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Testing and Diversity in Postsecondary Education: The Case of California

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Abstract

The past several years have seen numerous efforts to scale back or eliminate affirmative action in postsecondary admissions. In response, policymakers and postsecondary institutions in many states are searching for ways to maintain the diversity of student populations without resorting to a prohibited focus on race. In response to these changes, this study used data from California and a simplified model of the University of California admissions process to explore how various approaches to admissions affect the diversity of the admitted student population. "Race-neutral" admissions based solely on test scores and grades were compared with the results of actual admissions before and after the elimination of affirmative action. A final set of analyses explored the effects on diversity of alternative approaches that take into account factors other than grades and scores, but not race or ethnicity. Replacing the former admissions process that included preferences with a race-neutral model based solely on GPA and SAT-I scores substantially reduced minority representation at the two most selective UC campuses but had much smaller effects at the other six, less selective campuses. SAT-I scores contributed to but were not the sole cause of the underrepresentation of African American and Hispanic students. A race-neutral model based solely on GPA also produced an underrepresentation of minorities, albeit a less severe one. None of the alternative admissions models analyzed could replicate the composition of the student population that was in place before the termination of affirmative action in California. The only approach that substantially increased the representation of minority students was accepting most students on the basis of within-school rather than statewide rankings, and this approach caused a sizable drop in both the average SAT scores and the average GPA of admitted applicants, particularly among African American and Hispanic students. Although admissions systems differ, the basic findings of this study are likely to apply at a general level to many universities and underscore the difficulty of providing proportional representation for underserved minority students at highly selective institutions without explicit preferences.

Over the past several years, the use of affirmative action to increase the representation of underserved minorities in postsecondary education has faced increasingly widespread threats. Efforts to scale back or eliminate affirmative action in admissions have taken numerous forms, including popular referenda, court decisions, and executive actions, and have led to its elimination in California, Florida, and Washington. Affirmative action was also terminated in Texas, although a recent court decision may permit its reinstatement. A university affirmative action program recently survived legal challenge in Michigan, but additional litigation is pending in other states, including cases on appeal in Michigan and Georgia.

Faced with these events, policymakers and postsecondary institutions in many states are searching for ways to maintain the diversity of student populations without resorting to a prohibited focus on race. For example, several states are experimenting with what we call "X% rules," in which the best students in each high school—that is, those who

exceed a specified percentile in class rank—are guaranteed admission to a college campus or system.

In response to these changes, we undertook to explore how various approaches to admissions affect the diversity of the admitted student population. We examined the effects of different stages in the admissions process—for example, the student's decision to take a college-admissions test and to apply, and the college's decision to accept an applicant—on the composition of the student population. In doing this, we focused not only on race and ethnicity, but also on other aspects of diversity, such as the educational background of accepted students. We modeled "race-neutral" admissions based solely on test scores and grades and compared the results with actual admissions before and after the elimination of affirmative action. Finally, we explored the effects on diversity of alternative approaches that take into account factors other than grades and scores, but not race or ethnicity.

Because California has been one of the primary focuses of debate about the rollback of affirmative action, these analyses use data from that state and are loosely modeled after the admissions procedures and student population of the University of California. We expect that many of the findings could be generalized in broad brush to other states, but some patterns may differ depending on differences among states in demographics, the selectivity of state universities, and so on.

Recent Trends in Postsecondary Admissions

Although hard data on affirmative action are scanty, most observers believe that selective institutions have widely employed it for several decades. The use of race as a factor in higher education admissions was legitimized but limited by a 1978 Supreme Court decision, *University of California Board of Regents v. Bakke* (1978). The justices held that racial diversity was a legitimate goal for institutions of higher education but that creating a separate admissions process or a quota system was not the "least objectionable alternative" for achieving that goal. Consideration of race in the admissions process was deemed acceptable only if it was one of many factors considered.

The policies endorsing affirmative action have sometimes been explicit. An example is the state system of higher education in Texas. Until 1996, the state of Texas maintained a concerted effort to recruit minority students into higher education and to prepare its institutions to meet the demands of its growing minority college-age population. This effort was due to an investigation of segregation in Texas higher education by the U.S. Office of Civil Rights (OCR) between 1978 and 1981. As a result of that investigation, Texas was required to develop a plan to desegregate and to "increase the representation of blacks and Hispanics in institutions of higher education" in order to avoid federal enforcement proceedings (Texas Higher Education Coordinating Board, 1997). Since Governor William Clements issued the first plan, each subsequent governor has submitted a follow-up designed to continue increasing minority representation in Texas higher education. The most recent plan, Access and Equity 2000, sought increases reflecting the proportion of college-age minorities in the Texas population as well as increased minority representation on faculties and advisory boards. Similarly, until affirmative action was terminated in California, the state of California engaged in numerous activities to increase minority representation on campus, ranging from

academic preparation programs at community colleges to actively recruiting minority applicants to the campuses of the University of the California (UC).

Nonetheless, many of the admissions policies implementing affirmative action, particularly at the institutional level, have not been made explicit, and their effect in practice has often been unclear. As Kane noted, "Nearly two decades after the U.S. Supreme Court's 1978 *Bakke* decision, we know little about the true extent of affirmative action admissions by race or ethnicity…. Hard evidence has been difficult to obtain, primarily because many colleges guard their admissions practices closely" (Kane, 1998a, p. 17).

One recent study used survey data to estimate the extent in practice of race-based preferences in higher education admissions. Kane (1998b) estimated how race/ethnicity, high school grade-point average (GPA), scores on the Scholastic Assessment Test (SAT), participation in student government and athletics, and college selectivity affected the probability of acceptance to college for a nationally representative sample of the high school class of 1982. Kane found that, holding constant the factors other than race, black and Hispanic applicants had an appreciable advantage over white applicants, but only in selective colleges. In the most selective colleges (those in the top quintile of selectivity), Kane estimated that the average advantage of black applicants was "equivalent to nearly a full point increase in high school grade-point average (on a four-point scale), or to several hundred points on the SAT" (Kane, 1998b, p. 438). The data upon which Kane's estimates were based, however, are now quite dated, and the sample did not allow estimates specific to states or individual postsecondary systems. Thus research leaves unclear how substantial preferences were in the states that have been at the center of the debate about the elimination of affirmative action, such as California and Texas.

Recent Policies Curtailing Group-Based Preferences

Although this report focuses on California, recent initiatives curtailing affirmative action have been proposed or enacted in several states.

California

The first recent major rollback of affirmative action in higher education was the enactment of SP‑1 in 1995 by the University of California Board of Regents. SP-1 stated that "the University of California shall not use race, religion, sex, color, ethnicity, or national origin as criteria for admission to the University or to any program of study." This resolution was a response to executive orders issued by Governor Pete Wilson that severely curtailed affirmative action in a broad range of state procurement and administrative decisions.

In November 1996, California voters approved Proposition 209, which eliminated the consideration of race, ethnicity, and gender in public employment, public contracting, and education. In effect, Proposition 209 provided constitutional backing for SP-1. The US Supreme Court refused to hear a challenge to Proposition 209 in November 1997, thus allowing the measure to stand. Admission decisions based on these new policies went into effect with students seeking admission for the Spring quarter 1997-1998. These actions, taken together, represent a full repeal of affirmative action policies in

California's state system of higher education.

Texas

Around the same time, the Fifth Circuit Court of Appeals ended the use of any race-based consideration in admission decisions in the area under its jurisdiction. In 1992, four white students who had been denied entrance to the University of Texas law school filed suit against the university, claiming that the partially race-based admission process violated their Fourteenth Amendment rights. Four years later, the Fifth Circuit Court of Appeals upheld their claims. "The case against race-based preferences does not rest on the sterile assumption that American society is untouched or unaffected by the tragic oppression of its past. Rather, it is the very enormity of that tragedy that lends resolve to the desire never to repeat it, and find a legal order in which distinctions based on race shall have no place" (*Hopwood v. Texas,* (1996), as quoted in Feinberg, 1998, p.12).

The principle enunciated in *Hopwood* appears to be inconsistent with the standards enforced by the OCR investigations of the state's efforts to remedy the remaining vestiges of *de jure* segregation in public higher education. First in 1980 and again in 1987, the OCR found that Texas had not made adequate progress in eliminating such problems and required that additional plans be adopted in order to avoid federal action. Texas was informed by the OCR in 1997 (after the *Hopwood* ruling) that its higher education system would once again be reviewed to ensure that an OCR-approved plan had been effectively implemented and that all traces of segregation had been eliminated in compliance with Supreme Court precedent (Siegel, 1998). The standard for the OCR review was set by *United States v. Fordice*, a 1992 case in which the U.S. Supreme Court held "that any state with a history of segregation in higher education must implement affirmative measures, including racial preferences to eliminate those vestiges." This standard differs from the one set out in *Hopwood*, which allows the use of racial preferences, but only when a state entity is acting to remedy present effects of past discrimination at a specific institution (THECB, 1997). The OCR review is still in progress and it is uncertain how OCR standard in *Fordice* may affect the interpretation or implementation of *Hopwood*.

The *Hopwood* case has been returned to the Court of Appeals three times, and the most recent ruling suggests that race may play some role in admissions. In its most recent ruling, the Court of Appeals did not overturn the original *Hopwood* ruling, but it did rule that the District Court injunction prohibiting the University of Texas Law School from any use of race in making admissions decisions was overly broad and excessive. The case has been remanded again to Circuit Court for additional action. The degree to which racial preferences will be allowable in Texas and in other states under the jurisdiction of the Fifth Circuit therefore remains uncertain.

Washington

Initiative 200 (I-200) was passed by the voters of Washington state in November 1998. Like Proposition 209 in California, it restricts the use of race in employment, education, and contracting. In response to the initiative, University of Washington (UW) President Richard L. McCormick announced that UW would suspend the use of race, ethnicity, and gender in admissions beginning in Spring 1999. It is important to note, however,

that I-200 was passed as a law, not as an amendment to the state constitution as was Proposition 209 in California. It is therefore still uncertain whether I-200 will supersede existing laws that allow the use of race in employment and contracting decisions. It does not, for example, apply to federally funded state programs that must comply with federal nondiscrimination laws.

Florida

The Board of Regents of the State University System of Florida voted in favor of Governor Jeb Bush's "One Florida" Initiative in February 2000. This plan eliminates the use of race as a factor in admission decisions in the Florida University system and outlines an alternative, race-neutral admission process. Florida planned to have its new admission criteria in effect for students graduating from high school in 2000.

Georgia

In Georgia, a case was filed in federal court by three white women denied admission to the University of Georgia. The plaintiffs sued the University and State Board of Regents under Title VI of the Civil Rights Act of 1964, alleging that they were discriminated against because of their race. In a decision handed down in July of 2000, federal judge B. Avant Edenfield of Georgia ruled that the 1978 *Bakke* decision has been misinterpreted and that diversity is "an amorphous, unquantifiable goal" that cannot be constitutionally justified. He nullified the University of Georgia's now-discarded policy of maintaining lower admission standards for blacks. In a non-binding opinion, he further criticized the university's use of race/ethnicity as a "plus" factor in the selection of 10 to 15% of the students in each year's entering class. The case is likely to be appealed to the 11th U.S. Circuit Court of Appeals (Denniston, 2000).

Michigan

Michigan has recently seen two challenges to affirmative action in higher education in federal court. The first, *Gratz v. Bollinger et. Al* (2000), challenged the use of race in admissions at the undergraduate level. The plaintiffs were unsuccessful applicants to the College of Literature, Science, and the Arts in Fall 1995 and Fall 1997, respectively. This case was recently decided in favor of the defendant. *Grutter v. Bollinger* (2001) was filed in 1997 against the University of Michigan's law school, challenging the use of race in its admission policy. In March, 2001, District Court Judge Bernard Friedman ruled that the law school's admissions policies considering race were unconstitutional and a violation of Title VI of the 1964 Civil Rights Act. Both cases have been certified as class actions and are expected to be appealed.

Policy Responses to Challenges to Affirmative Action

Policymakers in the university systems of Texas, California, and Florida have tried in various ways to maintain diversity in the face of legal restrictions on affirmative action. In all three states, individual campuses have tried to recruit at high schools whose students are traditionally underrepresented in the college population. At the system level, outreach in California and Texas has focused on informing the public about the race-neutral admissions policies and on assuring minorities that the higher education

system is still hospitable.

All three of these states have also instituted "X% plans"—that is, policies that admit a certain percentage of graduating public high school seniors automatically to their university systems, primarily on the basis of students' academic ranks within their high schools. The Texas legislature passed House Bill No. 588, also known as the 10% rule, in May of 1997. The measure mandates that public or private high school students whose GPA places them in the top 10% of their graduating class be admitted automatically to "each general academic teaching institution" if they graduated within the previous two years and filed the appropriate applications on time. The act also stipulates that the governing board of each such institution will decide on an institutional basis whether to automatically admit any student in the top 25% of his or her graduating class, but not in the top 10%. The legislature also outlined factors other than academic achievement that institutions were to take into consideration when admitting the rest of their freshman classes—factors related primarily to socioeconomic status, geographic region, and uncommon hardship. The admission criteria for students not in the top 10% or 25% of their class were to be published in the academic catalogs and made available to the public not later than one year before the date when they were to take effect. Similarly, the factors used in awarding competitive fellowships and scholarships were to be made public. The act has applied to all admissions and scholarship awards since the Fall semester of 1998.

In California, the top 4% of graduating seniors from each public high school are now eligible for admission to a school in the UC system, although not necessarily to the campus of their choice. Each school sets its own admission standards based on system policies, but a student deemed eligible is guaranteed admission to at least one of the UC campuses. The 4% plan in California has been termed ELC, eligibility in the local context. In addition to graduating in the top 4% of their class, students must fulfill a minimum course requirement that specifies the number and level of courses to be taken in high school subject areas, and they must submit ACT or SAT scores if the institution of their choice requires test scores. The ELC 4% plan is expected to be in effect for freshmen applicants in Fall 2001.

Unlike Texas and California, Florida established an alternative policy concurrently with terminating of race-based admissions. Beginning with the class of 2000, the top 20% of graduating seniors from each public high school will automatically be admitted to the state university system under the Talented 20 Program. Because of enrollment caps, however, students are guaranteed admission only to one of the 10 Florida universities, not necessarily to their top choice. The "One Florida" plan also calls for an additional $20 million in need-based financial aid. Under this initiative, universities are asked to address the financial-aid needs of students admitted under the Talented 20 Program before those of other students.

Washington state is in the process of reviewing its policies in response to Initiative 200. The UW Board of Regents is considering a proposal to allow the use of race and gender as factors in choosing the recipients of privately funded scholarships. Applicants would undergo screening based on neutral factors such as merit and need. From among those who pass the screen, students would be matched with scholarships. The aim is to attract minority students to the UW system.

Initial Effects of Policy Responses

Only Texas has fully implemented its "X% rule" admission policy. Holley and Spencer (1999) found that in its first year, the 10% rule had no significant impact on the number of minority students enrolled as first-time freshmen at the University of Texas at Austin and Texas A&M University, the state's two flagship schools. Only eight more black students and one fewer Hispanic student enrolled at UT-Austin in 1998 than in 1997. At A&M, 19 more black students and 62 more Hispanic students enrolled in 1998. However, the results of the 10% rule were available only for the first year (academic year 1998) and may not be indicative of the long-term effects of the new program.

Although no data on the effects of the 4% rule on freshman enrollment patterns at the University of California schools are available, a simulation study assessing the potential effects was conducted by Saul Geiser of the UC Office of the President.[1] For all California public high-school graduates for whom SAT scores were available, Geiser (1998) calculated an Academic Index score—an 8,000-point scale that gives approximately equal weight to a student's high school GPA and SAT scores. Students were then ranked by Academic Index score within each high school, and those in several top percentiles were combined into a simulated UC eligibility pool. Geiser found that limiting admissions to only the top 4% of students within each high school would have a modest impact on the racial/ethnic composition of the admitted population. Of the total eligible pool, 31% would be white, 47% Asian, 14% Latino, 3% black, and 5% "other."

In the second stage, the three models chosen in the first stage were applied to the College Board data to estimate the racial/ethnic composition of the admitted pool under race-neutral admissions rules. These analyses used 1998 and 1995 data and were limited to students who attended high school in California at the time they took the SAT. The models did not predict acceptance or rejection for individual students; rather, they predicted the probability of admission for students in a given range of SAT scores and GPA. These probabilities were applied to counts of tested students in each range to obtain estimated counts of admitted students. The resulting estimates of racial/ethnic composition were compared with actual admission data from the class admitted in 1999 (after SP-1 and Proposition 209 had been implemented) to confirm their reasonableness.

The application and acceptance process in the UC system can be seen as a sequence of filters, which are described in the following section: (1) taking the SAT; (2) meeting the UC system eligibility criteria, based on SAT scores and GPA; (3) applying to a campus at a given level of selectivity; and (4) being admitted to that campus. Our models represented a simplified, race-neutral version of the fourth of these filters. We examined the effects of the four filters, individually and in various combinations, on the diversity of the surviving pool of students. For example, by removing the application filter, we estimated the racial/ethnic composition that would result if all students were successfully encouraged to apply to campuses at all three levels of selectivity. We also examined the effects of these filters on other characteristics of the admitted groups: whether high school students attended an urban, suburban, or rural high school, the type of high school attended (e.g., public, private, religiously affiliated), parents' level of education, and first language spoken at home. The results of these analyses were compared with actual admission data from three years: 1995 (to represent policy before the enactment of SP-1 and Proposition 209), 1999 (to represent full implementation of these policies), and 1997 (to represent the transitional period).

In the third stage, a number of alternative admission models were applied to gauge their effects on the diversity of the admitted student population. These models used both individual variables (such as parents' education) and school characteristics (such as the percentage of students receiving free or reduced-price lunch). As part of this stage, we replicated the analyses performed by the UC office of the President to model the effects of 4%, 6% and 12.5% admission policies to ensure that our data and methods were consistent with those used in that study.

Steps in the Selection Process

The selection process entails a series of filters that progressively winnow the applicant pool. The filters in our models are the following.

The decision to take the SAT (or ACT). Because admission to the University of California system requires that students take the SAT or ACT, those who fail to do so remove themselves from the pool of potential students. This filter is nearly universal among selective colleges and universities nationwide, although a few institutions (e.g., Bates and Bowdoin) either do not use it or make the submission of scores optional.

In California, 98% of students who apply to the University of California take the SAT (Geiser, 1998), and our models accordingly simplified this filter slightly by considering only whether students take the SAT, not either the SAT or the ACT.

University system eligibility. The University of California screens students for eligibility to the entire UC system. Ineligible students are for the most part ineligible for admission to any of the eight campuses. However, at the outset of the study period, each campus was allowed to allocate up to 6% of its slots to UC-ineligible students, and up to two-thirds of these slots could be used for admitting disadvantaged students (*1996 Guidelines for Implementation of University Policy on Undergraduate Admissions*, http://www.ucop.edu/sas/exguides.html).

UC system eligibility was based on three criteria. First, GPA and SAT-I scores were combined on a sliding scale to set minimum requirements. (SAT-I refers to the basic verbal and mathematics tests, while SAT-II refers to a number of optional, subject-matter tests.) For example, students with GPAs of at least 3.29 were UC-eligible as long as their combined SAT-I scores were at least 570, while students with GPAs of 3.0 were required to have a combined SAT-I score of at least 1270. Second, students were required to take a set of required courses. Third, students had to take three SAT-II tests, "including writing, mathematics Level 1 or Level 2, and one test in one of the following areas: English literature, foreign language, science, or social studies," although they were not required to attain a specific score on these tests (*Admission as a Freshman*, http://www.ucop.edu/pathways/impinfo/freshx.html).

Our models simplified system eligibility by applying the UC GPA and SAT-I criteria but not the UC requirements for specific courses or for taking SAT-II tests. Because the system-eligibility filter is specific to the University of California system, we conducted parallel analyses that excluded it.

Application to a campus at a given level of selectivity. Students who elect not to apply to an institution remove themselves from the pool of potential students. We lacked data on actual applications, but we did have a record of all institutions to which each student had his or her SAT-I scores sent. We treated sending a score as a proxy for application, thus overestimating by a presumably small amount the actual number of applications. We established a flag indicating whether a student had sent scores to *any* of the campuses within three levels of selectivity (see Appendix A):

- High selectivity: Berkeley and UCLA
- Moderate selectivity: Irvine, Davis, Santa Barbara, and San Diego
- Low selectivity: Santa Cruz and Riverside.

Predicted admission based on GPA and SAT. The probability that each student will be accepted to a campus at a given level of selectivity was predicted using logistic regression models derived from published campus-level admission statistics (see Appendix A).[2] We refer to this as a race-neutral admissions model because the probabilities assigned to students were unaffected by race or ethnicity (or any characteristics other than SAT scores and GPA). These models could not predict admission or rejection for individual students; rather, they predicted the probability of admission for students within a given range of GPA and SAT-I scores. These probabilities were multiplied by the number of students in each range to yield a count of "admitted" students.

Limitations

This study is limited to students who attended high school in California and who took the SAT, and it examines only the impact of race-neutral admission decisions to University of California campuses. Analyses in other states might yield substantially different results. Because this study sorts campuses into three categories and uses one model from one campus within each category to represent all campuses in that category, the findings do not necessarily apply to individual campuses. Moreover, this study is based almost entirely on data collected during the late 1990s, and patterns of application, test-taking, and acceptance may change with time. Nonetheless, we expect that the findings generalize in broad stroke to numerous other state university systems.

This study was also limited by the type of data to which we had access. For example, we had no access to individual-level data about acceptance or rejection, and the aggregate data on admissions probabilities were not available separately by race/ethnicity. That lack precluded more refined and powerful analysis.

The Effects of Current and Race-Neutral Selection on Racial/Ethnic Composition

Estimates of the effects of selection policies on diversity are presented by the selectivity of the institutions, starting with the most highly selective.

Effects in Highly Selective Institutions

Admissions to highly selective institutions were modeled loosely on UCLA and Berkeley. As noted, while the application filter showed whether students applied to either of these two campuses, the regression model used for both was derived from Berkeley data. Use of the UCLA data would not have greatly changed the results (see Appendix A).

The first screen applied, students' decision whether to take the SAT, substantially decreased the percentage of Hispanic students and increased the percentage of Asian students. In 1998, 31% of California high school graduates, but only 19% of those taking the SAT, were Hispanic (Table 1). Conversely, 15% of graduates but 23% of SAT-takers were Asian. This screen, however, only slightly reduced the representation of black students, who constituted roughly 7% of both graduates and SAT-takers. The decision to take the SAT also slightly reduced the representation of white students, who constituted 45% of graduates and 42% of SAT-takers.

It is important to note, however, that eliminating this screen—that is, having all students take the SAT—would not fully eliminate its effects. The students who decide against taking the SAT are presumably lower-achieving on average than those who do take it. Thus if all students took the SAT, many of those who currently do not take it would fail to gain admission because of low scores; and if the SAT were no longer used in admissions, some would fail to gain admission because of weaker academic records.

The UC system eligibility screen had a very different effect: it reduced the percentage of black students substantially and the percentage of Hispanic students more modestly. In 1998, 7% of California students taking the SAT were black, in contrast to 4% of those system-eligible in terms of SAT scores and GPA (see italicized panel of Table 1.) Hispanics constituted 19% of all SAT-takers but 15% of those eligible. Applying the

eligibility screen slightly increased the representation of whites and Asians.

Table 1
Racial/Ethnic Composition, Highly Selective Campuses:
Actual, and Estimated Using All Screens and SAT+GPA Admissions Model

|	Asian, Asian-American, Pacific Islander	Black or African-American	Hispanic	White	Other	Decline to State
Graduates, 1998	15	7	31	45	1	NA
SAT-takers, 1998	22	7	19	42	6	3
UC eligible, 1998	*25*	*4*	*15*	*46*	*6*	*3*
Eligible and applied to high-selectivity school, 1998	*36*	*4*	*15*	*35*	*7*	*2*
Admitted by neutral model, 1998	*38*	*2*	*9*	*42*	*7*	*3*
1995 Admitted class	36	7	19	31	2	5
1997 Admitted class	38	6	15	33	2	6
1999 Admitted class	41	3	10	35	2	9

Note: Race/ethnicity is based on student self-reports for all rows except the "Graduates" row, which is based on reports by school administrators. Estimates are italicized; other numbers are actual counts. Percentages may not sum to totals because of the exclusion of American Indian students and rounding.

Sources: Estimates reflect NBETPP analysis; admission figures are published figures from UC (http://www.ucop.edu/pathways/infoctr/introuc/prof_engin.html); counts of SAT-takers are based on NBETPP tabulations of data provided by the College Board; counts of graduates are from California Department of Education, Educational Demographics Unit (http://data1.cde.gov/dataquest).

Using the application screen—that is, dropping all students who did not apply to Berkeley or UCLA—did not affect the representation of Hispanics or blacks ("Eligible and applied to high selectivity school" row of Table 1). The *number* of minority students dropped by nearly half when this filter was applied, but that decrease was similar to the decrease in the total number of students in the pool. The application filter did, however, increase the percentage of Asian students and decrease the percentage of whites. Assuming that most of the students who requested that scores be sent to a particular campus actually applied for admission to that campus, it appears that Asians are particularly likely and whites less likely to apply to Berkeley and UCLA.

The final screen, the race-neutral admissions function based only on SAT and GPA, markedly reduced the representation of Hispanics and more still that of blacks. Black students dropped from 4% to 2% of the pool at this stage (see "Admitted by neutral model" row of Table 1), while Hispanics dropped from 15% to 9%. The offsetting increase was among white students, not Asians.

These screens have a cumulative effect, progressively reducing the representation of Hispanic and black students in the pool. That effect for Hispanics can be seen in Figure 1, which graphically represents the percentages in Table 1. The second bar shows a dramatic reduction from all graduates to those who took the SAT. The next screen, UC eligibility (simplified, as noted earlier, to reflect only SAT scores and GPA), produced a more modest but still appreciable drop. Application to high-selectivity schools had no effect on the representation of Hispanics, but the race-neutral admissions model reduced it substantially.
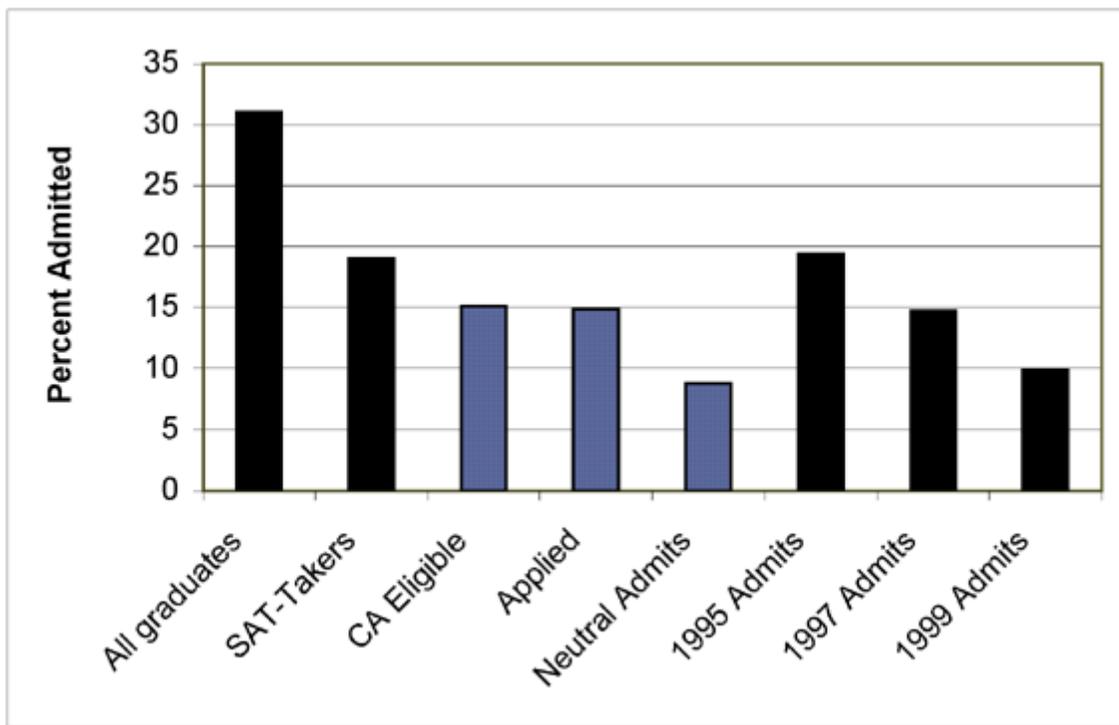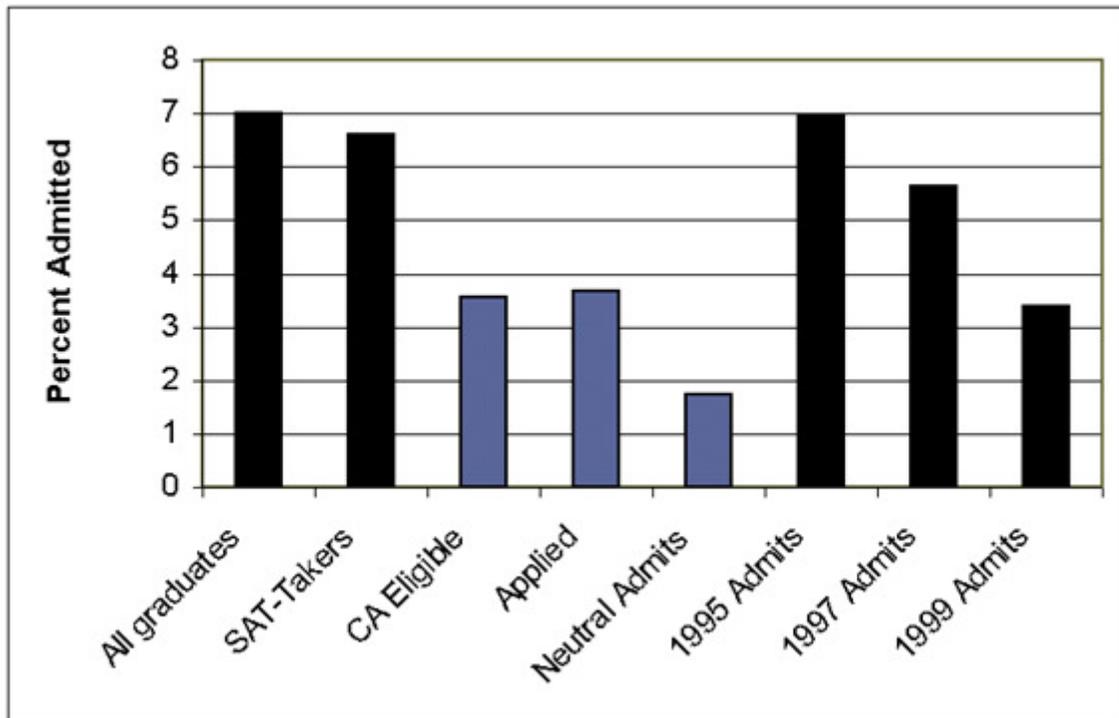

Figure 1. Hispanics as Percentage of Group Admitted, Highly Selective Campuses

SOURCES: See Note, Table 1.

In 1995, before the implementation of SP-1 or Proposition 209, Hispanics constituted 19% of students admitted to Berkeley and UCLA, which was almost exactly equal to their representation in the population of SAT-takers (Figure 1). Hispanics were thus overrepresented slightly relative to their numbers among UC-eligible students and substantially relative to a race-neutral policy. By 1999, after SP-1 and Proposition 209 were implemented, the representation of Hispanics admitted at these two campuses fell to roughly the percentage predicted by our race-neutral model. As Karabel (1998) noted, the admission of minorities fell after the enactment but before the implementation of SP-1 and Proposition 209 (note the drop between 1995 and 1997 in Figure 1).

The cumulative effects of these admissions screens on blacks present a somewhat different picture. While the sharpest drops in the representation of Hispanics arose from self-selection to take the SAT and the use of a race-neutral model, the declines for blacks arose primarily from the UC system eligibility screen and the race-neutral model (Figure 2). In 1995, blacks constituted 7% of students admitted to Berkeley or UCLA, almost exactly matching their representation among SAT-takers and high school graduates (Figure 2). Their representation among students actually admitted to Berkeley or UCLA, like that of Hispanics, dropped in both 1997 and 1999. Their representation among actual admissions in 1999, however, while very low, was substantially higher than was predicted by our simple GPA- and SAT-based race-neutral admissions model.

Figure 2. Blacks as Percentage of Group Admitted, Highly Selective Campuses

SOURCES: See Note, Table 1.

Our model did not match as well the representation of Asian and white students in the admitted pool. In 1999, 41% of the students admitted to Berkeley or UCLA were Asian, and 35% were white. Our race-neutral model predicted slightly fewer Asians (38%) and appreciably more whites (42%) than were actually admitted. We suspect but cannot verify that this is due to differences in the proportions of white and Asian students applying to selective private institutions in California and to colleges outside the state.

Because most states lack the system-eligibility screen used in California, we tested the generality of these findings. We applied the race-neutral admissions model based on SAT scores and GPA to all students who had sought admission to either UCLA or Berkeley and eliminated the UC system eligibility screen. Dropping that screen had almost no effect on the racial/ethnic composition of the group "admitted by neutral model" presented in Table 1. Recall that our simplified system eligibility rule is based solely on SAT scores and GPA, and the admissions model for the highly selective campuses

applies such stringent requirements for those scores that the system eligibility screen is simply irrelevant.

In principle, one simple way to address the underrepresentation of minority students would be to encourage all students to apply to the highly selective campuses. Therefore, in a second simplification, we applied the race-neutral admissions model to all students who took the SAT, regardless of system eligibility and of the schools to which they had their SAT scores sent. This too affected the racial/ethnic composition of the "admitted" pool only slightly. The total number of "admitted" students went up by more than half; the increases in the numbers of "admitted" blacks and Hispanics, however, were roughly proportional to that overall increase.

Some observers have argued that admissions tests such as the SAT should be abandoned in order to produce a student body more nearly representative of the racial/ethnic composition of the entire population. For example, in 1997, a university task force recommended that the University of California drop the SAT as an admission requirement to avoid a precipitous decline in the enrollment of minorities at the university's flagship campuses (Fletcher, 1997). Thus we estimated a second set of race-neutral models, based solely on GPA with no consideration of SAT, to explore how that criterion would affect the diversity of the accepted student population. (See Appendix A.)

A race-neutral model based solely on GPA creates a substantial underrepresentation of both black and Hispanic students, though a somewhat less severe one than that generated by the race-neutral model based on SAT and GPA together. This is shown in Table 2, which presents the racial/ethnic composition of the groups admitted by the SAT+GPA and GPA-only models. The second panel in Table 2, "SAT+GPA," presents estimates (discussed earlier) based on the SAT+GPA race-neutral model.[3] For example, using the SAT+GPA model with students who applied to either Berkeley or UCLA, 9% of those "admitted" would be Hispanic. In contrast, 13% of students selected by the GPA-only model would be Hispanic (third panel of Table 2). Thus the GPA-only model increased by roughly half the percentage of admitted students who are Hispanic; but even with this model, Hispanics were substantially underrepresented relative to the 31% of graduates and 19% of SAT-takers who were Hispanic. Similarly, using a GPA-only model increased the percentage of the admitted group who are black by about half, but would still admit less than half as many blacks as there were either among graduates or among SAT-takers.

Table 2
Racial/Ethnic Composition, Highly Selective Campuses, Estimated Using SAT+GPA and GPA-Only Admissions Models

	Asian, Asian-American, Pacific Islander	Black or African-American	Hispanic	White	Other	Decline to State
Graduates, 1998	15	7	31	45	1	NA

SAT-takers, 1998	22	7	19	42	6	3
SAT+GPA						
Applied and admitted	38	2	9	42	7	3
GPA only						
Applied and admitted	36	3	13	37	7	2

Note: Race/ethnicity is based on student self-reports for all rows except the "Graduates" row, which is based on reports by school administrators. Estimates are italicized; other numbers are actual counts. Percentages may not sum to totals because of the exclusion of American Indian students and rounding.
Sources: Estimates reflect NBETPP analysis; admission figures are published figures from UC (http://www.ucop.edu/pathways/infoctr/introuc/prof_engin.html); counts of SAT-takers are based on NBETPP tabulations of data provided by the College Board; counts of graduates are from California Department of Education, Educational Demographics Unit (http://data1.cde.gov/dataquest).

The improved representation of minority students achieved by using a GPA-only model rather than a GPA+SAT model, however, would come at a price. Grading standards are inconsistent from high school to high school, and there is evidence that they vary across types of school. For example, grading tends to be more lenient in schools with high poverty rates (U.S. Department of Education, 1994). Absent a measure standardized across schools, these inconsistencies would introduce additional arbitrariness into the admission process and could lower the overall level of academic preparedness of the admitted group.

Effects in Moderately Selective Institutions

We classified as moderately selective the campuses at Irvine, Davis, Santa Barbara, and San Diego. Our race-neutral admissions model for these campuses was based on data from Irvine.

The first two screens applied in examining admissions to moderately selective institutions were the same as for highly selective schools—that is, deciding to take the SAT and meeting UC system eligibility requirements. Thus, the representation of non-Asian minority students fell substantially before use of the filter of application to a moderately selective campus: Hispanic representation was reduced by the SAT-taking screen, and black representation by the UC system eligibility screen.

Although the self-selection of eligible students to apply to moderately selective campuses reduced the pool by about 40%, it affected the racial/ethnic composition of the pool only modestly (Table 3). Hispanic students constituted 15% of the eligible pool but 13 % of the eligible students who applied to such an institution. Black students, who constituted a meager 4% of eligible students, made up only 3% of those who were eligible and applied. The representation of Asian-American students increased appreciably with this filter, and the representation of whites dropped.

Table 3

Racial/Ethnic Composition, Moderately Selective Campuses: Actual, and Estimated Using All Screens and SAT+GPA Admissions Model

	Asian, Asian-American, Pacific Islander	Black or African-American	Hispanic	White	Other	Decline to State
Graduates, 1998	15	7	31	45	1	NA
SAT-takers, 1998	22	7	19	42	6	3
UC eligible, 1998	*25*	*4*	*15*	*46*	*6*	*3*
Eligible and applied to moderately selective school, 1998	*32*	*3*	*13*	*42*	*6*	*2*
Admitted by neutral model, 1998	*33*	*2*	*12*	*43*	*7*	*2*
1995 Admitted class	35	3	14	42	4	2
1997 Admitted class	36	3	13	44	3	5
1999 Admitted class	36	2	11	41	2	8

Note 1: Race/ethnicity is based on student self-reports for all rows except the "Graduates" row, which is based on reports by school administrators. Estimates are italicized; other numbers are actual counts. Percentages may not sum to totals because of the exclusion of American Indian students and rounding.
Note 2: An earlier version of this table was corrected on January 17, 2002.
Sources: Estimates reflect NBETPP analysis; admission figures are published figures from UC (http://www.ucop.edu/pathways/infoctr/introuc/prof_engin.html); counts of SAT-takers are based on NBETPP tabulations of data provided by the College Board; counts of graduates are from California Department of Education, Educational Demographics Unit (http://data1.cde.gov/dataquest).

When used with UC-eligible students who applied to one of the four moderately selective institutions, the race-neutral admissions model had little effect on the racial/ethnic composition of the student pool. The number of students fell by roughly one-fourth with use of the admissions model, but the reduction was nearly proportional to the racial/ethnic groups. The percentage of Hispanics decreased only from 13% to 12%; that of blacks dropped from 2.6% to 2.2 %.

For moderately selective campuses as well, our models suggest that by 1999 admissions in all four campuses taken together were largely race-neutral. The composition of the group admitted in 1999 was very similar to that predicted by our race-neutral model (Table 3; compare the "Admitted by neutral model" row with the actual figures for 1999

admissions).

However, at the moderate-selectivity campuses taken together—in contrast to the highly selective campuses—the composition of the classes admitted changed only modestly from 1995 to 1999. Between 1997 and 1999, the percentage of admitted students who were black declined from 3% to 2%, and the percentage who were Hispanic from 14% to 11% (Table 3). These small changes after affirmative action was terminated suggest that racial/ethnic preferences had been much less substantial at the moderately selective campuses, taken together, than at the highly selective campuses.

We again examined the effects of removing the UC eligibility requirements and the application screen. Removing the former only slightly increased the size of the pool of students, and had only trivial effects on the ethnic composition of the accepted student group. In other words, for the most part students who were not UC system eligible either did not apply to any of these colleges or were predicted to be rejected by our admissions model. This was due mainly to students who took the SAT but did not apply to any of the four institutions. Removing the application screen—in effect, having all students who took the SAT apply—increased the number of students "accepted" by more than half. This increase, however, was roughly proportional to racial/ethnic groups, and so would raise the percentage of students who were black or Hispanic only slightly.

Effects in the Least Selective Institutions

In many respects, admission to the least and the moderately selective UC campuses was similar. In both cases, the main reduction in the representation of Hispanics occurred though the self-selection of students to take the SAT (Table 4). The UC system eligibility screen brought a modest further reduction, but the application screen and the race-neutral model had little effect. In contrast, blacks were proportionately represented among SAT-takers, and the primary reduction in the representation resulted from the application of the UC eligibility screen.

Table 4
Racial/Ethnic Composition, Least Selective Campuses: Actual, and Estimated Using all Screens and SAT+GPA Admissions Model

	Asian, Asian-American, Pacific Islander	Black or African-American	Hispanic	White	Other	Decline to State
Graduates, 1998	15	7	31	45	1	NA
SAT-takers, 1998	22	7	19	42	6	3
UC eligible, 1998	25	4	15	46	6	3
Eligible and applied to low-selectivity school, 1998	33	3	16	38	7	2

Admitted by neutral model, 1998	*33*	*3*	*15*	*39*	*7*	*3*
1995 Admitted class	32	4	19	38	4	2
1997 Admitted class	35	3	15	39	3	5
1999 Admitted class	33	3	15	39	2	7

Note: Race/ethnicity is based on student self-reports for all rows except the "Graduates" row, which is based on reports by school administrators. Estimates are italicized; other numbers are actual counts. Percentages may not sum to totals because of the exclusion of American Indian students and rounding.
Sources: Estimates reflect NBETPP analysis; admission figures are published figures from UC (http://www.ucop.edu/pathways/infoctr/introuc/prof_engin.html); counts of SAT-takers are based on NBETPP tabulations of data provided by the College Board; counts of graduates are from California Department of Education, Educational Demographics Unit (http://data1.cde.gov/dataquest).

Admission of black and Hispanic students to the least selective campuses changed little from 1995 to 1999 and matched our race-neutral model reasonably closely in all years. This suggests that students' preferences played little role in admission to these institutions.

The Effects of Admission Filters and Race-Neutral Selection on Other Aspects of Diversity

The diversity of the student body has numerous aspects in addition to race and ethnicity. In this section, we examine the effect of each filter in the admission process on other aspects of diversity: the geographic location and type of the secondary schools students attended, the education level of students' parents, and the languages students speak at home.

Information on these variables was obtained from the Student Descriptive Questionnaire (SDQ) that students complete when registering for the SAT and thus is subject to the errors common to survey data of this sort. For example, students may not consistently characterize the language used in their homes. Because the effects on racial/ethnic diversity are largest at the highly selective campuses, these analyses are limited to them.

Geographic Location

The SDQ offers six options for classifying the location of students' high schools: large city, medium city, small city, suburban, rural, and other. In 1998, 30% of SAT takers in California reported attending a secondary school located in a large city, and 60% in cities of all sizes (Table 5).[4] Thirty percent attended school in a suburban area, and only 5% in a rural area.

Table 5
Geographic Composition, Highly Selective Campuses, Using System

Eligibility, Application, and SAT+GPA Admissions Model

	Large City	Medium City	Small City	Suburban	Rural	Other
SAT-takers, 1998	30	16	14	30	5	5
UC Eligible, 1998	*28*	*17*	*15*	*32*	*6*	*3*
Eligible and applied to high-selectivity schools, 1998	*32*	*16*	*12*	*35*	*3*	*2*
Admitted by neutral model, 1998	*28*	*16*	*12*	*40*	*3*	*1*

Although the effects of the application filters on geographic representation are modest compared with those on racial/ethnic composition, they do somewhat increase the percentage of students who are from suburban schools. All three filters—UC system eligibility, application to a highly selective campus, and predicted admission—contribute to this effect; taken together, they increased the representation of suburban students from 30% of all SAT-takers to 40% of those admitted by a race-neutral model (Table 5). This increase was offset by smaller decreases in the percentages from schools in other locations. Surprisingly, the admission filter had only very small and inconsistent effects on the representation of students from large cities.

School Type

The SDQ allowed students to specify four types of high school: public school, religiously affiliated school, independent school without religious affiliation, and other. Of California students who took the SAT in 1998, 81% attended a public school, 13% attended religiously affiliated schools, 2% attended a non-religious independent school, and 4% attended alternative types of school (Table 6).

Table 6
School Type, Highly Selective Campuses, Using System Eligibility, Application, and SAT+GPA Admission Model

	Public	Independent	Religious	Other
SAT-takers, 1998	81	2	13	4
UC Eligible, 1998	*82*	*3*	*13*	*3*
Eligible and applied to high-selectivity schools, 1998	*83*	*3*	*13*	*1*
Admitted by neutral model, 1998	*83*	*4*	*12*	*1*

The effects of the admission filters on the mix of school types were minor. At all stages of selection, between 81% and 83% of students were from public schools, and 12% or 13% were from religious schools (Table 6). The filters reduced the representation of students from "other" schools and increased that of students from non-religious independent schools, but both of these groups constituted only a small percentage of the total group at each stage.

Parents' Education

Students were asked to report the highest education level attained by their fathers and mothers. The SDQ offered the following response options: grade school, some high school, high school diploma, business school, some college, associate's degree, BA degree, some graduate school, and graduate degree. We collapsed these nine categories into five:

- No high school diploma;
- High school diploma;
- Some higher education;
- College degree (BA degree);
- Beyond BA.

Each of the filters increased the representation of students whose parents had at least a bachelor's degree. The three filters taken together increased the representation of children of college-educated mothers by 50% or more (Table 7). For example, 18% of SAT-takers but 30% of "admitted" students had mothers with more than a BA degree. The two categories of mothers with a BA or beyond were roughly of equal size and showed approximately the same effects. While all three screens contributed to this pattern, use of the race-neutral admissions model had the largest effect. These increases were offset by decreases in the representation of children of the three categories of less-educated mothers, with proportionately the greatest reduction occurring for children of mothers with no high school diploma.

Table 7
Mother's Education, Highly Selective Campuses, Using System Eligibility, Application, and SAT+GPA Admissions Model

	No HS Diploma	HS Diploma	Some Higher Ed	BA Degree	Beyond BA
SAT-takers, 1998	14	16	34	19	18
UC Eligible, 1998	11	14	32	21	21
Eligible and applied to high-selectivity schools, 1998	12	13	28	23	23
Admitted by neutral model, 1998	6	11	25	28	30

The same general pattern appeared with fathers' education, for students who reported that as well, although some specific effects were different. The admission filters—particularly the race-neutral admission model—had more impact on the representation of children whose fathers had post-graduate education. Students who reported that their fathers had more than a BA constituted 24% of all SAT-takers but 43% of "admitted" students (Table 8).

Table 8
Father's Education, Highly Selective Campuses, Using System

Eligibility, Application, and SAT+GPA Admissions Model

	No HS Diploma	HS Diploma	Some Higher Ed	BA Degree	Beyond BA
SAT-takers, 1998	13	14	28	20	24
UC Eligible, 1998	11	12	26	22	29
Eligible and applied to high, 1998	11	10	22	23	33
Admitted by neutral model, 1998	6	7	19	25	43

Home Language

Students responding to the SDQ were given three options for describing the first language they speak at home: only English, English and another language, and another language. As Table 9 indicates, most students who took the SAT in 1998 spoke only English at home; 21% of the SAT takers primarily spoke a language other than English; and 16% spoke a combination of English and another language.

The effects of the admission filters on the representation of these three groups were inconsistent. For example, use of the UC system eligibility filter slightly decreased the representation of students who speak other languages at home, from 21% to 19%; use of the application filter increased their representation to 25%; and use of the race-neutral admission model reduced it again to precisely the level—21%—shown among all SAT-takers (Table 9). We suspect that these effects stem from the fact that the categories "English and other language" and "another language" include some of the Asian students who are overrepresented at the most selective UC campuses.

Table 9
Representation of Home Languages, Highly Selective Campuses, Using System Eligibility, Application, and SAT+GPA Admission Model

	English Only	English & Other Language	Another Language
SAT-takers, 1998	63	16	21
UC Eligible, 1998	65	16	19
Eligible and applied to high, 1998	54	21	25
Admitted by neutral model, 1998	59	20	21

The Effects of Alternative Selection Models on Diversity

The "X%" policies adopted by California, Texas, and Florida are intended to capitalize on the unequal distribution of low-scoring minority students among high schools in order to increase the representation of racial/ethnic minorities in the pool of admitted students. An alternative approach to that end is to give weight to other demographic variables that may act as a proxy for race/ethnicity. In this section, the effects of both

approaches are examined.

Top X % Policies and Other Aspects of Diversity

As summarized above, Geiser (1998) simulated the impact four different X% policies would have on both the racial/ethnic composition and on the average academic preparedness of groups admitted to the University of California. Here, we examine the effect of these policies on other measures of ethnic diversity as well. Unlike Geiser (1998), however, we ranked students solely on their GPAs, an approach that is more consistent with the X% policies actually implemented to date.[5]

We modeled four X% rules. The first ranked all students in public high schools statewide by their GPAs and admitted the top 12.5%. The second ranked all students within each school and admitted the top 12.5% from each school.[6] The third rule admitted the top 6% within each school, and the fourth admitted the top 4% within each school. To yield an admitted group of students that represents 12.5% of graduating public school students, the third and fourth models also accept the top 6.5% and 8.5% of students statewide after removing the top 6% and 4% from within each school, respectively.

The baseline rule is to attract the top 12.5% across the state. Automatically accepting the top 4% from each school before accepting the remaining top 8.5% would not appreciably affect the academic qualifications of admitted students overall or the proportion of black or Hispanic students. Accepting the top 6% within each school would likewise have little effect on diversity and academic qualifications, but it would reduce the mean SAT of accepted black and Hispanic students appreciably relative to the baseline, by 45 and 33 points respectively.

Table 10
Modeled Results of Top 4%, 6% and 12.5% Admission Policies

	White	Asian	Black	Hispanic	Other	Total
Top 12.5% Across State (Baseline)						
% of Admitted Group	49	29	2	10	10	
Mean SAT	1211	1222	1136	1126	1210	1204
Mean GPA	3.87	3.89	3.90	3.93	3.88	3.89
Top 4% Within HS						
% of Admitted Group	49	29	2	10	10	
Mean SAT	1214	1223	1117	1115	1210	1204
Mean GPA	3.88	3.90	3.87	3.93	3.88	3.89
Top 6% Within HS						
% of Admitted Group	48	29	2	11	10	
Mean SAT	1216	1221	1091	1093	1208	1200
Mean GPA	3.89	3.90	3.84	3.89	3.88	3.89

Top 12.5% Within HS						
% of Admitted Group	42	27	4	18	9	
Mean SAT	1198	1173	1001	999	1168	1145
Mean GPA	3.87	3.88	3.60	3.68	3.85	3.83

In contrast, accepting the top 12.5% within each school would have dramatic effects compared with the baseline condition of accepting the top 12.5% statewide. The percentage of admitted students who are black would double, from 2% to 4%, and the percentage of Hispanic students would increase from 10% to 18%. This increase in diversity, however, would occur at the cost of a large drop in the academic qualifications of admitted minority students. The mean SAT scores of black and Hispanic students would drop 135 and 127 points, respectively, and their mean GPAs would drop by .3 and .25, respectively. The academic qualifications of the total admitted pool would drop as well, although less markedly. The mean SAT would drop 59 points relative to the baseline rule.

Accepting the top 12.5% within each school rather than the top 12.5% across the state to would have similar effects on other aspects of diversity. Table 11 shows that moving from 12.5% statewide to accepting the top 4% or 6% within schools would have little impact on the distribution of geographic location, first language, or education level of a student's mother. However, accepting the top 12.5% within schools increases the representation of urban students, students who speak a language other than English at home, and students whose mothers have limited education.

Table 11
Impact of Top X% Policies on Other Aspects of Diversity

	12.5% Across State	4% Within School	6% Within School	12.5% Within School
Location				
Urban	.55	.56	.56	.63
Suburban	.39	.38	.38	.30
Rural	.06	.06	.06	.07
Home Language				
English	.65	.65	.64	.60
Eng. and Other Language	.15	.15	.15	.16
Other than English	.19	.19	.20	.22
Mother's Education				
No HS diploma	.07	.08	.09	.15
HS Diploma	.12	.12	.12	.15
Some Higher Ed.	.30	.30	.30	.30
College Degree	.23	.23	.23	.19

Beyond BA	.23	.23	.23	.18
Missing	.03	.03	.03	.03

Giving Preference to Other Aspects of Diversity

The race-neutral admission models presented above result in an over-representation of white and Asian students. The model for highly selective schools also results in an overrepresentation of suburban students, students who speak only English at home, and students whose parents are highly educated. In this section, we explore the impact on racial/ethnic composition of giving preference to students who are from low-income families, whose mothers have little education, who attended high school in urban or rural areas, who attended high schools with low graduation rates, or who attended high schools in which a high percentage of students received free or reduced-price lunch.[7]

In each of these analyses, we awarded the equivalent of a 200-point SAT bonus to students who came from the most disadvantaged background in terms of one of these variables. The preference awarded for each step on a variable depended on the number of categories the variable had. For example, in this analysis, mother's education had only two categories (BA or beyond versus no BA), while income was broken into 14 categories (Table 12). Accordingly, while all students whose mothers lacked a BA were given the full 200-point preference, each decrease of one step on the income variable warranted an additional 1/14 of the total 200 points, or roughly 17 points per step.

Table 12
Variables, Number of Levels, and Preference per Step Applied in Alternative Models

Variable	Levels	Effective SAT Point Boost Per Level
Income	14	16.67 per step
Mother's Education	BA or Beyond No BA	0 200
HS Graduation Rate	>75% 50 to 75% <50%	0 100 200
Free/Reduced Lunch	Continuous, from 0% to 95%	2.1 for each 1 percent increase in percent free lunch
School Location	Suburban/Other Urban/Rural	0 200

Table 13 displays the effect of giving preference to each variable, first individually and then in combination. When combinations of variables were used, the maximum impact of the combination was set to 200 points. Since school-level data were available only for public schools, these analyses were run on a reduced data set. The first two rows of Table 13 compare the results of the SAT and GPA-only models and show that the reduced and full data set yielded about the same ethnic mix of admitted students.

Giving preference to students based on any of the variables decreases the representation

of Asian students and increases that of white, black, and Hispanic students. Giving preference to students from schools that have low graduation rates and that are located in either urban or rural settings has the largest impact on the representation of white students and the smallest on that of Hispanic and black students. However, giving preference to students whose mothers are less well-educated or whose families are poor has the largest impact on the representation of Hispanic and black students.

Perhaps most important, even the largest effects of giving preference based on demographic variables do not come close to making the representation of black and Hispanic students in the admitted groups proportionate to their numbers in the pool of potential students. As Table 13 shows, even giving preference to urban and rural students with low family incomes, whose mothers have not completed college, and who attend high schools with low graduation rates and high free and reduced lunch rates still results in a dramatic underrepresentation of black and Hispanic students and an overrepresentation of white students.

Table 13
Students Admitted (%)

Modeled Variable	Asian	Black	Hispanic	White	Other	Decline to state
SAT + GPA Full Sample	37.5	1.7	8.8	41.7	7.5	2.8
SAT + GPA Alt. Sample	39.9	1.8	8.3	40.0	7.5	2.4
SAT + GPA + Income	32.6	2.3	11.2	46.0	7.1	0.9
SAT + GPA + Mother's Education	30.0	2.2	11.7	47.9	7.0	1.3
SAT + GPA + Location	29.2	2.2	10.3	48.6	7.1	2.5
SAT + GPA + Graduation Rate	30.5	1.9	9.1	48.8	7.1	2.6
SAT + GPA + Free Lunch	30.6	2.1	10.2	47.4	7.0	2.5
SAT + GPA + Income + Free Lunch + Mother's Ed + Location	30.2	2.1	10.4	48.8	7.1	1.4

Discussion

Our analyses addressed two broad questions: what stages of the admissions process produce the under representation of minorities, and what effects might different admissions processes—including both a strict race-neutral policy and alternative preferences based on variables other than race and ethnicity—have on the diversity of the student population? Investigating these general questions shed light on several others as well: the extent of racial/ethnic preferences in place before the end of affirmative action, the relationships between preferences and the selectivity of campuses, and the effects of alternative admissions policies on the characteristics of admitted students, both minority and non-minority.

Replacing the former admissions process that included preferences with a race-neutral model based solely on GPA and SAT scores had major effects at the two most selective campuses in the UC system but much smaller effects at both moderate- and

low-selectivity campuses. Kane (1998b) found a similar pattern in national data, but the present analyses show that this pattern is maintained even within a single university system in which some admissions criteria are common across campuses. Both black and Hispanic populations were also noticeably underrepresented in our moderately and least selective environments, but this under representation stemmed primarily from factors other than the actual admissions process—in particular, whether a student decided to take the SAT and whether the student met the minimum eligibility criteria for the UC system. Once students passed these two hurdles, the actual admission decision had a substantial impact on the representation of black and Hispanic students only for highly selective campuses.

The adverse effects of a race-neutral admissions process were complex. An under-representation of Hispanics (but not of blacks) arose because of the large percentage of the former group who decided not to take the SAT. (Because we lacked scores for those students, we could not estimate how many would have been admitted had they taken the test.) Scores had an adverse impact at two stages, the UC eligibility stage and the campus-level race-neutral admissions process. However, these effects were in some ways duplicative, and eliminating the UC eligibility screen had little impact on the composition of the groups admitted to highly selective campuses if the campus-level admissions process remained unaltered. The decision to apply to selective campuses had little impact on diversity; the race-neutral admissions model would have produced a similar mix of students even if all students who had taken the SAT had applied.

The adverse impact of a race-neutral admissions policy was not solely the result of group differences in scores on admissions tests. A race-neutral model based solely on GPA also produced an under-representation of minorities, albeit a less severe one. The effects of using GPA alone are smaller because the gap between groups in grades is smaller than the gap in average scores. The reasons for this difference and the potential effects of relying more on GPA, however, remain uncertain.

None of the alternative admissions models we analyzed could replicate the composition of the student population that was in place before the termination of affirmative action in California. Giving preference to students on the basis of other socioeconomic or demographic variables had only modest effects on the representation of black and Hispanic students; none that we examined brought minority students to proportional representation. Some of these preferences, however, increased the representation of whites at the cost of Asians. Guaranteeing admission to top students within each school—the "X-percent rules"—would substantially increase the representation of minority students only if the percentage within each high school guaranteed admission is large. Of the models we examined, only admitting the top 12.5 percent of students from each high school—in effect, basing admission to the UC system solely on rank within high schools—led to a large increase in the representation of black and Hispanic students. Applying the 12.5% rule, however, had a large cost: it caused a sizable drop in both average SAT scores and average GPA, and that decline was particularly large for black and Hispanic students. As Geiser (1998, p. 4) noted, "Redefining the UC eligibility pool to include the top 12.5% of each school would, in short, produce a bifurcated eligibility pool with severe academic disparities along racial/ethnic lines."

Admissions systems differ greatly, and the UC system studied has elements not shared by many others—in particular, the dual screening, first for UC system eligibility and subsequently for admission to a specific campus. Moreover, the effects of preferences

and other admissions policies depend on the characteristics of the student populations from which universities draw. For example, the Hispanic population in Florida is unlike that in California in several important respects, and the effects of admissions policies on access for Hispanic students therefore could be substantially different in Florida.

Nonetheless, we expect that many of the basic conclusions we reached in examining the California system will apply at a general level to many university systems nationwide because group differences in prior academic performance and test scores are typically large. The task of providing access to postsecondary education for underrepresented minorities without frank preferences is likely to be difficult and complex throughout the nation. Many of the alternatives will have unintended effects, such as lowering the average level of qualification among admitted minority students. However, some important details of the impact of alternative admissions policies will vary from one system and population to another. Therefore, it would be prudent to examine proposed alternatives carefully before implementation and to monitor their effects once implemented in order to maximize their positive effects and minimize unintended outcomes.

Notes

This research was conducted under the auspices of the National Board on Educational Testing and Public Policy (NBETPP), and is published here with the Board's permission. The NBETPP is located in the Lynch School of Education at Boston College and is an independent body created to monitor assessment in American education. The NBETPP provides research-based information for policy decision making, with special attention to groups historically underserved by the educational system. In particular, the Board a) monitors testing programs, policies, and products; b) evaluates the benefits and costs of specific testing policies; and c) evaluates to what extent professional standards for test development and use are met in specific contexts.

[1] Note that Geiser's simulation modeled a policy that differs from the actual 4% policy implemented in California. Rather than selecting the top 4% of students from within each high school based on their GPAs, Geiser based selection on students' combined high school GPA and SAT scores.

[2] More precisely, the models were weighted least squares regressions of logits of admissions probabilities on GPA and SAT. This is equivalent except in estimation method to a logistic regression of the probability of admission on GPA and SAT. See Appendix A.

[3] The estimates in Table 2, unlike those in Table 1, do not use the UC system-eligibility screen. That screen is based in part on SAT scores; applying it here would therefore not provide a clear contrast between admissions models that do and do not use SAT scores. The estimates in Table 2 reflect only students who have taken the SAT, however, as we have data for only those students.

[4]Because could not locate data that describe the distribution of all high school graduates in terms of school location, school type, or household language use, we were compelled to use student self-reports from the SDQ for this information. Therefore, the tables in

this section consider no groups larger than the pool of SAT-takers and lack the "Graduates" rows that appear in the tables in the previous section.

[5]Geiser calculated an "Academic Index score" using the following formula: AI = 1,000GPA + 2.5SAT. Geiser then ranked students within schools based on AI.

[6] To determine the top 12.5 % within a graduating class, we used data from the CDE to establish the number of students who graduated and multiplied this by .125. Students were then ranked by their GPA within schools, and the number of students representing the top 12.5% within the graduating class were admitted. The same procedure was repeated for the 6% and 4% models.

[7]These analyses roughly follow the approach Wightman (1997) took in examining the result of giving preference to students with disadvantaged backgrounds for law school decisions.

[8]Because they are simpler to interpret, we also estimated linear probability models. As expected, however, they were problematic. In some cases, they yielded considerably weaker fits, gave impossible estimates for some cells, and showed inappropriate residuals.

[9]Values of 0 and 1 were set to .001 and .999, respectively, to calculate logits.

[10]In the case of Berkeley, the interactive model predicted somewhat better than the non-interactive model, but nonetheless yielded unreasonable estimates for some cells. In the case of Irvine and Santa Cruz, the interaction term added little to prediction.

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Appendix A
Constructing Race-Neutral Admissions Models

The baseline admission models presented in this report are intended to reflect some of the most important characteristics of the University of California system, but it was not possible to match that system precisely. Unlike Bowen and Bok (1998), we lacked data from campuses on the characteristics of individual students, and we lacked important aggregate variables separately by race, such as the probability of acceptance given SAT scores and HSGPA. We lacked campus-level data on the characteristics of the relatively few students admitted despite failing to meet the UC eligibility requirements ("admitted by exception"). More important, we lacked campus-level information on the more numerous UC-eligible students who were admitted for reasons other than only their academic performance, variously measured. Diverse factors, including personal disadvantage and school characteristics, can be used in deciding whether to admit these students, who can constitute 25% to 50% of an admitted class (http://www.ucop.edu/pathways/infoctr/introuc/select.html).

Even without this information, however, it was possible to create an approximation to admission in the UC system as it would operate without racial preferences. The steps we followed are presented here.

The starting point for our baseline models was data showing the numbers of total and accepted applicants by SAT score and HSGPA, separately by campus, for all programs except Engineering. In the data we obtained, SAT scores were broken into five ranges, and HSGPA was broken into six. Table A.1 shows the data we obtained for one of the campuses; these were not further broken into racial/ethnic categories. We analyzed the probability of admission in each cell of this matrix—that is, the ratio of the number admitted to the total number of applicants—separately for each of the eight UC campuses.

Table A.1
Admissions Probabilities, Berkeley
All Programs Except Engineering, 1999

GPA	SAT Composite Score					
	490 - 790	800 - 990	1000 - 1190	1200 - 1390	1400 - 1600	Overall
2.82 - 2.99			149 / 10	115 / 4	16 / 0	280 / 14
			6.70%	3.50%	6.70%	5.00%
3.00 - 3.29	61 / 6	288 / 23	831 / 65	730 / 48	138 / 9	2048 / 151
	9.80%	8.00%	7.80%	6.60%	6.50%	7.40%
3.30 - 3.59	65 / 11	408 / 33	1336 / 94	1620 / 116	423 / 45	3852 / 299
	16.90%	8.10%	7.00%	7.20%	10.60%	7.80%
3.60 - 3.89	52 / 4	421 / 57	1726 / 175	3025 / 414	830 / 259	6054 / 909
	7.70%	13.50%	10.10%	13.70%	31.20%	15.00%
3.90 - 3.99	01-May	59 / 14	353 / 48	798 / 181	198 / 107	1413 / 351
	20.00%	23.70%	13.60%	22.70%	54.00%	24.80%
4	21 / 5	210 / 59	1673 / 506	4775 / 2100	3179 / 2405	9858 / 5075
	23.80%	28.10%	30.20%	44.00%	75.70%	51.50%
Overall	204 / 27	1386 / 186	6068 / 898	11063 / 2863	4784 / 2825	25796 / 7072
	13.20%	13.40%	14.80%	25.90%	59.10%	27.40%

SOURCE: University of California, Office of the President
(www.ucop.edu/pathways/infoctr/introuc/prof_except.html).

As expected, these data show tremendous differences in the selectivity of the UC campuses. The probability of admission to Berkeley along with UCLA, the most

selective, is low for all applicants other than those with both high SAT scores and high HSGPA (Figure A.1). For those with low SAT scores, only very high grades increase the probability of admission at all. Similarly, only very high SAT scores help students with grades as low as B (3.0), and even high scores do not increase the probability of admission greatly.
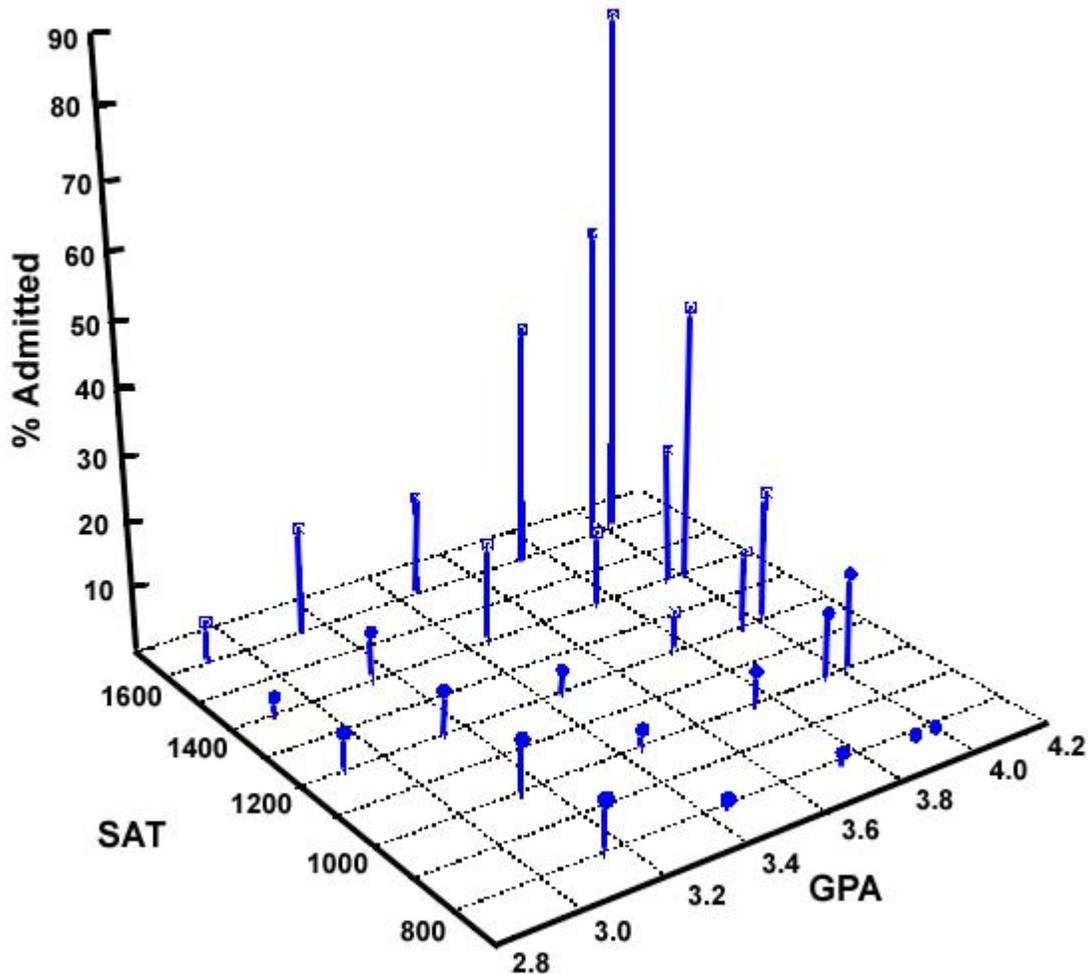
Figure A.1. Probability of Admission to Berkeley, by SAT and GPA

Riverside presents a dramatically different picture(Figure A.2). Most students with either high GPA or high SAT scores are admitted, and acceptance rates are above 50% for most groups in the graph. Note that as a result, the relationship between admissions probabilities and both SAT scores and grades is relatively weak; lines drawn between most points in planes parallel to either the GPA or the SAT axis in Figure A.2 have shallow slopes.
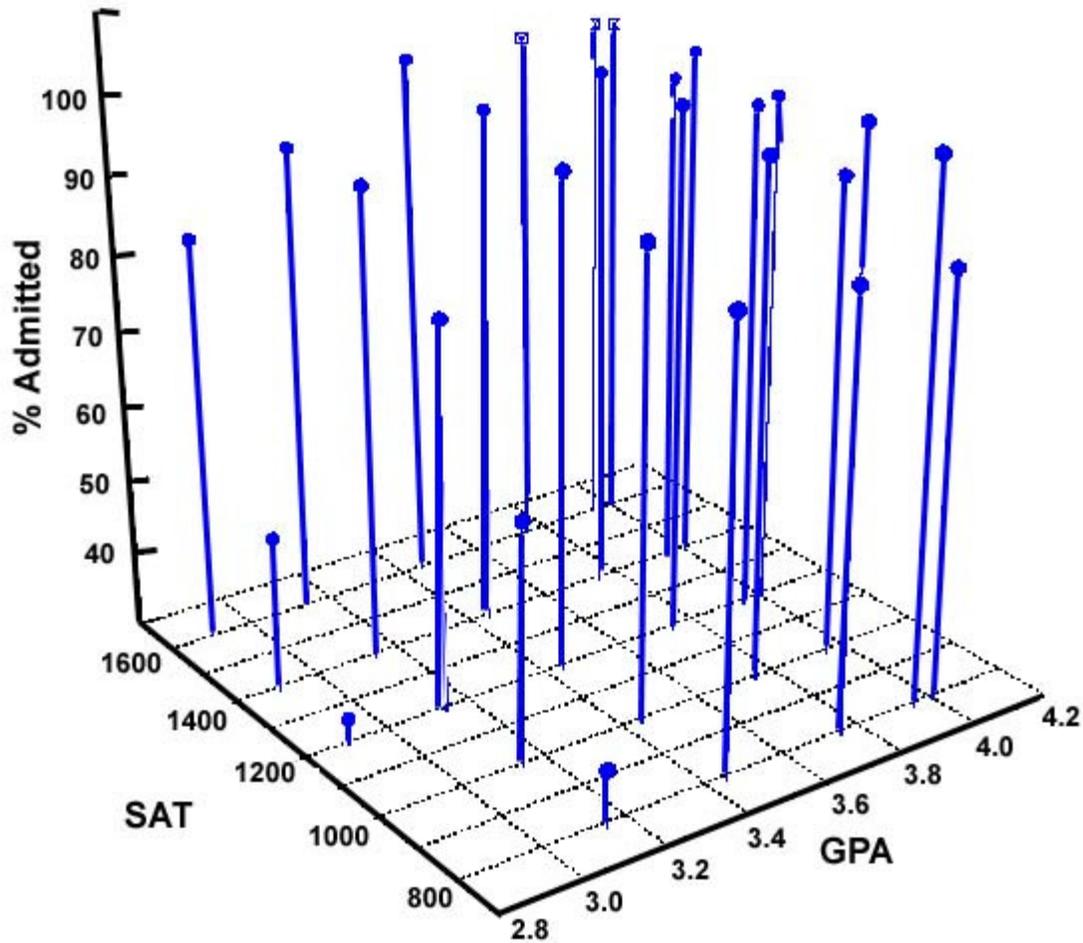
Figure A.2. Probability of Admission to Riverside, by SAT and GPA

To estimate the probability of admission for individual students, we fit models estimating admission probability as a function of SAT scores and GPA, separately for each campus. Given the dichotomous outcome and the distribution of probabilities (the number of cells with either very high or very low probability), we used logistic models to estimate both non-interactive and interactive models. All models were weighted by the number of applicants in each cell.[8] Because all of the variables were categorical, the logistic models could be estimated as ordinary least squares models by taking the logits of the probabilities for each cell[9]:

$$y = \ln\left[\frac{p}{(1-p)}\right] = \alpha + \beta_1 SAT + \beta_2 GPA + \varepsilon \qquad (1)$$

$$y = \ln\left[\frac{p}{(1-p)}\right] = \alpha + \beta_1 SAT + \beta_2 GPA + \beta_3 (SAT \cdot GPA) + \varepsilon \quad (2)$$

These are equivalent to logistic probability models but are simpler to estimate. For example, model 1 is equivalent to:

$$p = \frac{1}{1 + \exp(-\alpha - \beta_1 SAT - \beta_2 GPA - \varepsilon)}$$

These simple logistic models fit the data closely. The R^2 values for the non-interactive models, adjusted for shrinkage, were all greater than or equal to .79, and six of the eight were greater than or equal to .90. The interaction added appreciably to the fit in the case of Berkeley and UCLA but had little impact elsewhere.

Examination of the data and the models suggested that the UC campuses fell into the following three levels of selectivity.

- High selectivity. Berkeley and UCLA were clearly more selective than any of the other campuses. Although the models for these two schools had substantially different parameter estimates, the probabilities they predicted were very similar.
- Moderate selectivity. This group includes four schools: Irvine, Davis, Santa Barbara, and San Diego. They appeared to place somewhat different weights on GPA and SAT scores. Irvine and San Diego showed greater effects of GPA than did Davis and Santa Barbara. Santa Barbara and San Diego showed stronger effects of SAT scores than did Irvine or, especially, Davis. As a group, however, they were distinct from the high- and low-selectivity schools.
- Low selectivity. Santa Cruz and Riverside appeared to be the least selective of the eight campuses. They gave similarly little weight to low SATs; Riverside gave less weight to low GPAs.

These three groups are the basis for our high-, moderate-, and low-selectivity scenarios. The high-selectivity scenario was based on the Berkeley campus. The mid-selectivity scenario was based on the Irvine campus, and the low-selectivity scenario was based on the Santa Cruz campus. The non-interactive logistic model was used in all cases.[10]

Because SAT scores and GPA are correlated in the UC data, we used separate regression models to estimate the effects of selection models based on solely GPA or SAT rather than both. These models were simply:

$$y = \ln\left[\frac{p}{(1-p)}\right] = \alpha + \beta \cdot SAT + \varepsilon$$

$$y = \ln\left[\frac{p}{(1-p)}\right] = \alpha + \beta \cdot GPA + \varepsilon$$

These were estimated using marginal percentages in the data tables such as Table 1.

Using data from the College Board, these models were applied to records of all California high school seniors who took the SAT in 1995 and 1998. Students' SAT-Total and HSGPA were used to place them in cells corresponding to the UC admissions probability matrix, and on that basis each student was assigned a probability of admission to a campus at each of the three levels. The models estimated logits, so the estimated probabilities were simply the anti-logits of the model estimates, that is:

$$\hat{p} = \frac{\exp(\hat{y})}{1 + \exp(\hat{y})}$$

These probabilities were multiplied by the counts in each cell and rounded to get counts of "admitted" students. For certain purposes, the counts provided by each model were adjusted to approximate total admissions for all of the campuses (either two or four) at that level of selectivity, but in most cases, only the characteristics of the "admitted" group (i.e., the percentage of admitted students who were black) were used.

A series of additional flags was created for each student in the College Board database. The data contain no information about actual applications but do include the identities of all schools to which students had their SAT scores sent. Students who sent scores to any of the UC campuses were assumed to have applied to that campus. Four flags were created in this way: sent scores to any campus; sent scores to one of the two high-selectivity campuses; sent scores to any moderate-selectivity campus; and sent scores to any of the two low-selectivity schools. These were treated as application flags but may overestimate applications, presumably by a modest amount. An additional eligibility flag was created using the UC systemwide eligibility criteria for SAT scores and GPA. The UC requirement that SAT-II scores be submitted was not used in creating this flag. All of these flags were set to 0 when the condition was not met and to 1 when the condition was met.

Applying these screens and our baseline admission models in various combinations allowed us to examine the effects of various stages of the admission process and to simulate the effects of alternatives on the composition of the accepted group. For example, removing the application flag provides an upper-bound estimate of the effects of efforts to encourage all UC-eligible students to apply to all campuses; removing the eligibility screen estimates the impact of moving to a system in which students apply directly to UC campuses without first being filtered by a systemwide eligibility screen.

Appendix B
Comparison of Merged and Full Databases

As noted in the body of this report, data on high school characteristics were unavailable for many of the California students for whom we had data from the College Entrance Examination Board. When school characteristics were not needed, we used the full database, but analyses involving any school characteristics were necessarily conducted with a reduced database. This Appendix briefly describes the two databases.

The full database was defined as all students in the College Board database who had valid data on GPA (variable = RECUMGPA) and SAT scores (variable = SATTOTAL). In 1998, that selection criterion left a total of 131,406 out of 152,680 students in the College Board California data. A key school variable obtained from the California Department of Education (Educational Demographics Unit, http://data1.cde.gov/dataquest) was counts of students in grade 12. We were able to merge this variable into the records of 93,027 students who also had valid data on SAT scores and GPA. These 93,027 students are represented in the merged database. Thus, merging school data caused a loss of 29% of the full database.

Although this sample loss was large, tabulations suggest that it did not materially affect our analyses. Table B1 provides a comparison of the racial/ethnic composition of the full and merged databases at four stages of the process of admission to the highly selective campuses. In all cases, the percentages are similar. More important for our purposes, the change in percentages caused by each of the filters is similar in the merged and full databases. The conclusions presented in the paper would not differ greatly if one of these databases were substituted for the other.

Table B1
Racial/Ethnic Composition, Merged and Full Databases
Model Based on SAT+GPA (Row Percents)

	Asian, Pacific Islander	Black or African-American	Hispanic	White	Other	Decline to State
Merged Data						
SAT-takers, 1998	24.2	6.6	19.5	40.2	5.6	2.8
UC eligible, 1998	27.4	3.5	15.3	44.6	5.9	2.4
Eligible and applied to high selectivity schools, 1998	38.4	3.5	14.7	33.9	6.7	2.1
Admitted by neutral model, 1998	39.9	1.8	8.3	40.0	6.9	2.4
Full Database Without Merge						
SAT-takers, 1998	22.4	6.6	19.0	41.9	5.8	3.2
UC eligible, 1998	25.3	3.6	15.1	46.1	6.2	2.9
Eligible and applied to high selectivity schools, 1998	36.0	3.7	14.8	35.4	6.9	2.4
Admitted by neutral model, 1998	37.5	1.7	8.8	41.7	7.0	2.8

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