

# The Use of Admissions Tests by the University of California

*A Discussion Paper Prepared by the Board of Admissions and Relations with Schools:*

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## ***I. Introduction***

As part of its general responsibility to set undergraduate admissions policy, the Board of Admissions and Relations with Schools of the University of California's Academic Senate (BOARS) is charged with determining how examinations will be used in the establishment of eligibility and admission to the University.<sup>1</sup> In keeping with this responsibility, BOARS recommended the addition of admissions test scores to the University's eligibility requirements more than forty years ago. Since then, the use of admissions tests has been reconsidered on several occasions and the specific role that test scores play in determining eligibility has been adjusted. However, in the view of the current members of BOARS, the broad policy questions surrounding the appropriate use of admissions tests at the University have not been fully studied in many years; indeed it can be argued that they have never been studied fully enough.

This paper is the result of intensive review of the University's current use of admissions tests that BOARS began in February 2001. The immediate impetus for this work was the February 15, 2001 request by UC President Richard Atkinson that the faculty reconsider UC's current testing policy.<sup>2</sup> However, in many ways this paper has its roots in discussions begun in the mid-1990's that led to BOARS' 1999 recommendation—effective with the freshman class entering in fall 2001—that the University of California revise its Eligibility Index to place twice as much weight on the SAT II as on the SAT I. BOARS made this recommendation following analysis of a validity study conducted in 1998<sup>3</sup> that concluded that the SAT II tests, taken together, were better predictors of first-year UC GPA than the combined SAT I math and verbal tests (see section III for more information on this study). The question of the appropriateness of admissions tests has also come up frequently in public

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<sup>1</sup> Standing Order of The Regents 105.2 delegates to the Academic Senate authority for "determin[ing] the conditions of admission." Academic Senate Bylaw 145.B.3 includes among the duties of BOARS "determin[ing] the basis of the examinations used to satisfy admissions requirements."

<sup>2</sup> Richard C. Atkinson to Michael Cowan, February 15, 2001.

<sup>3</sup> Kowarsky, J., Clatfelter, D. and Widaman, K. (1998). *Predicting University Grade-Point Average in a Class of University of California Freshmen: An Assessment of the Validity of A-F GPA and Test Scores as Indicators of Future Academic Performance*. Oakland, California: UC Office of the President.

discussion of the University's admission processes and was the subject of substantial discussion at a Universitywide full-day meeting on admissions on December 7, 2000.

### Goals of BOARS' Reassessment of UC's Use of Admissions Tests

In reconsidering the use of admissions tests by UC, BOARS sought to:

1. Understand the historical and philosophical background of UC's use of admissions tests, including the principles that led to the original decision to include test scores in the determination of eligibility and selection and that should guide their future use;
2. Examine carefully the statistical justifications for the use of admissions tests, including their usefulness in predicting undergraduate performance at UC;
3. Consider carefully the policy implications of the University's admissions test requirement—in particular its relationship to the college preparatory work students undertake in high school—and identify desirable policy goals for UC's use of particular tests to fulfill that requirement;
4. Evaluate the degree to which existing test options meet the needs of the University's faculty and students; and
5. Draw conclusions and make recommendations regarding the future use of admissions tests for the purposes of both eligibility and selection at specific UC campuses and lay the groundwork for a broader faculty dialog on these issues.

In the coming decade, the University faces a substantial increase in student demand for places at all of its campuses. As we enter this period of increased demand, it seems particularly important that we reassure ourselves that the means by which we determine which of California's students will be offered the opportunity of a UC education are as educationally sound as possible.

### Current Use of Tests at UC

The University of California currently requires applicants to present scores on the following admissions tests:

1. A general test of language arts and mathematics that can be met in one of two ways:
  - a) SAT I. The SAT I is a three-hour test of "critical reading and problem solving"<sup>4</sup> ability that is developed by the Educational Testing Service (Princeton, New Jersey) and administered by the College Board (New York City). Students taking the SAT I receive two scores, one in verbal reasoning and one in math reasoning.

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<sup>4</sup> The College Board, *What Does the SAT Measure and Why Does It Matter?*, (2001) p.4.

- b) ACT. The ACT Assessment is a three-and-a-half hour test described by its creator, ACT, Inc. (Iowa City, Iowa) as a “curriculum-based achievement test designed to assess students’ critical reasoning and higher order thinking skills in four core content areas: English, mathematics, reading, and science reasoning.”<sup>5</sup> Students taking the ACT receive sub-scores in the four disciplines covered as well as a combined total.

At present, approximately 73% of UC applicants take the SAT I. Roughly 25% take both the SAT and the ACT and about 2% take the ACT alone. Composite scores on the SAT I and ACT are highly correlated with one another and concordance tables enable the University and others to convert scores on one test to equivalent scores on the other, allowing either test to be used in the UC Eligibility Index, described below.

2. SAT II subject examinations in writing, math (level 1 or level 2), and a third area of the student’s choice. The SAT II’s, formerly known as the College Entrance Examination Board (CEEB) Achievement Tests, are designed by the Educational Testing Service and administered by the College Board. Each SAT II is a one-hour multiple-choice<sup>6</sup> achievement-type test designed to assess mastery of high-school level work in one of 21 different fields, including the natural and social sciences, languages and literature, writing, and two different levels of mathematics.

UC uses scores from these tests in several ways. First, all students are required to present a combination of high school GPA and test scores that meets the minimum requirements of the “Eligibility Index,” a weighted scale that pairs test scores with grades so that high test scores can balance out lower grades and vice versa. The Eligibility Index is composed of the total of each student’s three SAT II scores, times two, plus the total SAT I combined Math and Verbal score or ACT equivalent. At present, UC eligibility is sufficient for admission to two campuses, while the other six employ additional selection guidelines and criteria. Each campus has designed a selection system that evaluates academic achievement consistent with faculty-approved Universitywide guidelines<sup>7</sup> and with the unique academic environment of the campus.

Finally, SAT II scores in particular fields are used for placement purposes Universitywide as well as in various campus departments. For example, a student receiving a score of 680 or above on the SAT II writing examination is considered to have fulfilled the Universitywide writing and composition (“Subject A”) requirement, which students on all campuses must meet before they graduate. This paper focuses on the first two purposes, eligibility and selection.

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<sup>5</sup> ACT Inc., *College Admissions Assessment: Debunking Myths and Misrepresentations*, Iowa City, Iowa (no date).

<sup>6</sup> In addition, the SAT II Writing exam includes a written sample and several of the language tests have optional listening sections.

<sup>7</sup> *Guidelines for Implementation of Universitywide Policy on Undergraduate Admissions*, University of California Office of the President, 2001.

## ***II. Historical Background for the Use of Admissions Tests at UC***

### *A Brief History of Standardized Admissions Tests*

The admissions tests used today by the University of California (and most selective colleges and universities in the United States) trace their heritage from two distinct lines: (1) written examinations required historically for entrance into private colleges; and (2) aptitude tests that grew out of changing social needs and notions of intelligence in the late 1800's and were designed to provide a means of sorting large numbers of people into appropriate occupational or intellectual categories and, therefore, contributing to the efficient organization of democratic society.

Through the nineteenth century, college entrance examinations had traditionally been oral tests administered by traveling examiners and restricted generally to the eastern seaboard. After the turn of the century, these tests underwent a transformation to written examinations administered on a regional basis and capable of reaching a much broader audience. The College Board, then the College Entrance Examination Board, was formed in 1900, as one of these regional agencies, serving the private colleges of the Northeast and their "feeder" college preparatory secondary schools, also generally private. Throughout the first three decades of the twentieth century, the "college boards" were week-long essay examinations of the curriculum provided in elite boarding schools.<sup>8</sup>

This model began to shift in the 1930's, as a result of the introduction of the SAT (at that time an abbreviation for "Scholastic Aptitude Test;" the SAT was later renamed "Scholastic Assessment Test" and then later became simply the "SAT I"), which was first administered by the College Board in 1926. The SAT was created from intelligence tests developed in the late 1800's and early 1900's and first administered on a large scale to army recruits during World War I. In the early 1930's, it attracted the attention of then-President of Harvard James Bryant Conant, who was searching for a means to identify highly talented young men from obscure backgrounds who nonetheless would succeed at Harvard. By this time the original creator of the SAT, Carl Campbell Brigham, had begun to express deep reservations about the notion of testing innate abilities and had come to advocate achievement tests over aptitude tests.<sup>9</sup> Conant believed, however, that tests of achievement would always favor those who had the financial resources to attend the best preparatory schools and saw in the SAT a tool for restructuring society by counterbalancing the benefits of inherited privilege in favor of innate talent.

Beginning in 1934, Harvard used the SAT to award scholarships, though the traditional entrance examinations were still administered as admissions tests. During the same period, the College Board developed a series of hour-long multiple choice achievement tests (the antecedents of today's SAT II) to replace the essay examinations. By the late 1930's the combination of the SAT I and the achievement tests was administered at hundreds of test sites around the country, although the written essay examinations were also still in wide use.

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<sup>8</sup> Lemann, Nicholas (1999), *The Big Test: The Secret History of the American Meritocracy*. New York: Farrar, Straus and Giroux. p. 28.

<sup>9</sup> Lemann, p.33.

It was not until World War II that the traditional written examinations were abandoned. In 1948, with strong support from Conant, the Educational Testing Service (ETS) was formed as a central testing agency for the entire nation, and the College Board turned its test development activities over to ETS. Throughout the 1950's, the SAT I maintained its close link to intelligence tests and the number of SAT takers grew rapidly.

Although a belief in the value of aptitude tests in general and the SAT in particular pervaded most of higher education in the 1950's, some educators were concerned both about the monopolistic dominance of the Educational Testing Service and the possible shortcomings of aptitude-type tests. In 1959, University of Iowa Professor E.F. Lindquist, a noted psychologist and developer of the Iowa State achievement tests, formed a rival testing company, American College Testing (ACT Inc.). Lindquist was a believer in expanding the numbers of Americans attending college and created the ACT as an achievement-type admissions test designed to provide diagnostic information that would enable students to prepare themselves for college and aid colleges in placement as well as admissions.<sup>10</sup> The ACT quickly gained popularity among public universities and in the midwest and the south, while the SAT continued to be seen as the test of choice in the northeast and for more elite private institutions. Today, the ACT is widely accepted by both public and private institutions as an alternative to the SAT I.

*The Adoption of Admissions Tests by the University of California*<sup>11</sup>

In the mid-1950's, BOARS first began serious consideration of the use of standardized tests in establishing eligibility for the University of California. Up until the 1920's, UC could accommodate most students who applied, and they were admitted based upon graduation from UC-accredited high schools, performance on a set of examinations, or recommendation from their high school principal. By the 1930's, students were required to complete a specific set of high school courses and grades in these courses were considered in determining eligibility. During this period the Academic Senate considered—and rejected—the use of standardized admissions tests.<sup>12</sup>

By the 1950's, the University was confronting serious problems associated with growth. The GI Bill had increased enrollments significantly and the baby boom generation had already entered the school system. A 1955 statewide planning study suggested the consideration of the use of “aptitude and achievement” tests. In 1957, BOARS agreed to run a series of experiments with the SAT I, designed to assess whether (1) the test improved prediction of freshman grades; (2) it could be used to assess grade inflation; and (3) it could be used to help manage enrollment growth. With the support of ETS, the SAT I was administered to all freshmen entering UC in the fall of 1960. BOARS concluded that the study did not indicate

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<sup>10</sup> Lindquist, E.F. (1958), *The Nature of the Problem of Improving Scholarship and College Entrance Examinations*, presented at the ETS Invitational Conference on Testing Problems, November 1, 1958.

<sup>11</sup> BOARS is indebted to John Douglass, senior research fellow at the Center for Studies in Higher Education at UC Berkeley, for the comprehensive and thoughtful analysis of the historical record provided in *Setting the Conditions of Undergraduate Admissions: the Role of University Faculty in Policy Making* (University of California Academic Senate, 1977). We have drawn extensively from Douglass's work for this section of our paper, which he graciously agreed to review for accuracy.

<sup>12</sup> Douglass, personal communication, January 23, 2002.

any additional predictive power associated with the SAT I. A subsequent study of achievement tests showed a better correlation with freshman GPA, but not enough to convince the Academic Assembly of the value of adopting an admissions test requirement.<sup>13</sup>

By the mid-1960's, however, this situation had changed. Eligibility studies conducted in 1965 and 1966 estimated that the University was significantly out of compliance with the eligibility cap of 12.5% imposed by the California Master Plan for Education (adopted in 1960). Adopting an admissions test requirement was seen as a “relatively easy” means of reducing the size of the pool. In supporting the use of admissions tests to reduce the size of the eligibility pool, John Grant, chair of BOARS at the time, wrote,

“All of our studies indicate that the best single predictor of academic success in college is a satisfactory grade-point record...but that the addition of test scores will yield a statistically significant improvement in predictability. In addition, their use would tend to reduce the inequities resulting from differences among school marking systems, and thus would be in the interest of the applicant.”

In 1968, the Academic Assembly accepted BOARS' recommendation that the University require the SAT I and three achievement (SAT II) tests and the requirement took effect for the class entering in fall 1968. For students with GPA's above 3.1, the actual scores were irrelevant; those with GPA's between 3.0 and 3.1 were required to present a total score of 2,500 on the five tests.

Over the past 35 years, BOARS has adjusted the testing requirement several times. In 1977, the first Eligibility Index was created, specifying a sliding scale of required test scores that applied to students with GPA's between 2.78 and 3.29. At the same time, the option of taking the ACT in lieu of the SAT I was added to the testing policy.<sup>14</sup> Although all students continued to be required to take five tests, the 1977 Eligibility Index considered only SAT I/ACT scores. In 1992, the requirements were tightened to address concerns that the UC eligibility pool had grown beyond 12.5% of high school graduates. In 1996, the Index was revised to incorporate re-scaling of the SAT I and SAT II by the Educational Testing Service. Finally, as noted previously, the Eligibility Index was revised in 1999 to reincorporate SAT II scores, weighting them twice as heavily as SAT I/ACT scores, and to extend the test score requirement across the full breadth of the GPA range.

### ***III. Statistical Justifications for the Use of Admissions Tests***

BOARS' review of the history of admissions testing at UC, its discussions with testing experts (including, but not limited to, colleagues within the UC community and representatives of the major testing agencies), and general observation of the public

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<sup>13</sup> Douglass, personal communication, January 23, 2002.

<sup>14</sup> In accepting BOARS' recommendation, The Regents noted their approval of “offer[ing] applicants an additional option...The choice of whether to submit SAT or ACT scores will be up to the applicant.”

conversation over admissions tests reveal a number of different, but related, assumptions regarding the value of tests in making admissions decisions:

1. Admissions tests are a valid measure of student preparation and/or promise that have been proven statistically to add to an institution's ability to predict student success beyond the predictive information that high school grades alone provide.
2. Admissions tests provide a standardized measure of preparation that is independent of the variability among grading patterns inevitably present when reviewing the records of students from thousands of high schools across the country.
3. Admissions tests can identify as-yet undeveloped talent in students who for a variety of reasons may not have worked to their full potential in high school, but who will nonetheless excel in college.

As described in the historical background section, each of these theories about the value of admissions tests has contributed to some degree to their adoption by UC and by other institutions of higher learning across the country. For many both inside and outside the academy, some of these assumptions are deeply ingrained and have the status of unassailable fact. Prior to developing a set of principles and recommendations regarding the use of tests, however, BOARS felt it should undertake additional study to determine which of these theories about the value of tests—particularly the relative value of aptitude tests versus achievement tests—are actually borne out in the available data about student performance *at UC*. Ideally, this analysis would serve to answer the following questions.

1. To what degree do admissions test scores contribute to UC's ability to identify which students will succeed at the University? How does their ability to predict success add to that of high school GPA? How do various types of tests differ in their predictive ability?
2. Can admissions tests be used to identify reliably students with as-yet undeveloped talent who are likely to be high achievers at UC despite relatively lackluster high school records?
3. Does analysis of admissions test scores for UC students reveal any evidence that the scores are inappropriately correlated with other factors, such as socioeconomic status?

As noted in Section II, in 1997 BOARS commissioned a study, conducted by OP staff, designed to assess the appropriate relative weighting of SAT I and SAT II scores in the UC Eligibility Index. This study, which examined the first-year grades of a sample of the class entering UC in the fall of 1996, concluded that a composite of the SAT II math and writing scores was more predictive of freshman performance than the SAT I composite, which since 1977 had been the only test score utilized in computing the Eligibility Index. The study suggested that the superior performance of SAT II's in predicting freshman grades might be "due to the somewhat different nature of the SAT II exams, which are curriculum driven...in

contrast to the SAT I which [is a] general reasoning test.”<sup>15</sup> This study also found that the third SAT II exam yielded a small but statistically significant additional predictive value above those of the other four exams.<sup>16</sup> On the basis of this study, UC’s Eligibility Index was changed to add in SAT II scores and weight them twice as heavily as the SAT I.

Early in 2001, BOARS developed a research agenda designed to explore further the value of admissions test scores in predicting success at UC. The conclusions presented here were gleaned from regression analyses of the records of a pool of 77,893 students who applied and were admitted to UC as freshmen from Fall 1996 through Fall 1999.<sup>17 18</sup> Students’ high school grades (as expressed in the UC-calculated weighted GPA<sup>19</sup>) and SAT I and SAT II scores were compared to freshman GPA to determine the relative value of admissions test scores in predicting first-year performance.<sup>20</sup> In addition, correlations between the various test scores and socio-economic and demographic information were examined. The full study from which the conclusions here are excerpted is attached as an appendix.

### Predictive Validity

The primary conclusions of BOARS’ research on the usefulness of admissions test scores in identifying successful students include the following.

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<sup>15</sup> Kowarsky, et.al, 1998, p.6.

<sup>16</sup> Prior to recommending this change in 1999, BOARS commissioned simulation studies designed to ensure that the composition of the eligibility pool would not be fundamentally changed with the imposition of the new Eligibility Index—that is that changing the relative weights of the different scores would not significantly affect who was made eligible. However, it should be noted that in the three years since this study was completed—and particularly in the past six months—additional questions have been raised about the statistical validity of the SAT II third test and, particularly, the statistical and educational justifications for allowing students to be examined in foreign language if they are native speakers of the language in which they are tested. BOARS is currently studying this question. Strong educational reasons exist for allowing California students to present test scores in a foreign language, regardless of whether some of their knowledge of that language was gained outside the classroom. However data indicate that many of the individual third test exams, including, but not limited to, some of the language exams, add little predictive validity. Additional study of this question will be completed before BOARS issues specific recommendations on the use of language examinations in any future test battery.

<sup>17</sup> Geiser, Saul with Roger Studley *UC and the SAT: Predictive Validity and Differential Impact of the SAT I and SAT II at the University of California*. University of California Office of the President, 2001.

<sup>18</sup> As with the Kowarsky et.al. 1998 study, students who enrolled at UC Santa Cruz were excluded from some analyses because the campus did not assign letter grades and therefore could not compute a numeric GPA. In addition, only two years of UC Riverside data were included in the original analysis, due to anomalies in the data. Riverside data for the missing years have since been obtained and are discussed in this paper when relevant.

<sup>19</sup> UC calculates the high school GPA using only courses that meet the “A-G” requirements and adding one grade point for each UC-approved honors, Advanced Placement, or college-level course; thus an “A” in an approved honors course counts for five points rather than four and many students submit GPA’s above 4.0.

<sup>20</sup> It should be noted here that historically the measure of “student success” most commonly used in validity studies of admissions tests—and the one on which the College Board and Educational Testing Service base statistical studies of SAT I and SAT II scores—has been the freshman-year GPA. This is because intervening variables (including differing academic programs pursued by individual students and the intellectual and personal development students experience during their college years) serve to weaken substantially the predictive relationship between pre-college factors like high school GPA and test scores and eventual college GPA. Predictive validity studies justify use of freshman-year GPA by citing its correlation with GPA at graduation. Nonetheless, faculty and admissions officers involved in determining eligibility and selection criteria and processes point out that maximizing freshman year GPA is at best a relatively minor goal of the admissions evaluation process. While highly cognizant of the weaknesses involved in using freshman GPA, BOARS could not identify an alternative and therefore followed the generally accepted practice of using freshman-year GPA as the outcome variable indicating success in college.



1. Overall, high school GPA is the best predictor of freshman grades at the University of California. Virtually all of the extant literature on the relative value of grades and admissions test scores in predicting first-year performance cites high school GPA as the best predictor. This has been known for many years and was a factor in the hesitancy of the Academic Assembly to adopt BOARS' original 1958 recommendation regarding adoption of admissions tests. In a standard regression formula where the outcome variable freshman-year GPA was regressed against a combination of high school GPA, SAT I, and SAT II, the standardized regression coefficient (beta weight) for high school GPA was .27 for the four-year sample, as opposed to .07 for the SAT I and .23 for the SAT II.<sup>21</sup>
2. Test scores do contribute a statistically significant increment of prediction when added to a regression analysis combining grades and test scores. When the effects of different combinations of predictor variables were studied in the full four-year sample, adding scores from the SAT I and SAT II to high school GPA in the prediction equation increased the amount of variance in freshman-year GPA explained from 15.4% for GPA alone to 22.3%. However, this combination employing both the SAT I and SAT II was only marginally more predictive than a combination of just the high school GPA and the SAT II composite, which explained 22.2% of the variance. In addition, when the sample was disaggregated by year, the additional predictive ability contributed by SAT I was not statistically significant for two of the four years studied.<sup>22</sup>
3. The SAT II appears overall to be a better predictor of freshman grades at UC than the SAT I. In fact, in a series of regressions that examined various individual predictors, a composite of the three SAT II scores performed slightly better than either the SAT I or high school GPA in two of the years studied and for the full four-year pool. For the four-year pool, the three-test SAT II composite explained 16% of the variance in freshman grades, compared to 15.4% for high school GPA and 13.3% for the SAT I combined math and verbal scores.<sup>23</sup>

These analyses were conducted on various sub-populations of the pool to determine whether the findings were consistent across campuses, academic disciplines, etc. With very few anomalies, the findings held. For example, at every campus but one (UC Riverside, where the SAT I is a slightly better predictor<sup>24</sup>), the SAT II was a better predictor than the SAT I when considered in an equation that included high school GPA, SAT I, and SAT II.

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<sup>21</sup> Geiser, et. al (2001), p.5.

<sup>22</sup> Geiser, et.al. (2001), p.3.

<sup>23</sup> Geiser, et.al. (2001), p.3.

<sup>24</sup> Geiser, Saul and Studley, Roger, *Research Addendum: Additional Findings on UC and the SAT*, University of California Office of the President, 2002. Note that in the original study completed in October 2001, the SAT I appeared to be a better predictor at UC Riverside than the SAT II. This finding was based on incomplete data that was subsequently reanalyzed with the missing data included. The new data show that the two are roughly equivalent. In a series of standard linear regression equations where freshman GPA is predicted by various combination of high school GPA, SAT I, and SAT II, SAT II and SAT I scores were equivalent in equations that included only one set of test scores. In an equation that included high school GPA and both test scores, the beta weights for the two scores were virtually identical, but the SAT II contributed only 0.6% additional predictive validity when added to the equation already containing high school GPA and SAT I scores.

Similarly, when the sample was disaggregated by intended major, high school GPA was the strongest predictor (with beta weights ranging from .27 to .31 across the disciplines) in most cases, followed closely by SAT II (with beta weights ranging from .20 to .30). In all cases, SAT I was a slightly weaker predictor. For example, the beta weight for the SAT I ranged from -.05 (for students intending to major in physical science, math, or engineering) to .12 (for students intending to major in biological sciences).<sup>25</sup>

### Identifying Students with High Potential

One strength that admissions tests are commonly presumed to have over high school grades—and that aptitude-type tests are commonly presumed to have over achievement-type tests—is an ability to identify students with high potential who have not yet demonstrated that potential. This theory has at least two main variants. The first is that students with high ability who attend schools with fewer resources or less rigorous curricula will score relatively low on achievement tests, as opposed to aptitude tests, because they are held back by the poor education they have received to date. The second is that, regardless of the type of school attended, some very talented students simply do not perform in high school (perhaps because they have not been sufficiently challenged or engaged), nor on achievement-type tests, but will score well on aptitude tests and then “blossom” when placed in the rich and challenging intellectual environment of university life.

An analysis of freshman performance data disaggregated by the type of high school (from “low” to “high” performing, as measured by the state’s Academic Performance Index, which considers a number of factors related to student achievement and school resources) indicated that, for all types of schools, the SAT II remained a slightly stronger predictor. The predictive ability of the SAT I improves for schools at the “low performing” end of the spectrum, but it remains less predictive than the SAT II. Thus, in a regression equation including high school GPA, SAT I composite, and SAT II composite, for schools in the “top” quintile, the beta weight of the SAT I was not statistically significant, while the weight for the SAT II was .20 (as compared to .33 for the high school GPA). For schools in the lowest quintile—those where students would be most disadvantaged by a weak curriculum—the beta weight for the SAT II was .18 as compared to .25 for the high school GPA and .12 for the SAT I.<sup>26</sup>

Similar patterns emerge when we look at data disaggregating students according to their high school GPA. That is, when considered in a regression equation that includes both SAT I and SAT II, the SAT II is a stronger predictor of freshman grades than the SAT I across all quintiles of high school GPA, although the predictive power of the SAT I increases toward the bottom end of the pool. For example, for students whose high school GPA’s place them

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<sup>25</sup> The finding that the SAT I is negatively correlated with freshman GPA for students in physical science, math, and engineering is interesting because it has been suggested that admissions test scores are actually better predictors of college performance than aggregated data would indicate, due to differences in grading patterns across disciplines. For example, it has been suggested that student with high SAT I scores tend to cluster in disciplines with particularly rigorous grading patterns—e.g., physical sciences, math, and engineering—where the (relatively) lower grades they receive mask the true predictive power of their SAT I scores. If this were true, disaggregated data like these presented here should reveal the true relationship. Instead the SAT I scores appear to have no predictive value for these students.

<sup>26</sup> Geiser, et. al. (2001), p.6.

in the highest twenty percent of UC enrolled freshmen, the beta weight for the SAT II is .31 versus .04 for the SAT I. For students in the bottom twenty percent, the relative weights are .08 for the SAT I and .16 for the SAT II.<sup>27</sup>

To further illuminate this question of whether a particular test can identify potential not indicated in the GPA or the other test scores, BOARS also reviewed data regarding discrepant scores—cases where test scores differed substantially on different kinds of tests. Here, perhaps the most important finding is that such cases are quite rare. Out of a sample of nearly 78,000 students reporting both SAT I and SAT II scores, a total of 3,607 students (4.63% of the total) were found to have scores that differed from one another by more than one standard deviation (about 200 points on the SAT I—because the scales of the two different test composites are not the same, test scores were standardized relative to the mean). Of these, 1,859 reported significantly higher scores on the SAT I and 1,748 reported significantly higher scores on the SAT II. When the threshold for considering scores “discrepant” was increased to 1.5 standard deviations, the number of students dropped to 343—0.44% of the total. That is, in 99 out of 100 cases, the information provided by the two different types of tests was very similar. Analysis of the characteristics of those who score differently on the two types of tests revealed that, on average, the group of UC students who scored relatively higher on the SAT I than on the SAT II came from families with higher incomes, performed less well in high school, performed less well after arriving at UC, and were more likely to be white.<sup>28</sup>

#### Relationship to Socio-economic and Demographic Characteristics

It is well known that admissions tests of all types—along with high school grades and other indicators of academic achievement—are strongly correlated with family income. This does not reflect bias in the tests, but rather the inescapable fact that schools in California—like those throughout the country—vary widely in available resources and students from poor families are more likely to attend schools with fewer resources. The members of BOARS are well aware that they cannot eliminate this level of “disparate impact” admissions tests have on students from socio-economically disadvantaged circumstances. As noted above, predictive validity analyses that disaggregated UC students according to the type of school they attended found the SAT I and SAT II tests to be roughly equivalent predictors of performance for students from the lowest- as well as the highest-quintile schools.

BOARS also reviewed data disaggregated by student socio-economic factors. In this analysis, two measures of socioeconomic status, family income and parental education, were included to assess their conditioning effects on the predictive validity of the SAT I and SAT II. Including these variables along with SAT II scores and high school GPA in the analysis increased the predicted variance in freshman GPA to 22.8%. When SAT I scores were then added, the predicted variance remained at 22.8%. This indicates that once socio-economic variables are included, SAT I scores do not add to the prediction of freshman grades.

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<sup>27</sup> Geiser presentation to BOARS, December 18, 2001.

<sup>28</sup> Studley presentation to BOARS, December 18, 2001.

BOARS also reviewed data considering differences in performance on the aptitude and achievement tests for students of different races and ethnicities. As is the case with family income, certain patterns emerge in scores on all tests: white and Asian American students tend to have higher scores, on average, than African American, American Indian, and Chicano/Latino students. However, the analysis did not reveal significant differences within groups for performance on the SAT I versus the SAT II math and writing tests. For example, African American students scored .71 standard deviations below the mean on the SAT I and .67 standard deviations below the mean on the SAT II (composite of math and writing). White students scored .18 standard deviations above the mean on the SAT I and .16 standard deviations above the mean on the SAT II. The largest difference in average scores between the two tests was for American Indians who scored .10 standard deviations below the mean on the SAT I and .17 standard deviations below the mean for the SAT II.<sup>29</sup> BOARS concluded that none of these differences was substantial enough to indicate that choosing one kind of test over the other would significantly advantage or disadvantage students from particular backgrounds.

Score variations among students of different ethnicities do emerge when looking at scores on the third SAT II test, which can be in a subject of the student's choice. Chicano and Latino students are more likely to take the third test in a foreign language—Spanish—and, in some cases, to score higher on this test than they do on other admissions tests. This can also be true in the case of other language examinations, such as Chinese, Japanese, and Korean. The question of the foreign language examinations is quite complex both educationally and statistically. BOARS is studying this question separately and will release a discussion paper on this matter prior to making any recommendations about specific subject examinations to be included in a new admissions test policy.

### Conclusions Regarding Statistical Justifications

BOARS has concluded the following with regard to the statistical validity of SAT I and SAT II scores.

1. Admissions tests have value in predicting freshman-year GPA and add statistically significant information to that provided by the high school GPA alone.
2. Based on research regarding freshman student performance at UC, the SAT II appears to be at least as effective a predictor of freshman performance at UC as the SAT I.
3. BOARS sees no evidence to corroborate the theory that the SAT I has special value because it can identify students who have not performed well to date but in fact have innate ability that will show itself in college.
4. BOARS sees no evidence that one test performs significantly better than another in predicting performance for students from more challenged socio-economic circumstances or different demographic groups.

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<sup>29</sup> Geiser, et.al. (2001), p. 15.

5. The question of variations in scoring patterns and prediction for the language examinations requires further study.

In BOARS' view, the statistical analyses support the use of achievement tests as predictors of student success at least equivalent to aptitude tests. But the evidence is not so compelling that we believe it should drive a decision to prefer one type of test over another. Rather, the University should carefully consider the policy implications and justifications of its use of tests and base its conclusions and future actions of educational policy grounds.

#### ***IV. Policy Issues Associated with UC's Admissions Test Requirement***

Admission to the University of California is a highly sought-after public resource. Access to this resource should be based on sound principles and an understanding of the educational and social implications of different choices.

BOARS' review of the history of the development of admissions tests and of their use at the University of California points clearly to the fact that the original decision to adopt the testing requirement and create the Eligibility Index was driven only in part by policy goals. Pragmatic needs to reduce the size of the eligibility pool and to rank-order applicants to selective campuses in a simple, efficient way also played substantial roles. In BOARS' current view, these pragmatic reasons—while important—are insufficient justification in themselves for the adoption of a test requirement or the selection of a specific test battery. And while the additional predictive validity that admissions tests provide is convincing in terms of the value of admissions tests in general, the differing statistical properties of the admissions tests currently in use by the University are not sufficient on their own to support their continued use without modification or to drive a decision regarding the specific design of a future test battery.

On what, then, should the University base decisions regarding its use of admissions tests? In BOARS' lengthy discussions of the role of admissions tests and the desirability or lack thereof of particular kinds of tests, the following interrelated policy issues emerged that BOARS concluded should be carefully considered when making decisions about UC's admissions test requirement.

1. The relative merits of tests that measure achievement versus those that purport to measure aptitude. BOARS is strongly persuaded that achievement-type tests offer the University a number of advantages over aptitude-type tests. The original justification for the use of admissions test scores in determining eligibility rested largely on their role as "objective" measures that could be applied to the whole applicant pool and, therefore, provide information that was independent of high school grades, which are subject to inconsistency across schools and teachers. BOARS assumes that the University seeks to measure mastery of the content of the high school curriculum, that using scores from appropriate admissions tests to complement high school grades increases our ability to achieve this goal, and that achievement exams are more suited to measuring mastery of the high school curriculum than exams designed to measure

- general intellectual aptitude. Moreover, achievement tests provide information that students and their families can use to prepare for college and that schools can use to evaluate and improve their own programs. Focusing on achievement tests rather than aptitude tests also avoids the historical association of aptitude tests with intelligence tests.
2. The messages that our test requirement sends to students and their families. Clearly, an important factor of any admissions test is the nature of the message it sends to students. The University's traditional eligibility requirements—i.e., the combination of the coursework (A-G) and scholarship (GPA) requirements—send a clear message: *the best way to prepare for post-secondary education is to take a rigorous and comprehensive college-preparatory curriculum and to excel in this work.* This message is reinforced by the University's new comprehensive admissions review policy that emphasizes the importance of taking a challenging curriculum and excelling across a broad range of areas. In the view of BOARS, achievement tests reinforce this message: students who take challenging courses and work hard will see their effort pay off not only in good grades but also in high scores on tests that measure mastery of the work they have undertaken in high school. This message is consistent with, and underscores, current efforts to improve the quality and rigor of K-12 education in the state.
  3. The degree to which admissions tests should be related to the curriculum UC applicants are expected to study in high school. BOARS is mindful of the influence that colleges and universities have in determining what is taught in high schools. The University's own historical role as the accreditor of high school curricula in California speaks to this influence. UC's A-G requirements for coursework in history and social science, English, mathematics, laboratory science, foreign language, and the arts help shape the curricula California's public schools offer. In BOARS' view, it follows that the University's testing policy should be more consistent with the A-G expectations regarding the breadth of the areas studied in high school. In this regard, it is noteworthy that while UC applicants are required to complete coursework in six curricular areas, they are currently expected to submit admissions test scores in only three: English/language arts, mathematics, and a third area that they may choose.
  4. The burden that our test requirements place on students and schools. At present, applicants to the University of California are required to take four examinations that require a minimum of six hours and from two to four separate testing sessions. Although this requirement has not changed in the years that have passed since UC adopted its admissions testing policy, the context in which the requirement is seen has changed. Educators, students, and families frequently decry the proliferation of tests that have accompanied the growth of the standards and accountability movements in education. Not only do students spend more time taking tests, but increased competition for spaces in the University and the proliferation of test preparation services put additional pressure on them to spend even more time preparing for admissions tests. In addition, each test charges a fee (although major testing agencies offer fee waivers for low-income students) and the cumulative total of these

fees—not to mention the cost of test preparation programs—can be daunting to many families. One of BOARS’ goals in considering options for revising the admissions test policy was to not increase the burden, in terms of time or money, that UC’s requirements place on potential applicants.

In the view of BOARS, consideration of these issues underscores the need for a sound set of principles and a description of desirable admissions test properties to guide the development of a new admissions test requirement for the University of California.

## ***V. Recommendations***

In the view of BOARS, admissions tests offer important benefits to the University by providing information about student mastery of key areas of the college preparatory curriculum that adds to and complements the information provided by the high school GPA. *Therefore, BOARS endorses the continued use of admissions tests.*

Given the important role that admissions tests play in determining access to UC, it is critical that their use be governed by clear principles and that the properties of tests to be used by the University be clearly articulated.

### *Recommended Principles for the Use of Admissions Tests at the University of California*

*Therefore, BOARS recommends to the faculty the adoption of the following policy regarding the purposes and properties of admissions tests used by the University of California.*

1. Admissions tests will be used at the University of California
  - to assess academic preparation and achievement of UC applicants;
  - to predict success at UC beyond that predicted by high school GPA;
  - to aid in establishing UC eligibility; and
  - to aid in selecting students for admission at individual UC campuses.
2. The desired properties of admissions tests to be used for these purposes include the following.
  - An admissions test should be a reliable measurement that provides uniform assessment and should be fair across demographic groups.
  - An admissions test should measure levels of mastery of content in UC-approved high school preparatory coursework and should provide information to students, parents, and educators enabling them to identify academic strengths and weaknesses.

- An admissions test should be demonstrably useful in predicting student success at UC and provide information beyond that which is contained in other parts of the application. (It is recognized that predictors of success are currently limited, and generally only include first-year college GPA and graduation rate. As this field advances, better predictors should be identified and used in validating admissions tests.)
- An admissions test should be useful in a way that justifies its social and monetary costs.

*BOARS also recommends that, as a matter of principle, the faculty regularly review UC's admissions testing policy and practices to ensure that tests are being used in a way that is consistent with these principles and desired properties of admissions tests.*

*Recommendations Regarding an Admissions Test Array to be Adopted by the University of California*

BOARS has undertaken to propose a policy based on agreed-upon principles of testing, and upon the purposes for which admissions tests are created, rather than simply working within the constraints of existing tests. We consider this an opportunity to work with testing agencies and interested parties to move toward admissions tests that more precisely fit the needs of the University of California. In setting forth this far-sighted goal, BOARS is cognizant that no existing test or tests precisely fit the goals of the University. However, there are valid, reliable, and well-respected tests available that can be adapted for our purposes, and possibly developed, to more closely match the proposed UC purposes and principles for admissions tests.

***BOARS recommends to the faculty of the University of California a new testing array with the following components.***

1. A core achievement examination required of all students covering mastery of the fundamental disciplines needed for University-level work: language arts (reading and writing, including a writing sample) and mathematics. This examination would be roughly three hours in length. Although no currently available test meets this specification, BOARS members have discussed it in general terms with the two major national testing agencies, the College Board/Educational Testing Service and ACT Inc. Both have indicated interest in pursuing such a test option within the timeframe required—roughly two years for test development, assuming the requirement would go into effect no earlier than for the class entering in fall 2006. BOARS will remain in close conversation with both testing agencies and any new tests will undergo rigorous evaluation to ensure that they are consistent with BOARS' principles. In addition, BOARS is interested in other examination alternatives (e.g., versions of the Golden State Examination) that might emerge in the more distant future.

A critical requirement for any agency developing such a test is that it be able to produce or derive from the California core test an acceptable score equivalent to one



of the two major admissions tests currently available nationally (the SAT I and the ACT). Both the College Board/ETS and ACT INC. have indicated that this is feasible. Thus, California students would not be required to take additional tests in order to apply to non-UC institutions.

2. Two one-hour long examinations in specific content areas within the subjects covered by University's A-G requirements, allowing for some level of student choice in the selection of specific tests.

In BOARS' opinion, this recommended test requirement provides greater breadth, depth, and rigor than the current policy. It ensures sufficient coverage of the skills most vital to post-secondary work without encompassing unneeded redundancy. Further, the proposed array increases the breadth of high school coursework covered in the subject examinations; it preserves the element of choice that allows students to demonstrate particular strengths in areas they feel they know best; it slightly reduces the test burden on students by reducing the total number of sessions and seat time required; and it ensures that scores are fully transportable to other institutions.

#### Remaining Questions and Timing for Implementation

This recommendation lays out general guidelines for a desirable admissions test array. However, a number of questions require additional faculty discussion and study. Among these are the following:

1. Specification of the mathematics examination requirement. At present, students are tested in general level math skills as part of the core SAT I or ACT examination and are then offered the choice of two achievement examinations in math: the SAT II Mathematics level 1 or level 2 test. BOARS wishes to reduce the overall amount of test time devoted to mathematics, but also believes that it is highly desirable for students wishing to pursue majors in science or engineering to be able to demonstrate higher-level math achievement. Several options exist for achieving this goal. One attractive option is to allow students to choose one of two levels of math within the new core examination. Another option would be to require all students to take the same math tests (presumably a lower-level examination) within the core, but permit them to choose higher-level math as one of their two additional subject tests. These options need further study as well as conversation with the testing agencies.
2. The specific nature of the choice students would be given for the subject examinations. Several different options exist here. Students could be given an entirely free choice for these examinations. They could be required to take tests in given disciplines (e.g., science) but given choices (e.g., Biology, Chemistry, or Physics) within those disciplines. They could be given a menu of four general disciplines (e.g., natural science, social science, literature, foreign language) and asked to select tests from among two of the disciplines. New tests could be developed in A-G areas (e.g., the arts) not now covered by any existing tests. Again,

this question requires additional study and discussion as well as consultation with the testing agencies.

3. Issues related to the language examinations. These issues are many and complex. There is considerable faculty and public concern over the perceived fairness of submitting language exam scores in a multicultural society with many languages spoken in homes and communities, and tests that were designed to measure a second language learned in high school. BOARS is preparing a position paper on this complex issue that will be available to inform faculty discussion and decision-making.
4. The future role of the SAT I. The testing array proposed by BOARS does not include the SAT I and the requirement that any new test developed to meet BOARS' specifications include scores that are transferable to other institutions means that students taking the California core examination would not have to take the SAT I. Presumably, however, some will choose to take the SAT I, just as at present some students choose to take multiple tests. What role the existing SAT I would have as an optional additional piece of information remains to be discussed and decided.

Regarding timing of the implementation of this proposal, BOARS recognizes that, traditionally, the University of California has given students substantial advance notice of changes in eligibility requirements. In this case, because some students could conceivably choose to take subject area tests as early as the spring of their tenth-grade year, BOARS proposes that the new admissions test requirement take effect for students entering the University in fall 2006—that is, for students who will begin ninth grade in fall 2002. This gives students time to plan their full high school program with the new requirements in mind. It also allows ample time to address the remaining questions (and those that have not yet been anticipated) and develop and evaluate new tests. We would assume that additional refinement of BOARS' specifications and development of new tests that meet the requirements for the core examination would take place over the next two years and that new tests could be piloted and evaluated beginning in 2004.

This policy recommendation will now be refined in discussion with faculty colleagues and other experts, as well as continued consultation with the major testing agencies. BOARS looks forward to a vigorous and productive exchange over its proposed recommendation for the future of admissions testing at the University of California.