, mathematics, and science placement. But the +.06 increment in correlation for the American History Test (from .35 for the SAT alone to .41 for the American History and SAT combination) was slightly higher than corresponding increments for mathematics and English placement. The American History correlation increment was higher at colleges with low SAT means (+.09) than at colleges with medium or high SAT means (+.05 to +.06).

The American History Test was taken more frequently by American Indian (47 percent) and Asian American (41 percent) Achievement Test takers and less frequently by Hispanic Achievement Test takers (21 percent). It was also taken more by students at less selective colleges (44 percent of Achievement Test takers) than at more selective colleges (22 percent), and more by males (36 percent) than by females (26 percent).

In addition to taking the American History Test more frequently, Asian American students had moderately high performance on the test compared with their SAT verbal scores. The students who had much higher relative performance on both history tests compared with their SAT verbal scores were those for whom English is not their best language, obtaining higher standard scores by .65 for the American History Test and .75 for the European History Test. For both Asian American students and students for whom English is not their best language, among the 9 (Asian American) or 11 (English not best language) Achievement Tests with sufficient data, the American History Test was one of only two tests (Biology was the other) for which there was overprediction of relevant course grade.

The students with the lowest relative performance on both history tests, compared to their SAT verbal score, were females, who had lower standard scores by .16 for the American History Test and .32 for the European History Test. As noted, the female American History test-taking rate was well below that of males.

Science Tests

The science test-taking rates for the Achievement Test takers in this study were Biology 19 percent, Chemistry 17 percent, and Physics 7 percent. National rates from 1985 to 1998 increased slightly for Physics and Chemistry, but remained the same for Biology.

For admission, the Chemistry Test had a correlation of .58 with FGPA, which, with Mathematics Level II, was the highest among all Achievement Tests, and was the same as the full Achievement Test average. Chemistry had the third highest correlation with course grade, after Mathematics Level II and Mathematics Level I. The admission correlations for Biology and Physics were somewhat lower, but above average among the Achievement Tests.

Without the SAT, the placement correlations, with corresponding science course grade, were at the same level as the correlations for the mathematics tests. With the SAT, the placement correlations were the highest of all Achievement Tests.

Even though the science Achievement Tests were highly correlated with the corresponding science course grade, the SAT (verbal combined with mathematics) was about equally correlated with the science course grade for physics and was even more highly correlated for biology and chemistry.

Among the science Achievement Tests, the highest placement correlations were for the Chemistry Test. Among the types of science courses, the highest placement correlations were for advanced courses in any of the sciences. Without the SAT, the correlation between the Chemistry Test and the advanced chemistry course grade was .60. With the SAT, the correlation rose to .75!

The science test-taking rates for Achievement Test takers were much higher for colleges with relatively high SAT means (27 percent for Biology and Chemistry, and 11 percent for Physics) than for colleges with relatively low SAT means (12 percent for Biology, 8 percent for Chemistry, and 3 percent for Physics). But for the science test-taking students at colleges with relatively low SAT means, the science test correlation increment over the SAT for placement was exceptionally high for Physics (+.22), and also was relatively high for Biology (+.10) and Chemistry (+.09).

While students for whom English is not their best language had relatively low test-taking rates for Biology, they had high rates for Physics and Chemistry. Their relative performance on these tests, compared with their SAT scores, was also very high, by .71 of a standard deviation for Physics and by .64 of a standard deviation for Chemistry. Although there were insufficient numbers to determine the placement predictive effectiveness of the Physics Test for these students, the Chemistry Test produced a high correlation increment of +.11 for them. Their high relative performance on the Chemistry Test was associated with higher predictive effectiveness.

The Biology Test was one of only two Achievement Tests that overpredicted the relevant subject course grade for students for whom English is not their best language (overprediction of -.20); the American History Test (-.07) was the other. This was also true for Asian American students, but by only -.01 for the Biology Test and -.05 for the American History Test.

The Physics Test had a large discrepancy in test-taking rate by sex, with 12 percent of the male Achievement Test takers taking it compared with only 3 percent of the females. For those females that did take it, their relative performance, compared with their SAT scores, was lower, by .30 of a standard deviation. But the correlation increment for physics placement over the SAT was higher for females (+.09) than for males (+.07). The Biology Test was the only Achievement Test that overpredicted the relevant subject course grade for females (by -.01).

Hispanic and American Indian test-taking rates were about half the overall rates for all three sciences. But the rates for black Achievement Test takers were only slightly below average. Compared with their SAT scores, black students had high relative performance on each of the science tests, by .33 of a standard deviation for Physics, .30 for Chemistry, and .25 for Biology. But, while there were insufficient numbers of students to evaluate the predictive effectiveness of Physics or Biology for the placement of black students, the correlation between the Chemistry Test and the chemistry course grade, without or with the SAT, was relatively low for black students. The correlation increment over the SAT was also relatively low for the Chemistry Test, indicating that higher relative performance by black students on the Chemistry Test was not associated with a higher than average increase in predictive effectiveness. The three science tests produced the largest overpredictions of relevant subject course grade among all Achievement Tests for black students (by .37–.47), especially at colleges with relatively high SAT means (by .41–.70).

Foreign Language Tests

Among the Achievement Test takers in this study, Spanish was taken by 16 percent, French 14 percent, German 2 percent, Latin 2 percent, and Hebrew 0.1 percent. Students at more selective colleges were more likely to take French, German, and Latin. National rates from 1985 to 1998 showed stability for Spanish (at 13 percent) and a shift from French (12 percent to 7 percent) and German (2 percent to 1 percent) to the new language tests of Chinese (2 percent), Japanese (0.5 percent), and Italian (0.2 percent).

For admission, the foreign language tests had the lowest correlations with relevant course grade of all the Achievement Tests. The Spanish Test had the lowest correlation of .14 with course grade and .17 with FGPA.

For placement, the Spanish and French tests had higher correlations with relevant course grade than the SAT verbal score (there was insufficient data for the other foreign language tests). Interestingly, the SAT mathematical score also had higher correlations than the SAT verbal score. When the SAT scores were both used, the correlations were higher than those for the Spanish and French Tests. But without and with the SAT, the Spanish and French correlations were at the lowest level of all Achievement Tests, comparable to American History and Literature.

However, despite relatively low correlations with relevant course grade, the predictive capabilities of the Spanish and French tests were relatively independent of those of the SAT. The correlation increments over the SAT were well above those for all other Achievement Tests. This was especially true for the Spanish Test, for which the increment in entry-level courses was a very high +.15 and the increment in beyond entry-level courses was an even higher +.16. The latter increment was an almost unbelievable +.25 at colleges with relatively low SAT means (.43 for the SAT–Spanish correlation compared to .18 for the SAT). For both Spanish and French, the correlations were higher for entry-level courses than for beyond entry-level courses, but the Achievement Test correlation increments over the SAT were about the same.

More than half of all Hispanic Achievement Test takers took the Spanish Test, triple the rate of Achievement Test takers in general. Hispanic students had lower than average test-taking rates for the other foreign language tests.

Students for whom English is not their best language had very high relative performance over their SAT scores on both the Spanish Test (by 1.82 standard deviations) and the French Test (by 1.53 standard deviations). Hispanic students in general had about as high of a relative performance on the Spanish Test (by 1.50 standard deviations), and a moderately high relative performance on the French Test (by .56 of a standard deviation). Hispanic students for whom English is not their best language had a higher relative performance on the Spanish Test by 2.58 standard deviations!

The grades of Hispanic students in beyond entry-level courses were not as high as their Spanish and French scores would indicate: they were overpredicted by -.07 using the Spanish Test and by -.10 using the French Test. On the other hand, students for whom English is not their best language performed even better than indicated by their Spanish and French scores: they were underpredicted by +.03 using the Spanish Test and by +.07 using the French Test.

The French Test was much more likely to be taken by females (20 percent) than males (8 percent). Asian American students were less likely to take the French or Spanish Test.

Students whose parents were not college graduates had higher relative performance over their SAT scores on the Spanish Test (by .50 of a standard deviation) and the French Test (by .17 of a standard deviation). Their high relative performance was associated both with high correlations with relevant course grade and high correlation increments over the SAT.

Academic Composite

Students in the high academic composite group were more likely to take the Mathematics Level II Test (38 percent) than students in the low academic composite group (17 percent). Students in the low academic composite

group were more likely to take the Mathematics Level I Test (82 percent) than students in the high academic composite group (66 percent). Overall, students in the high academic composite group were slightly more likely to take one of the mathematics tests (96 percent compared to 93 percent). They were also more likely to take the Chemistry Test (22 percent compared to 12 percent) and the Physics Test (10 percent compared to 5 percent).

Compared with their performance on the SAT, students in the low academic composite (defined partly by their SAT scores) performed relatively better on all Achievement Tests than on the SAT, especially on foreign language tests (by .22 to .48 of a standard deviation). These students also performed better on the ECT-essay section than on the ECT-objective section by .23 of a standard deviation.

For admission, HSGPA and SAT correlations were higher for the students in the high academic composite group than for students in the low academic composite group. This was especially true for the HSGPA correlation with FGPA, which was .75 for the high composite group, .64 for the middle composite group, and .47 for the low composite group. Among the three predictors HSGPA, the SAT, and the Achievement Test average, HSGPA had the highest correlations for the high and middle composite groups, but the correlations for the three predictors were almost identical for the low composite group (highest by a slight amount for the Achievement Test average). In contrast to HSGPA and the SAT, the Achievement Test average had a slightly higher correlation for the low composite group than for the high composite group. The improvement in correlation using mean course difficulty was also higher for the low composite group (+.11) than for the high composite group (+.04).

For English placement, the correlation increment for the ECT over the SAT was the smallest for the low academic composite and was the highest for the high academic composite group, especially in writing courses (+.04 compared with +.11). The increment in correlation for the ECT-essay section over the ECT-objective section was only positive (+.01) for the high academic composite group; for the middle and low academic composite groups it was -.01. High relative performance on the ECT for the low academic composite group was not associated with better predictive effectiveness. The opposite was true for the Literature Test: the low academic composite group had a higher correlation and a higher correlation increment, and therefore the higher relative performance was associated with better predictive effectiveness.

For mathematics placement, correlations with calculus course grade were higher for the high academic composite group than for the low academic composite group. On the other hand, correlation increments over the SAT were the same.

For American history placement, the correlation increment over the SAT for the low composite group was only +.04. It was +.18 or +.19 for the other composite groups.

For science placement, when each of the science Achievement Tests were used with the SAT, correlations for all three academic composite groups were high, in the .50–.62 range. High relative performance for the low academic composite group was associated with higher predictive effectiveness for Chemistry (correlation increment of +.11) and Biology (+.09), but not for Physics (correlation increment of only +.05).

For foreign language course placement, both SAT and Achievement Test correlations with beyond entry-level Spanish and French course grade were lower for the low academic composite group than for the high academic composite group. The high academic composite group had very high correlation increments over the SAT for the Spanish Test (+.21) and for the French Test (+.19).

Sex

Males more frequently chose to take the Mathematics Level II, American History, Physics, and Chemistry Tests. Females more frequently chose to take the French, Mathematics Level I, Spanish, and Literature Tests.

Compared to their SAT scores, females scored better on their Achievement Test average, by .05 of a standard deviation. Compared to their SAT verbal score:

- Females scored higher on the ECT by .10 of a standard deviation.
- Males scored higher on the history tests, by .18 of a standard deviation on the European History test and by .12 of a standard deviation on the American History Test.

For admission, almost all of the correlations between any predictor and FGPA were slightly higher for females. The correlation for both mathematics Achievement Tests were the same for males and females, but no full Achievement Test had a higher correlation for males. Only the ECT-essay section part score had a higher correlation for males (.30) than for females (.27). But the essay increment over the ECT-objective section was only +.01 for males, while it was -.01 for females.

For English placement, females had higher ECT correlations in all three types of English courses, but the ECT correlation increment over the SAT was higher for females only in writing courses. In reading/literature courses, the ECT correlation increment was the same

for males and females; in general English courses, it was higher for males. The higher relative performance on the ECT, compared with the SAT, for females was not necessarily associated with increased ECT predictive effectiveness. As for admission, the ECT-essay correlation increment over the ECT-objective section was +.01 for males and -.01 for females.

For use of the Literature Test in placement in reading/literature courses, the correlation was higher for females (.35) than for males (.23), and also the correlation increment over the SAT was much higher for females (+.10) than for males (+.02). Therefore, the higher relative performance of females on the Literature Test was associated with greater predictive effectiveness.

For mathematics placement, the combination of mathematics Achievement Tests had the same correlation (.54) and correlation increment over the SAT (+.05) for males and females.

For American history placement, the American History Test had a slightly higher correlation for females (.33) than for males (.30), but the same correlation increment over the SAT (+.08).

For science placement, the Biology Test had a higher correlation for females (.47) than for males (.32), but the Chemistry and Physics Tests had similar correlations for males and females. The correlation increment over the SAT was higher for females for the Chemistry Test (+.10) and the Physics Test (+.09) than for males (+.06 for Chemistry and +.07 for Physics), but the correlation increments were the same for the Biology Test (+.05).

For language placement, correlations by sex were the opposite for Spanish and French. For Spanish, females had a higher correlation (.33) than males (.19), and there was also a higher correlation increment over the SAT for females (+.14) than for males (+.09). For French, males had a higher correlation (.36) than females (.30), and there was also a higher correlation increment for males (+.17) than for females (+.09).

Among all SAT takers, there was underprediction of FGPA for females of +.09 using the SAT, +.02 using HSGPA, and +.06 using both. Among all Achievement Test takers, the underpredictions were lower: +.06 using the SAT, +.01 using HSGPA, and +.04 using both.

For the Achievement Test average, there was underprediction for females of +.05. When used with the SAT and HSGPA, it was +.03. When mean course difficulty was used also, the underprediction was reduced to +.01. At colleges with relatively high SAT means, the underprediction was further reduced to .00.

Among the individual tests, underprediction for females was highest for the Mathematics Level I Test (+.08) and there was overprediction for females for the Biology Test (-.01). For the science tests, there was relatively higher underprediction for females at colleges with a relatively low SAT mean (+.13 for Physics, +.06 for Chemistry, and +.02 for Biology), but there was overprediction for females at colleges with a relatively high SAT mean (-.03 for Chemistry, -.02 for Biology, and -.01 for Physics).

English Best Language

Compared with other students, students for whom English is not their best language favored the Spanish, Physics, and Chemistry Tests. They were less likely to take the Literature, ECT with essay, and Biology Tests.

Compared with their SAT scores, students for whom English is not their best language performed relatively well on all of the Achievement Tests (with the exception of Latin); their Achievement Test average was higher by .39 of a standard deviation over their SAT mean. They performed especially well on the Spanish Test (by 1.82 standard deviations), on the French Test (by 1.53 standard deviations), on the history tests (by .65–.75 of a standard deviation), and on the Physics (by .71 of a standard deviation) and Chemistry (by .64 of a standard deviation) Tests.

For admission, correlations with FGPA were generally lower for students for whom English is not their best language, especially for HSGPA (correlation of .49 compared with .59 for students for whom English is their best language). Among the predictors SAT mean, Achievement Test average, and HSGPA, the SAT mean had the highest correlation (.52) and HSGPA had the lowest correlation (.49) for these students, while the reverse was true for students for whom English is their best language. The 83 Hispanic students for whom English is not their best language had a huge increase in FGPA correlation of +.29 when using test scores with HSGPA (from .46 for HSGPA, adding +.17 to .63 when using the SAT, and then adding +.12 to .75 when using Achievement Tests) and an additional increase of +.11 when using information about the grading difficulty of chosen courses (from .75 to .86).

Among the individual Achievement Tests, those that had significantly lower correlations with FGPA for students for whom English is not their best language were French (.22 compared to .38), Physics (.38 compared to .52), Biology (.39 compared to .52), and ECT (.41 compared to .52). Two tests with almost the same correlations were Mathematics Level II, which had relatively high correlations for both groups (.57 compared to .58) and Spanish, which had relatively low correlations for both groups (.19 compared to .20).

For English, mathematics, and chemistry placement, while students for whom English is not their best

language had lower correlations with relevant course grade, the correlation increments over the SAT were much higher for these students. For the ECT, the increment was +.10 compared to +.03 for students for whom English is their best language. For the mathematics combination of Mathematics I and Mathematics II, the increment was +.11 compared to +.05. For the Chemistry Test, the increment was +.11 compared to +.06. For the ECT, Mathematics, and Chemistry tests, higher relative performance on these tests over the SAT for students for whom English is not their best language was associated with higher incremental predictive effectiveness. For history, biology, physics, and language placement, there were insufficient numbers of students for whom English is not their best language to obtain comparative predictive effectiveness information.

Even though students for whom English is not their best language obtained relatively high Achievement Test scores compared with their SAT scores, they obtained even higher course grades in quantitative courses than predicted by their Achievement Test scores in quantitative subjects. For these students, there was underprediction of relevant course grade by +.27 for the Physics Test, by +.19 for the Mathematics Level I Test, by +.19 for the Mathematics Level II Test, and by +.17 for the Chemistry Test. In contrast, there was overprediction of biology course grade by -.20 for the Biology Test. Given their ECT scores, they performed less well in reading/literature courses, with an overprediction of -.07, and better than expected in writing courses, with an underprediction of +.04.

Ethnic Groups

American Indian SAT takers from the low academic composite group were more likely to take Achievement Tests than those from the high academic composite group. American Indian Achievement Test takers were more likely to take the American History Test (47 percent compared to 31 percent for all students), and less likely to take the Chemistry (8 percent compared to 17 percent), French (6 percent compared to 14 percent), Biology (13 percent compared to 19 percent), and Physics (3 percent compared to 7 percent) Tests. They obtained a slightly lower Achievement Test average than SAT mean (by .07 of a standard deviation). For admission, they generally had the lowest correlations with FGPA for the standard predictors among the ethnic groups. Among the predictors HSGPA, the SAT mean, and the Achievement Test average, the highest correlation with FGPA was for HSGPA (.45), the lowest was for the Achievement Test average (.35), and the multiple correlation for the three predictors was .50. American Indian students had by far the largest increment in correlation for mean course difficulty of +.26. This increment raised the multiple correlation from .50, the lowest among the ethnic groups, to .76, the highest among the ethnic groups. There was a high overprediction of FGPA, -.21 for HSGPA and the SAT, with the Achievement Test average adding to it by -.09, to -.30. The addition of mean course difficulty slightly increased the overprediction for American Indian females, from .31 to .36, but reduced the overprediction substantially for American Indian males, from .23 to .07.

Asian American Achievement Test takers were more likely to take one of the two mathematics tests (99 percent compared to 95 percent for all students), especially the Mathematics Level II Test (38 percent compared to 27 percent). They were also more likely to take the American History (41 percent compared to 31 percent) and Physics (10 percent compared to 7 percent) Tests. They were less likely to take the French (9 percent compared to 14 percent) and Spanish (13 percent compared to 16 percent) Tests. Their relative performance on the Achievement Tests was at approximately the same high level as their performance on the SAT, although they performed somewhat higher on some specific Achievement Tests, such as Latin (by .54 of a standard deviation). For admission, they had the highest correlations with FGPA among the ethnic groups for the Achievement Test average (.58) and the SAT (.56). While the HSGPA correlation with FGPA of .55 was moderate, when HSGPA was used with the SAT the correlation had a large increase to .66. Among the ethnic groups, the correlation increment for mean course difficulty was the lowest (+.07) and the correlation increment for the Achievement Tests average was the highest (+.02). Correlations with FGPA were especially high for the Mathematics I (.58), Chemistry (.57), and Mathematics II (.53) Tests. The essay increment in correlation over the objective section in predicting FGPA was +.28 (from .30 to .58) for Asian American students for whom English is not their best language, but was only +.01 (from .45 to .46) for Asian American students for whom English is their best language. For placement, Asian American students generally had high Achievement Test correlations with relevant course grade and also high correlation increments for Achievement Tests over the SAT: in English, the ECT had relatively high correlations and correlation increments of .36 and +.04 for general English courses, .41 and +.06 for reading/literature courses, and .32 and +.06 for writing courses; in mathematics, the combination of Mathematics I and Mathematics II had a relatively high correlation of .53 for the mathematics course grade, with a correlation increment of +.07; in the

sciences, only the Chemistry Test had a high correlation without the SAT (.51) and with the SAT (.62), the Biology Test had a high correlation with the SAT (.69) but not without the SAT (.30), but all three sciences had large increments over the SAT (+.09 for Biology, +.08 for Chemistry, and +.08 for Physics). In predicting FGPA, there were underpredictions for Asian American Achievement Test takers using the SAT (+.04) and the Achievement Test average (+.05). Using HSGPA, there was a slight overprediction of FGPA by -.02 (in contrast to a slight underprediction for Asian American SAT takers of +.02). When the SAT, Achievement Test average, and HSGPA were used together, there was only a very slight underprediction of +.01. When mean course difficulty was also used, the underprediction increased to +.05. Using individual Achievement Tests for placement, there was generally slight to moderate underprediction of relevant course by +.02 to +.16 (an exception was overprediction of -.05 for the American History Test).

Black SAT takers from the low academic composite group were more likely to take Achievement Tests than those from the high academic composite group. Black Achievement Test takers were more likely to take the Mathematics Level I Test (81 percent compared to 75 percent for all students) and the Literature Test (15 percent compared to 10 percent). They were less likely to take the Mathematics Level II Test (16 percent compared to 27 percent), the Chemistry Test (12 percent compared to 17 percent), and the French Test (10 percent compared to 14 percent). Their relative performance was higher on the Achievement Tests than on the SAT (comparing means, by .07 of a standard deviation), especially for black students who took any of the science tests (by .33 of a standard deviation for Physics, .30 for Chemistry, and .25 for Biology) or math tests (by .22 for Mathematics Level II and .12 for Mathematics Level I). The main exception was for the Spanish Test, on which black students had lower performance by .17 of a standard deviation compared to their SAT verbal mean. Black students who took the ECT with essay performed better on the essay than on the objective portion of the test by .28 of a standard deviation. For predicting FGPA, the mean course difficulty had a very high increment in correlation of +.13 (+.17 for black males and +.11 for black females) over HSGPA, the SAT, and the Achievement Test average; without mean course difficulty, the multiple correlation was .67, relatively low compared with other groups. For both black males and black females, the Achievement Test average and the SAT mean had the same correlations for admission (.41 for males and .48 for females), which were higher than the correlations for HSGPA (.37 and .43). The increment in correlation for the Achievement Test average over the SAT and HSGPA was +.02, one of only two ethnic groups (the other was Asian American students) with an increment greater than +.01. The relatively high performance on the Achievement Tests by black students led to better FGPA prediction. The same was not true for the relatively higher performance on the ECT essay; the correlation with FGPA for the ECT-essay score was only .17, compared to .40 for the ECT-objective score, and the correlation increment of the ECT-essay score over the ECT-objective score was -.03, making prediction better if no use was made of the ECT-essay. This was especially true for black females, for which the correlation increment was -.13! For English placement, the ECT score had a very high increment over the SAT verbal score of +.26 in reading/literature courses, but an average increment of +.04 in the other English courses. For mathematics placement, the combination of Mathematics Level I and Mathematics Level II had a correlation increment of +.07 over the SAT mathematical score, which means that higher relative performance did result in higher incremental predictive effectiveness. Except for the American History Test (underprediction of +.01), Achievement Tests overpredicted the course grade of black students, especially the science and mathematic tests (by -.16 to -.47). Overprediction in the sciences was especially large at colleges with a relatively high SAT mean (-.70 for Physics, -.54 for Biology, and -.41 for Chemistry). For FGPA, the overprediction using HSGPA (-.34) exceeded that of using the Achievement Test average (-.26) or the SAT (-.27).

Hispanic SAT takers from the low academic composite group were more likely to take Achievement Tests than those from the high academic composite group. More than half of the Hispanic Achievement Test takers took the Spanish Test (52 percent compared to 16 percent for all students), and they were also more likely to take the Mathematics Level I Test (84 percent compared to 75 percent). They were less likely to take any of the other language tests, the Mathematics Level II Test, any of the science tests, or the American History Test. Their relative performance was much higher on their Achievement Test average than on the SAT (comparing means, by .36 of a standard deviation). While their relatively high performance was primarily due to their Spanish Test performance (higher by 1.50 standard deviations for all Hispanic students and higher by 2.58 standard deviations for Hispanic students for whom English is not their best language) and secondarily due to their French Test performance (higher by .56 of a standard deviation), they had relatively high performance on most of the Achievement Tests. Hispanic

students who took the ECT with essay performed better on the ECT-essay section than on the ECT-objective section, by .39 of a standard deviation. For predicting FGPA, HSGPA had a higher correlation (.50) than either the SAT (.45) or the Achievement Test average (.42). While the majority of Hispanic Achievement Test takers, those for whom English is their best language, had an increment in FGPA correlation from Achievement Tests of only +.01, after an SAT increment over HSGPA of +.06 (a total of +.07), the 83 Hispanic Achievement Test takers for whom English is not their best language had an Achievement Test increment of +.12, after an SAT increment of +.17, bringing the total test increment over HSGPA to +.29, from .46 to .75 (to .86 by also including information about the grading strictness of courses taken). Achievement Tests predicted the FGPA of the full Hispanic group less well than for other ethnic groups, especially the Spanish Test (correlation of only .06) and the French Test (.15). In general, high Achievement Test performance was not associated with better FGPA predictive effectiveness. One exception was the Physics Test (correlation of .51). Higher Hispanic performance on the ECT-essay section than on the ECT-objective section did lead to better FGPA predictive effectiveness: the correlation for the ECT-essay section (.29) was higher than the correlation for the ECT-objective section (.26), and the correlation increment for the ECT-essay section over the ECT-objective section was +.07, very high compared to other groups. For predicting English grade, the full ECT had mixed results for Hispanic students: in general English courses, the correlation of .42 was the highest among all groups, but the increment over the SAT was a modest +.04; in writing and reading/literature courses the correlations were lower (.22 and .13 respectively) and the correlation increment was high (+.09) for writing courses and .00 for reading/literature courses (41 students). For predicting mathematics course grade, the combination of Mathematics Level I and Mathematics Level II had a relatively low correlation of .38, but a relatively high correlation increment of +.08 over the SAT. Therefore, the relatively high performance on the mathematics Achievement Tests was associated with increased predictive effectiveness. There was moderately high overprediction of Hispanic grades for most of the predictors: -.25 for HSGPA, -.23 for the Achievement Test average, -.14 for the SAT, and -.03 to -.12 for the individual Achievement Tests. One exception was the underprediction of +.03 for the American History Test.

In general, **white** students performed slightly better on the SAT than on Achievement Tests. Because of competition with Hispanic students, white students averaged .33 of a standard deviation lower on the Spanish Test than on the SAT verbal section. For predicting FGPA and for placement, there were relatively high correlations for most predictors. For FGPA, the correlations were .59 for HSGPA, .56 for the Achievement Tests average, .53 for the SAT, .66 for the three predictors, and .74 for the three predictors plus mean course difficulty. White students were the only ethnic group for which the lowest of the three correlations was for the SAT. For the individual Achievement Tests, correlations with FGPA and relevant course grade were also relatively high. There was slight underprediction of FGPA: +.04 for HSGPA, +.02 for the SAT, and +.02 for the Achievement Test average.

First Generation in College

Compared with students who have a college-graduated parent, first-generation college students took the Mathematics Level I Test (79 percent compared to 73 percent) and the Spanish Test (19 percent compared to 15 percent) more frequently. Students who have a college-graduated parent took the French (15 percent compared to 9 percent), Mathematics Level II (28 percent compared to 22 percent), Biology (20 percent compared to 15 percent), and Chemistry (18 percent compared to 14 percent) Tests more frequently. First-generation college students performed slightly better on their Achievement Test average than on the SAT, by .06 of a standard deviation. They performed especially well on their language tests, and also on their history tests, Physics, Chemistry, and Literature. Several of the individual Achievement Tests had lower correlations with FGPA for first-generation college students, compared with students who have a college-graduated parent, especially European History (.00 compared with .28), Spanish (.08 compared with .26), German (.17 compared with .27), and Latin (.17 compared with .38). For predicting the relevant language course grade, first-generation students had slightly higher correlations for Spanish (.33 compared with .32) and French (.41 compared with .29), but much higher correlation increments over the SAT: for Spanish +.26, compared with +.11; for French +.20, compared with +.12. The higher relative performance on these language tests did produce higher relative predictive effectiveness.

Predictive Effectiveness for Admission

Comparing admission correlations for SAT takers and Achievement Test takers, uncorrected correlations for the SAT and HSGPA were almost identical. But because

there was more range restriction for Achievement Test takers, correlations corrected for restriction of range were higher for this group, by .03 for the SAT–HSGPA multiple. For Achievement Test takers as well as for SAT takers, HSGPA was a relatively better predictor of FGPA, due to similarity of course selection in HSGPA and FGPA, and the SAT was a relatively better predictor of course grade. For Achievement Test takers, fully corrected (for shrinkage, restriction of range, and criterion unreliability) single-predictor correlations were about the same for HSGPA (.63 for FGPA and .57 for course grade), the Achievement Test average (.62 for FGPA and .57 for course grade), and the SAT (.60 for FGPA and .59 for course grade).

The test score multiple correlation for the SAT and the Achievement Test average was higher than the HSGPA correlation for predicting course grade, without correction (.51 compared to .45) and with correction (.63 compared to .57, when fully corrected), and for predicting FGPA without correction (.41 compared to .38). For predicting FGPA with correction, they were the same (.63 when fully corrected).

But the combination of HSGPA and either the SAT (HS) or the Achievement Test average (HA) outperformed the test score combination of the SAT and the Achievement Test average (SA). The fully corrected correlations to predict course grade were: .71 for HS, .69 for HA, and .63 for SA. The fully corrected correlations to predict FGPA were: .72 for HA, .71 for HS, and .63 for SA.

Using all three variables—HSGPA, the SAT, and the Achievement Test average—the fully corrected correlations were .73 for course grade and .72 for FGPA. For FGPA, when mean course difficulty was used as a fourth variable, the correlation rose to .79, about as high as could reasonably be expected.

When one predictor was dropped from these four predictors in predicting FGPA, the correlation loss was .09 for HSGPA and .07 for mean course difficulty, but was only .01 for the SAT and for the Achievement Test average. Eliminating the need for mean course difficulty by predicting a specific course grade, the fully corrected correlation loss for dropping both test score measures was .16, compared to .10 for HSGPA. It appears that the SAT and the Achievement Test average may be somewhat interchangeable for admission, but one or the other is necessary.

Among the individual Achievement Tests, the highest correlations with FGPA (corrected for shrinkage and restriction of range, but not for criterion unreliability) were for the mathematics tests, especially Mathematics Level II (.58). The lowest correlations were for the language tests, especially Spanish (.17). The ECT without essay had a higher correlation than the ECT with essay (by .05 for a specific course grade and by .02 for FGPA). The essay correlation increment over the objective section of the ECT with essay was only .01 for a specific course grade and was .00 for FGPA. In contrast, the objective correlation increment over the essay section was .15 for a specific course grade and .21 for FGPA.

Students in the high and middle academic composites had higher admission correlations, especially for HSGPA. For the low academic composite group, correlations were lower and correlations for HSGPA, the SAT, and the Achievement Test average were about the same. Because of less comparable course taking, the low academic composite group had a correlation increment for mean course difficulty of +.11, compared to +.07 for the middle academic composite group and +.04 for the low academic composite group.

Females generally had higher admission correlations than males, especially for the European History, Physics, Latin, and Spanish Tests. Male and female correlations were the same for both Mathematics I and Mathematics II Tests. While no Achievement Test had a higher correlation for males, the ECT-essay section did (.30 compared to .26 for females), and it had a higher correlation increment over the objective section (+.01 compared to -.01 for females).

Students for whom English is not their best language had their highest correlation for the SAT (.52), then for the Achievement Test average (.50), and then for HSGPA (.49); students for whom English is their best language had the reverse order. While the latter group had a much higher correlation for the ECT-objective section (.50) over the ECT-essay section (.29) and an essay correlation increment of .00, students for whom English is not their best language had a higher correlation for the ECT-essay section (.24) than for the ECT-objective section (.23) and a large essay correlation increment of +.13.

For HSGPA, the SAT, and the Achievement Test average, among the ethnic groups, white and Asian American students had higher correlations and American Indian students had lower correlations. But American Indian students had a huge correlation increment of +.26 for mean course difficulty, raising the multiple correlation with FGPA from .50 to .76, from the lowest to the highest among ethnic groups (other groups had correlation increments ranging from +.07 to +.13). Among the three main predictors: HSGPA had the highest correlation for American Indian, Hispanic, and white students; the Achievement Test average had the highest correlation for Asian American and black students. The latter two groups also had the highest correlation increment (+.02) for Achievement Tests, which

meant that relatively high Achievement Test performance did correspond with better incremental admission predictive effectiveness for them.

Predictive Effectiveness for Placement

Comparing correlations for relevant course grade (corrected for restriction of range and shrinkage), the highest placement correlations were for the science Achievement Tests (.38–.60 without the SAT and .49–.73 with the SAT) and the mathematics Achievement Tests (.39–.55 without the SAT and .49–.59 with the SAT). The highest science correlations were for the Chemistry Test in advanced chemistry courses (.60 without the SAT and .73 with the SAT). The highest mathematics correlation without the SAT was .55 for the combination of Mathematics I and Mathematics II in calculus courses. The highest mathematics correlation with the SAT was .59 for Mathematics II in regular mathematics courses. The lowest placement correlations were for the American History Test (.30 without the SAT and .41 with the SAT) and the Literature Test (.31 without the SAT and .43 with the SAT).

The language tests had the largest correlation increments over the SAT: the Spanish Test had increments of +.16 for entry-level courses and +.15 for courses beyond entry-level; the French Test had increments of +.11 for entry-level and beyond entry-level courses. These increments were substantially higher for students in the high academic composite group and students in the first generation of college. Despite a relatively low correlation, the Literature Test had a relatively high increment of +.09. While all but one science test increment was in the range of +.04 to +.08, the increment for the Physics Test in advanced physics courses was +.15. The smallest increments were for the ECT, ranging from +.03 to +.06 in eight of the nine types of English courses; the exception was +.08 for 105 students in 11 advanced writing courses. All of the placement correlation increments for Achievement Tests over the SAT in predicting relevant course grade were substantially larger than the admission correlation increment of +.01 for the Achievement Test average over the SAT in predicting FGPA.

In general, for each of the subject areas, the combination of SAT verbal and mathematical scores had a higher correlation with course grade than the relevant Achievement Test. When correlations for the SAT verbal score were compared with those for the relevant Achievement Test for English, history, and language courses, and correlations for the SAT mathematical score were compared with those for the mathematics Achievement Tests in mathematics courses, the differences were very small and were without any apparent pattern. One exception was that correlations with language course grade for the French and Spanish Tests were higher than those for the SAT verbal score, especially in entry-level courses.

Over- and Underpredictions

Female Achievement Test takers had small average underpredictions of FGPA using the SAT (+.06), Achievement Test average (+.05), TSWE (+.01), and HSGPA (+.01). When the SAT and HSGPA were used together, the underprediction was +.04. When Achievement Test average was also used, the underprediction was reduced to +.03. When average grade difficulty was also used, the underprediction was reduced to +.01, which was the same as use of the SAT and HSGPA combination to predict course grade for SAT takers at more selective colleges. For Achievement Test takers at colleges with higher SAT means, there was no over- (or under-) prediction of course grade for females..

When Achievement Tests were used for placement to predict relevant course grade, only one test produced an underprediction for females greater than the +.05 produced for Achievement Test average in predicting FGPA: it was +.08 for the Mathematics II Test. The next highest was +.05 for the Mathematics I Test. Four tests produced no over- (or under-) predictions for females: Chemistry, European History, Latin, and German. One produced a slight overprediction: -.01 for the Biology Test.

Students for whom English is not their best language performed better on Achievement Tests involving mathematics than indicated by their SAT math score. Nevertheless, their grades in these courses were even higher than predicted by these higher scores, resulting in average relevant course grade underpredictions of +.27 for Physics, +.19 for Mathematics I, +.19 for Mathematics II, and +.17 for Chemistry. These students also performed better in their writing courses than predicted by their ECT score, with an average underprediction of +.04, and performed less well in their reading/literature courses than predicted by their ECT score, with an average overprediction of -.07.

For each of the main individual predictors of FGPA, there were large overpredictions for black and American Indian students of from -.23 to -.41, especially large for TSWE. Hispanic students had somewhat more moderate overpredictions, especially lower for TSWE and the SAT. For black students, when HSGPA, the SAT, and the Achievement Test average were used together, they offset each other to help reduce the over-

prediction to -.17, and further to -.14 when mean course difficulty was also used. For American Indian students, the use of multiple predictors did not reduce the overprediction of FGPA (but use of mean course difficulty substantially reduced overprediction for American Indian males). With HSGPA and the SAT, the additive effect of the Achievement Test average was an increase in overprediction of -.09 for American Indian students and -.04 for Hispanic students, but there were very small additive effects for the other ethnic groups.

Differences Among Colleges

For admission, colleges with relatively high SAT means had higher, and approximately equal, FGPA correlations for the three main predictors: .63 for the Achievement Test average, .62 for HSGPA, and .61 for the SAT. The FGPA correlations were slightly lower for colleges with medium and relatively lower SAT means, with correlations for HSGPA (.59 for colleges with medium SAT means and .55 for colleges with lower SAT means) slightly higher than correlations for the Achievement Test average (.55 for colleges with medium SAT means and .54 for colleges with lower SAT means) and the SAT (.53 for colleges with medium SAT means and .52 for colleges with lower SAT means).

Colleges with lower SAT means had a higher correlation for average course grade difficulty (.17, compared to .10 for colleges with higher SAT means and .09 for colleges with medium SAT means). Especially at these colleges, because of greater grading variability among courses, taking courses with easier grading resulted in a higher FGPA. At these colleges, the increase in correlation over the other predictors was +.09 for average course grade difficulty (average grade mean residual), the same increase in correlation as for HSGPA over the combination of the SAT, the Achievement Test average, and the average course grade difficulty.

For placement, the American history course grade was more difficult to predict at colleges with higher SAT means using the American History Test (correlation of .23), the SAT (.29), or both (.35), compared to colleges with medium SAT means (.34, .37, and .42 respectively) and colleges with lower SAT means (.33, .37, and .46 respectively). The Literature Test was especially effective at colleges with relatively lower SAT means, with a course grade correlation of .58 and a correlation increment over the SAT of +.12, compared with .26 and +.07 for colleges with medium SAT means and .27 and +.09 for colleges with higher SAT means. Colleges with lower SAT means also had the largest correlation increments over the SAT in predicting relevant course grade for the science Achievement Tests: +.09 for Chemistry (from .57 to .66), +.10 for Biology (from .49 to .59), and especially +.22 for Physics (from a low correlation of .31 using the SAT to .53). In addition, these colleges had a very high correlation increment of +.18 over the SAT in predicting Spanish course grade for the Spanish Test, from .25 to .43.

Average underprediction of course grade for females using HSGPA, the SAT, and the Achievement Test average was +.02 at colleges with lower SAT means, +.01 at colleges with medium SAT means, and .00 at colleges with higher SAT means. The average underprediction of relevant science course grade for females at colleges with lower SAT means was +.13 for the Physics Test, +.06 for the Chemistry Test, and +.02 for the Biology Test. At colleges with medium SAT means, the science test underpredictions were substantially lower or eliminated: underprediction of +.03 for the Physics Test, underpediction of +.02 for the Chemistry Test, and overprediction of -.01 for the Biology Test. At colleges with higher SAT means, there were only average overpredictions for females of relevant science course grade: -.01 for the Physics Test, -.03 for the Chemistry Test, and -.02 for the Biology Test.

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Appendix A: Colleges Participating in the Study

Arizona State University
Auburn University
Boston College
Bryant College
Bucknell University
California State University, Sacramento
Carleton College
Colby College
Colgate University
Columbia University
Dartmouth College
Dickinson College
Duke University
Franklin and Marshall College
George Washington University
Harvard University
La Salle University
Lehigh University
Marquette University
Mary Washington University
Mount Holyoke College
New Hampshire College
Ohio State University
Saint Michael's College
Suffolk University
Susquehanna University
Swarthmore College
University of California, Berkeley
University of California, Los Angeles
University of Maryland, Baltimore County
University of Maryland, College Park
University of North Carolina, Chapel Hill
University of Southern California
University of Texas, Austin
University of Washington
Vanderbilt University
Wellesley College
Wesleyan University
Whitman College

Appendix B: Course Categories

Advanced mathematics (Postcalculus)
Calculus
Precalculus
Remedial mathematics
Regular mathematics (other than 1–4)
English–advanced
English–regular
English–remedial
Reading/literature–advanced
Reading/literature–regular
Reading/literature–remedial
Writing/composition–advanced
Writing/composition–regular
Writing/composition–remedial
Biological sciences–advanced
Biological sciences–introductory with laboratory or for majors
Biological sciences–introductory with no laboratory and for nonmajors
Physics/engineering–advanced
Physics/engineering–introductory with laboratory or for majors
Physics/engineering–introductory with no laboratory and for nonmajors
Chemistry–advanced
Chemistry–introductory with laboratory or for majors
Chemistry–introductory with no laboratory and for nonmajors
French–beyond entry level
French–entry level
German–beyond entry level
German–entry level
Hebrew–beyond entry level
Hebrew–entry level
Latin–beyond entry level
Latin–entry level
Spanish–beyond entry level
Spanish–entry level
American history
World history