DOES THE "MISMATCH HYPOTHESIS" APPLY TO HISPANIC STUDENTS AT SELECTIVE COLLEGES?

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INTRODUCTION

The Latino population in the United States is the nation's largest minority group (Fry, 2010a), and it is growing rapidly. From a total of 48 million, or 16 percent of the U.S. population, in 2009 (U.S. Census Bureau, 2010), this population is projected to increase to 133 million, or 30 percent of the total population, by 2050 (U.S. Census Bureau, 2008). Owing partly to this rapid population growth, Latinos (along with Asian and Pacific Islanders) have had the highest rates of undergraduate enrollment growth in recent decades. Latinos' share of total enrollment grew from four percent in 1976 to 13 percent in 2008 (Aud, Fox, & Kewal Ramani, 2010), and it is projected to keep on rising at least through 2018 (Hussar & Bailey, 2009).[1]

At the same time their undergraduate enrollment is increasing, academic outcomes for Latinos are lagging behind those for white students. For example, high school test scores are lower for Latinos than for whites (Aud, Fox, & Kewal Ramani, 2010).[2] Moreover, college graduation rates are lower for Hispanic students than for whites. Of students seeking to complete a Bachelor's degree at four-year institutions, the six-year graduation rate for Latinos is 48 percent, compared to 60 percent for whites (Aud, Hussar, et al., 2010).

As a result of race-based affirmative action, more Latinos enroll in selective colleges and universities than would be the case if admission were based only on prior academic achievement. Simulations show that eliminating positive preferences for black

[1] The increase in freshman enrollment of Latinos at post-secondary institutions in the first year of the recession played a significant role in the recession-era boom in the size of freshman classes. From 2007 to 2008, enrollment of Latinos increased by 15 percent compared to three percent for whites (Fry, 2010b).
[2] The average SAT reading score for 12th-grade SAT test-takers in 2008 was 455 for Hispanics (excluding Puerto Ricans), compared to 528 for whites. In math the average scores were 461 and 537 for Hispanics and whites, respectively.

and Hispanic candidates (while maintaining the Asian "disadvantage") at private selective institutions reduces the acceptance rate for Latino applicants from 27 to 20 percent and results in a 2.1 percentage point decline (from 8 to 6 percent) in the share of admitted students who are Latino (Espenshade & Radford, 2009).[3] "Natural experiments" in states where race-conscious admission in public higher education is no longer practiced show that minority enrollment declines with the elimination of affirmative action (e.g., see Brown & Hirschman, 2006; Tienda et al., 2003).

The admission bonus for Hispanic applicants is the source of much controversy. The argument in favor can be either a remedial or a non-remedial one. The remedial perspective views affirmative action as a way to overcome the effects of past discrimination and open up pathways to social mobility for disadvantaged groups. The non-remedial view centers on the societal benefits of diversity on college campuses. One argument against affirmative action for Hispanics in college admissions centers on reverse discrimination, namely that it is unconstitutional for members of the majority group to be disadvantaged in the selective college admission process solely as a result of their race. A second claim focuses on the potential deleterious consequences of race-based affirmative action. Affirmative action policies assume that underrepresented minority students who are afforded an opportunity to attend selective colleges and universities because of admission preferences will benefit from this experience. Some opponents of affirmative action challenge this assumption and believe that affirmative action, in fact, hurts its intended beneficiaries. Known as the "mismatch" or the "fit" hypothesis, this argument contends that minority students who attend more selective

[3]Eliminating all consideration of race or ethnicity reduces the acceptance rate for Latino applicants to 16 percent and results in a 3.2 percentage point decline (from 8 to 5 percent) in the share of admitted students who are Latino.

institutions because of admission preferences have worse academic outcomes—in particular, lower graduation rates and lower class ranks at graduation—than they would have had in less selective institutions because of a mismatch or discrepancy between their academic preparation and the academic level of the schools to which they are admitted.[4]

The purpose of this chapter is to investigate whether the mismatch hypothesis characterizes the academic performance of Hispanic students at selective colleges and universities. The outcome variables of interest are (1) whether a student graduates within six years from the date of enrollment and (2) a student's class rank at graduation, conditional upon having graduated within six years. According to the mismatch hypothesis, attending a more academically selective institution should lower a student's chances of graduating within six years and also lower her class rank at graduation, holding constant indicators of a student's college academic preparedness and other background characteristics. Data to test these hypotheses come from a set of selective colleges and universities throughout the United States.

PRIOR LITERATURE

The mismatch hypothesis concerns the gap between an individual student's academic preparation and a university's general academic standards. According to this hypothesis, students whose SAT scores and high school grades fall significantly below an institution's average will suffer from poor academic performance in college. If students were better matched to the academic level of the institution, they would have better

[4] Thomas Sowell (2004), one of the most ardent supporters of the mismatch hypothesis, writes, "Put bluntly, many minority students with all the prerequisites for success would be artificially turned into failures because of this pervasive mismatching" (p. 146). See also Sowell (1975, 1993), Thernstrom (1994), Thernstrom & Thernstrom (1997), Graglia (1993).

outcomes, including higher graduation rates, cumulative grade point averages, and class ranks.[5,6]

If the mismatch hypothesis is supported with evidence, there could be important consequences for Hispanic students admitted under race-based affirmative action. A college degree is correlated with higher lifetime incomes, greater access to employer-provided health insurance and pension benefits, and better overall health (Baum & Ma, 2007). Latino students who do not graduate as a result of a mismatch forego these benefits.[7] In addition, ranking lower in one's class also has consequences for later employment. Class rank may be reported to prospective employers and to professional and graduate school admission officers. Poorer academic performance relative to one's peers can also lower self-confidence. If, as a result, such students forego intellectually challenging career fields, attending a selective institution may worsen their future prospects (Cole & Barber, 2003; Davis, 1996).

In reviewing the literature on mismatch in college, we have identified two approaches to assessing the mismatch hypothesis. The first allows the selectivity of the institution to fluctuate, while holding the student's background constant, thereby varying the discrepancy between the student's academic credentials and the institution's academic

[5] Rothstein & Yoon (2008) take a contrasting view and do not interpret declines in class rank as evidence for the mismatch hypothesis. They argue that students who have the same absolute performance will have lower class ranks in more selective schools by virtue of the fact that the competition is greater.

[6] Mismatch is distinct from minority "underperformance," in which minority students perform at lower levels than would be predicted from their academic and socioeconomic backgrounds because of factors like stereotype threat and cultural and social capital deficiency. Thus, studies typically do not consider the lower academic outcomes of black and Hispanic students relative to white students within a school as evidence for the mismatch hypothesis. For an overview of theories of minority underachievement, see Bowen & Bok, 1998; Massey, Charles, Lundy, & Fischer, 2003.

[7] Some students who do not graduate from a particular selective institution transfer to and graduate from another institution. Bowen & Bok (1998) find that 85 percent of selective school students in their sample graduated in six years, and they estimate that an additional seven percent transferred and graduated elsewhere.

standards. The second approach explicitly measures the discrepancy between an individual's SAT score and the institution's average SAT score.

In the first approach, researchers assess the mismatch hypothesis using institutional selectivity, which is typically measured by the mean or median SAT score of an institution's entering first-year class. The central question is: How would minority students have fared if they had attended a less selective rather than a more selective institution—one to which they may have gained access through affirmative action policies. Tests of the mismatch hypothesis use comparisons across institutions that differ in selectivity. Studies using this approach have consistently found that institutional selectivity is associated with a *higher* likelihood of graduation for all racial and ethnic groups, providing strong evidence against the mismatch hypothesis (Alon & Tienda, 2005; Bowen & Bok, 1998; Espenshade & Radford, 2009; Kane, 1998; Small & Winship, 2007; for an exception see Light & Strayer, 2000). In group-specific models, the positive association between selectivity and graduation rates remained for black students (Bowen & Bok, 1998), and in some cases was stronger for black and Hispanic students (Alon & Tienda, 2005). On the other hand, institutional selectivity has been associated with lower class ranks and cumulative grade point averages at graduation, providing evidence in support of the mismatch hypothesis (Bowen & Bok, 1998; Dale & Krueger, 2002; Espenshade & Radford, 2009; Kane, 1998).

Cortes (2010) takes advantage of a change from a race-based to a rank-based admission policy at public universities in Texas to study the effect of institutional selectivity on the academic outcomes of minority students. Following the ban of race-based affirmative action in Texas in 1996, the Top 10% plan was implemented to restore

campus diversity. Under the Top 10% plan, any student in the top decile of her high school class was guaranteed admission to any one of the state's four-year public universities. This change in policy had an insignificant effect on minority students who were in the first decile of their high school classes and who were qualified to be admitted under both admission regimes. But it decreased the number of minority students who were admitted to selective public universities if they were ranked in the second or lower deciles of their high schools. According to the mismatch hypothesis, this change should have improved the academic outcomes of second- and lower-decile students, because these students were better matched at less selective institutions. However, Cortes found that the implementation of the Top 10% plan lowered the freshman retention and graduation rates of minority students in the second and lower deciles.[8]

The second approach used to test the mismatch hypothesis creates an explicit measure for the mismatch between an individual student's academic ability and the academic level of all students at the *same* institution. In some studies, researchers measure the difference between a minority student's SAT score and the institution's average SAT score, coding students who are at or above the institutional average as zero. In other studies, researchers create a set of dummy variables for deviations below the institutional average, using students who meet or exceed the institutional average as the reference group. In both of these variants, in addition to the "mismatch" variable, researchers typically include the individual student's SAT score as a control variable.

[8] Our literature review focuses on mismatch among undergraduate students, but there is also a body of research that uses institutional selectivity to examine mismatch in law schools. For example, in a comprehensive study of 27,000 law school students who entered American law schools in the fall of 1991, Sander (2004) found that selectivity had a negative effect on law school grades for black students, which resulted in their higher attrition from law school, lower bar passage rates, and subsequent problems in the job market. His controversial findings generated a wave of critical responses, none of which, upon reanalyzing his dataset, found evidence for the mismatch hypothesis (Ayres & Brooks, 2005; Barnes, 2007; Chambers, Clydesdale, Kidder, & Lempert, 2005; Ho, 2005; Rothstein & Yoon, 2008).

The mismatch hypothesis would be supported from this perspective if an increase in the (negative) distance between an individual's SAT score and the institutional average SAT score was associated with higher attrition rates, lower graduation rates, and lower class ranks.

Using this approach, Fischer & Massey (2007) found no support for the mismatch hypothesis in their analysis of almost 4,000 students in the 1999 freshman cohort at 28 selective colleges and universities. For black and Hispanic students, they found that an additional 10-point drop in a student's SAT score below the institutional average was associated with an 8.5 percent *decline* in the odds of leaving college by the end of junior year, as well as a small increase in third-semester cumulative GPA. Similarly, among public high school graduates in Illinois attending four-year institutions, Gong (2006) found that the farther a student's ACT score was from the institution's median ACT score, the less likely he was to drop out between freshmen and sophomore year, other things equal. In contrast, Loury & Garman (1993) found evidence supporting the mismatch hypothesis among black students. In an analysis of the National Longitudinal Study of the High School Class of 1972, black students whose SAT scores were more than 100 points below the institutional median SAT score had on average a cumulative GPA that was 0.3 points lower than black students who were not as mismatched.

We use the first approach in our analysis, testing the mismatch hypothesis using institutional selectivity. We prefer this alternative for several reasons. First, mathematically the two approaches work out to be the same thing, except for the arbitrary treatment in the second specification of students at or above the institutional mean.[9] Grouping them together creates a lack of symmetry and introduces the possibility of

[9] Interested readers may consult the authors for a detailed demonstration.

biased estimates into the analysis. Second, it is preferable to include a richer array of measures of academic merit than simply SAT scores. And, third, a test of institutional selectivity has broader implications for policy debates (Alon & Tienda, 2005). Understanding the effects of institutional selectivity on students' academic outcomes has clear implications for affirmative action policies, which aim to increase the number of underrepresented minority students in selective colleges.

Our study extends prior work on institutional selectivity by including interactions between institutional selectivity and race/ethnicity, as well as between institutional selectivity and SAT score. To our knowledge, only one study on the mismatch hypothesis has examined the interaction between selectivity and race/ethnicity (Kane, 1998), finding no statistically significant interaction effects. No studies of which we are aware have examined an interaction between selectivity and SAT score.

DATA AND METHODS

Data to examine these issues come from the National Study of College Experience (NSCE). The purpose of the NSCE is to better understand the process of college admission and an array of campus life issues at academically selective colleges and universities in the United States. Eight selective, majority-white institutions were invited to participate in the NSCE.[10] The set of schools contains public and private institutions; it includes research universities as well as small liberal arts colleges; and it has geographic spread. When gauged in terms of such indicators as acceptance rates, total enrollment, student-faculty ratios, graduation rates, SAT scores of entering

[10] The participating institutions are a subset of colleges and universities in the College and Beyond data base constructed by the Andrew W. Mellon Foundation and studied by Bowen & Bok (1998). NSCE institutions were granted anonymity in exchange for their participation.

freshmen, and alumni giving rates, among other things, these eight colleges and universities are fully representative of the top 50 universities as rated by *U.S. News & World Report* (Espenshade & Radford, 2009). If the often alleged negative effects of race-based college admission are going to show up anywhere it will be here, because it is only the most selective fifth of all four-year colleges and universities that practice race-based affirmative action (Kane, 1998).

NSCE schools provided individual-level data on all applicants for admission in 1983, 1993, and 1997; whether each applicant was admitted and chose to enroll; applicants' race, sex, home address, secondary school attended, measures of academic performance; and whether students were legacy candidates or recruited athletes. We also asked participating institutions to provide information about every matriculant in the 1993 and 1997 entering cohorts on the following: degree date of undergraduate degree, field of the awarded degree, and cumulative GPA when last observed. From these additional data we were able to construct whether a student graduated within four or six years of enrollment, college major, and percentile class rank at graduation.

NSCE institutional data were supplemented in several ways. A 16-page survey instrument was completed by 9,085 students who applied to or attended one of the NSCE schools. This survey asked about such things as satisfaction with college, patterns of social interaction across racial and ethnic lines, extracurricular participation, paying for college, and family demographic and socioeconomic background characteristics. Data on students' standardized test scores, high school GPA and class rank, and high school type were obtained from the Educational Testing Service and The College Board. Finally, it was possible to link to individual student records information from the Department of

Education on high school characteristics and from the U.S. Census Bureau on neighborhood characteristics using zipcode files.[11]

We measured institutional "selectivity" by the average math and verbal SAT reasoning test score of students in the freshman class.[12] An institution qualified for the highest selectivity category if the mean (recentered) SAT score for freshmen in its 1993 and 1997 entering cohorts is greater than 1400. Schools in the middle selectivity category have average freshmen SAT scores between 1300 and 1400. An average SAT score below 1300 among entering freshmen placed an institution into the lowest selectivity tier. Every selectivity category contains at least two schools.

Altogether, 37,378 students are represented by 4,285 sample observations. Roughly 20 percent of these students attended one of the most selective NSCE schools. Approximately one-sixth fell into the second most selective tier, and the remaining 63 percent of students attended another NSCE college or university. The racial/ethnic composition of our study population is as follows: white (74.4 percent), black (7.7 percent), Hispanic (4.5 percent), and Asian (13.5 percent). White students are underrepresented at the most selective NSCE schools and overrepresented at the least selective ones. The opposite is true for Hispanic and Asian students. Table 1 contains descriptive statistics for other variables in the analysis. Because the mismatch hypothesis has most often been discussed in the context of black and Hispanic students, we concentrate our analysis on these groups and comparisons with white students, and leave aside a detailed discussion of results for Asian students.

[Table 1 about here]

[11] See Espenshade & Radford (2009) for an expanded discussion of the NSCE data.
[12] Compare Bowen & Bok (1998). ACT scores were converted to their SAT-equivalents for students with an ACT score but no SAT score.

HYPOTHESES

Empirical tests of the mismatch hypothesis hinge on two outcomes: (1) college graduation rates and (2) class rank at graduation. The mismatch hypothesis would be supported by a negative association between college selectivity and these outcomes, all else equal. In other words, if this hypothesis is to be believed, then an increase in college selectivity should be associated with *lower* college graduation rates and a *lower* class rank at graduation for those who do graduate.

RESULTS FOR COLLEGE GRADUATION

When averaged for the 1993 and 1997 entering cohorts, six-year graduation rates at the eight NSCE institutions range from 84 percent to more than 95 percent. When all institutions are combined, the overall six-year graduation rate is 89 percent.[13] This is an exceptionally high level of college completion. Just 56 percent of students who begin at all four-year colleges and universities complete their degrees in six years (Knapp et al., 2007). College completion rates rise as the level of college selectivity increases in the NSCE sample. For schools in the lowest selectivity tier, the average six-year graduation rate is 87 percent. This completion rate increases to 89 percent for schools in the middle tier of selectivity, and rises still more to 94 percent for students who attend the most selective NSCE institutions. Other researchers who use different data have also found a positive correlation between school selectivity and graduation rates (Bowen & Bok, 1998; Horn, 2006; Kane, 1998).[14]

[13] The corresponding four-year completion rate is 74 percent at NSCE schools.

[14] More substantial variations in college completion rates are found when the data are disaggregated by students' race or social class background. Black students at NSCE schools have the lowest chances of completing college in six years (78 percent), compared with a rate of 92 percent for Asian students.

A Simple Model

But these tabulations do not constitute an adequate test of the mismatch hypothesis. For this, we want to know what the effect of school selectivity is on six-year college completion rates, after controlling for other factors that might also influence these college outcomes. Some preliminary logistic regression results are shown in Table 2, where the outcome measure is whether a student who enrolled at an NSCE college in 1993 or 1997 graduated within six years. Logistic regression is an appropriate statistical technique when the dependent variable is dichotomous. The dependent variable is coded 1 if the student graduated and 0 otherwise. Reference groups are indicated by categories enclosed in parentheses. In addition to the predictor variables shown in the table, these models control for gender, entering college cohort, high school class rank, and attending a women's college.[15]

When the model is fit to all students in our sample, there is no evidence whatsoever to support the mismatch hypothesis. Indeed, quite the opposite is true. Holding constant a student's race, socioeconomic background, and one important indicator of college readiness (SAT score), college completion rates increase as the level of school selectivity increases. Compared to students who enroll in the least selective tier, entering students at top-tier institutions have nearly twice (1.96) the odds of college completion, and the result is statistically significant.[16] Attending a middle-tier school confers an insignificantly small advantage in terms of college graduation.

Graduation rates are roughly 80 percent for students from lower or working-class backgrounds, but rise to about 90 percent for students from middle, upper-middle, and upper-class family situations.

[15] Because these control variables are not the central explanatory variables of interest to the mismatch hypothesis, we do not report their coefficients.

[16] If p is the probability that an event will occur, then $p/(1-p)$ represents the "odds" that it will happen. Odds can also be thought of as the ratio of "successes" to "failures." Odds can vary between 0 (when $p = 0$) and infinity (when $p = 1$).

[Table 2 about here]

Other results in column 1 of Table 2 are also consistent with prior tabulations. Compared to whites, black students have 45 percent significantly lower odds of completing college in six years, which is consistent with an interpretation of academic "underperformance" on the part of black students (Bowen & Bok, 1998).[17] The chances of college completion for Hispanic students are lower than for whites—about 15 percent on average—but the effect is not statistically significant. Students from lower and working-class family backgrounds are 47 percent significantly less likely to graduate within six years than are middle-class students. And, perhaps surprisingly, a higher SAT score does not necessarily predict a higher rate of graduation. The effect is positive, as one would expect, but not significant.

The measured effect of college selectivity in Table 2 is an average effect across students from all racial and ethnic backgrounds. A central question of this paper is whether the mismatch hypothesis is supported when examined in the light of Hispanic students. One way to address this question is to re-estimate the model in column 1 and include interaction terms between race/ethnicity and college selectivity. This allows the effect of college selectivity to vary by race/ethnic category. Doing so shows that the estimated coefficients on the interaction terms are both individually and jointly insignificant (p=.453), which means that we cannot reject the hypothesis that the effects of college selectivity are the *same* for all racial and ethnic groups.

Effects by Race/Ethnic Group. But, of course, including interaction terms in the model is only one way of evaluating the mismatch hypothesis by race and ethnicity. And this approach makes an important assumption—that the effects of all other variables in

[17] See footnote 6.

the model (for example, social class, and SAT score) are the same for all groups. Therefore, a superior test would be to re-estimate the model shown in column 1 for each race-ethnic group separately. These results are shown in the remaining columns of Table 2. Our most important conclusion is that, once again, the mismatch hypothesis receives no empirical support at all. College selectivity is significantly positive at the most selective tier for white and black students, and it is positive (but not significantly so) for Hispanic students. Compared to students who matriculate at an NSCE institution in the lowest category of selectivity, there is no evidence—for any higher tier or for any racial-ethnic group—that attending a more selective institution significantly lowers college completion rates.

It is of interest to note in passing that the effects of some of the other predictor variables in Table 2 do differ depending upon which group is being considered. This finding lends support to the decision to estimate models separately for white, black, and Hispanic students. Coming from a lower or working-class socioeconomic background lowers college graduation rates for white and black students, but not for Hispanic students. For Hispanic students, in fact, having a more privileged upper-middle or upper-class background yields 106 percent significantly higher odds of college completion compared with middle-class students. The insignificant effect of SAT scores in column 1 is clearly dominated by the behaviors of white students. Higher SAT scores are associated with significantly higher chances of college completion for nonwhite students—more so for Hispanics than for blacks.

A More Elaborate Model

The model specification that we fit in Table 2 was used in an earlier study by Bowen & Bok (1998), and it is results such as these that led Bowen (2011) to conclude that his original research, and much of what has come later, has "put a stake through the heart of what is sometimes called 'the mismatch hypothesis'" (p. A68). But the models in Table 2 include only a small portion of the many factors that could plausibly influence college completion rates. The models for graduation rates that we fit in Table 3 include an expanded list of predictor variables. There are more measures of academic performance in high school and college preparedness,[18] a broader array of information that captures families' social class backgrounds, immigrant generation, first-generation college student status, satisfaction with college, and many other potentially important explanatory variables.

[Table 3 about here]

The most important conclusion to draw from Table 3 is that there are no significantly negative selectivity effects anywhere to be found. In other words, none of these models offers support for the mismatch hypothesis. But a second observation is perhaps equally important. When the list of predictor variables is expanded, the positive effects of school selectivity on six-year graduation rates become much weaker. Only for black students is the influence of attending a top-tier school significantly positive. For all students combined and for white students, attending a more selective institution raises the

[18] Indicators of college preparedness include, along with SAT and ACT scores, high school class rank, high school GPA, high school type (including whether the high school is one of the 75 or so most elite secondary schools in the United States, as judged by two seasoned Princeton University former admission deans), number of AP and SAT II exams taken, average SAT II score, and whether the student was a National Merit or National Achievement Scholar. These indicators are usually correlated, but elite college admissions deans typically use all of them to evaluate the preparedness of applicants for the rigors of college academic life.

likelihood of graduating within six years, but the effects are not statistically significant. Only for Hispanic students are the odds of timely college graduation reduced by attending an NSCE school in the most selective or the second most selective tier as compared with a school in the bottom tier. The likelihood of graduating in six years is 36 percent lower for Hispanic students at one of the upper-tier schools compared with one of the least selective NSCE institutions. But readers should note that these effects are not statistically significant. Our overall conclusion from Table 3, when a larger set of plausible predictor variables is included, is that school selectivity does not seem to matter quite as much for college graduation rates. There is no evidence that the effects are negative, which would support the mismatch hypothesis, but the former positive influence of school selectivity has largely disappeared.[19]

There is evidence in Table 3 of academic underperformance on the part of Hispanic students. When all other things are held constant, Hispanics are 43 percent significantly less likely to graduate in six years than white students. In addition, the effect of social class seems to matter less in Table 3 than in Table 2, presumably because Table 3 includes other indicators of families' socioeconomic status background that are correlated with social class. Finally, the effects of SAT scores are "flatter" in Table 3, largely due to the inclusion of other important measures of college preparedness. Hispanic students constitute the lone exception to this pattern. For them, each 100-point

[19] Using essentially the same data in another context, Espenshade & Radford (2009) conducted sensitivity tests to examine why the results for school selectivity when all students are combined differ between Tables 2 and 3. They concluded that the inclusion of additional academic performance measures in Table 3 is largely responsible for the weaker effects of school selectivity. In particular, they reported that, "the reason students at the most selective NSCE schools have the highest odds of graduating [as shown in Table 2] is due not so much to the intrinsic characteristics of the institutions they attend, although these surely must matter to some extent, but instead to their students' superior academic credentials that are not fully captured [in Table 2]" (p. 240).

increase in SAT scores is associated with a 41 percent significantly higher likelihood of graduating within six years—a larger effect than the one estimated in Table 2.

Effects by SAT Scores. The effects of school selectivity we estimate in Table 3 are additive or average effects across all categories of the relevant student populations. We might want to know whether the influence of school selectivity varies according to one or more of these characteristics and, in particular, whether it is the same for all ranges of students' SAT scores. To answer this question, we re-estimated the models in Table 3 by including interaction terms between school selectivity and SAT score. For all groups combined, as well as for white and black students considered separately, the coefficients on the interaction terms are jointly insignificant. But they are significant for Hispanic students (p=.0038). What does this mean?

For each school selectivity category, SAT scores for Hispanic students are positively correlated with college completion rates. But because the interaction term between the second most selective tier and SAT score is significantly positive, the slope on the relation between college graduation and SAT score is much steeper for students at second-tier institutions. Viewed differently, there is not a significant difference between college graduation rates at first-tier and third-tier institutions, and this difference does not vary by SAT score. However, Hispanic students with very high SAT scores (roughly 1350 and above) appear to have a slight college completion advantage if they attend a second-tier NSCE institution instead of a more selective or a less selective one. It should be added that, although some of these college-completion effects may be statistically significant, their substantive impact is nevertheless likely to be small because for this

sample of students and for this collection of colleges and universities, overall graduation rates are uniformly very high.

RESULTS FOR CLASS RANK AT GRADUATION

Percentile class rank at graduation is the other college performance measure that needs to be examined when evaluating the mismatch hypothesis. Even if students graduate on time, attending a more selective institution may have a deleterious effect on class rank. This in turn could have a number of additional disadvantages, not the least of which—as noted earlier—could be lower academic self-confidence and a reduced likelihood of pursuing high academic performance careers such as college teaching.

Participating NSCE colleges and universities supplied information on cumulative GPA when last observed. Having these data from institutional registrars is superior to relying on students' self-reports which are often biased upwards (Kuncel, Credé, & Thomas, 2005). In addition, to correct for possible differences across campuses in grading standards and the potential for grade inflation between our two entering cohorts (one in 1993 and the other in 1997), we have converted cumulative GPAs into percentile class ranks. Finally, percentile class ranks are derived not from all sample members, but from all students in the six-year graduating classes at each institution. This procedure better positions our sample members in the context of all students at their respective colleges and universities.[20]

Among those who graduate within six years, white students generally perform best in the classroom and black students least well (Espenshade & Radford, 2009). The

[20] The median percentile class rank of NSCE sample members is 52, which suggests that sample members are not drawn disproportionately from either the upper or the lower tails of their respective institution's GPA distributions (Espenshade & Radford, 2009).

typical white student graduates in the 57th percentile, whereas the median class rank for blacks is the 20th percentile. The corresponding figures for Hispanic and Asian students are the 32nd and the 52nd percentiles, respectively. When graduating seniors are disaggregated by social class instead of by race, students from higher socioeconomic backgrounds perform better in class and have higher class ranks at graduation than students of more modest means. The typical student from a lower or working-class family graduates in the 33rd percentile, whereas the median middle-class graduate occupies the 48th percentile, and a typical upper-middle or upper-class student graduates in the 58th percentile of the class.

Regression Results

But our central concern is with how variations in college selectivity influence ultimate class standing, controlling for other factors. Our ordinary least squares (OLS) regression results are shown in Table 4, where the dependent variable in each model is percentile class rank at graduation for students who graduated within six years of the date of enrollment. Because the dependent variable ranges continuously between 0 and 100, OLS regression is an appropriate statistical technique. Estimated regression coefficients represent the expected change in ultimate percentile class rank for a one-unit change in the corresponding predictor variable. Control variables are the same as those in Table 3 with the addition of college major. The results for all students combined, shown in the first column, indicate that there is a strong "class rank penalty"—that is, a decline in relative position in the graduating class—for attending a more selective institution. Students who have identical academic credentials and other characteristics can expect to graduate 15.7 percentile points lower in the ultimate class rank distribution if they attend

an NSCE institution in the second most selective tier as compared with a university in the bottom tier. The class rank penalty is almost 19 percentage points at one of the most selective colleges.

[Table 4 about here]

There is also strong evidence for academic underperformance. Holding academic qualifications and school selectivity constant, each group of nonwhite students is expected to perform less well than whites. Underperformance is greatest for black students, but even Asian students exhibit significantly lower class ranks than whites. Social class background has no association with class rank, but SAT scores do matter, and they make a difference in the expected direction. Higher SAT scores are associated with a higher ultimate class rank. And for all students combined, the effect is nonlinear; the boost in class standing for each 100-point increase in SAT scores is largest for students with lower scores and begins to taper off as scores increase.

We want to know whether the effect of school selectivity in Table 4 is the same for all race-ethnic groups. When the model in column 1 is re-estimated by including interaction terms between race and school selectivity, we find that the coefficients on the six interaction terms are individually and jointly statistically insignificant ($p=.207$). We conclude from this exercise that the effect of school selectivity does not vary appreciably by race. However, as we noted earlier, this strategy forces the effects of all other predictor variables in Table 4 to be the same for all race-ethnic groups. A more flexible approach is to estimate the same model for each group separately. These results are shown in the remaining columns in Table 4.

Effects by Race/Ethnic Group. The findings for whites, blacks, and Hispanics corroborate to a good first approximation what the interaction tests confirmed. The class rank penalties associated with attending a more selective college or university are all statistically significant and appear to be fairly similar for each demographic group. Black students, for whom the penalties appear to be smaller, might constitute an exception, possibly because their lower class ranks to begin with leave them with less room to fall as selectivity increases. In general, class standing declines as selectivity increases, but the results for Hispanic students reflect a slight reversal of this pattern. Based on findings in Table 4 for all students combined and for each race-ethnic group considered by itself, we would have to conclude that there is convincing evidence in *favor* of the mismatch hypothesis when ultimate class rank at graduation is the relevant criterion. This is true not just for Hispanic students, but also for whites and blacks. Attending a more selective institution can be expected to lower one's cumulative percentile class standing, other things the same.

Social class makes more of a difference when racial-ethnic groups are disaggregated. For Hispanic students, coming from a lower or working-class family reduces one's class-rank standing at graduation, as compared to middle-class students. There is a class-rank advantage for white students from upper-middle or upper-class backgrounds. The significantly negative effect for higher socioeconomic status black students is a puzzle. SAT scores matter in the expected direction, although only for white students is the effect nonlinear. The weakest estimated effects are for Hispanic students. Finally, one should note that the models in Table 4 explain a substantial portion of the

overall variation in class rank at graduation—roughly 30 percent in each case—which is generally considered a high proportion in cross-sectional data.

DISCUSSION

Although the majority of research on the mismatch hypothesis has focused either on all students combined or on black students, the growth in college enrollment among Hispanics makes it increasingly important to consider the consequences of race-based affirmative action for Hispanic students as well. Using data from the National Study of College Experience, we find no evidence that attending a more selective institution has a negative effect on six-year graduation rates for Hispanic students or for any other racial or ethnic group. However, we do find a strong class rank penalty for attending a more selective institution, both for all racial and ethnic groups combined and for each group considered separately, because attending a more selective college or university means being surrounded by students with stronger academic credentials. Hispanic students who attend a top-tier or second-tier NSCE institution instead of a college in the lowest selectivity tier can expect to graduate about 18 percentile points lower in the class rank distribution, other things equal.

Our findings suggest that attending a more rather than a less selective college entails a trade-off between university "eliteness" and graduating with a lower class rank. Graduation rates are higher, but class ranks are inevitably lower. So where does that leave us in terms of the *net* effect of college selectivity? Espenshade & Radford (2009) and Bowen & Bok (1998) argue persuasively that the benefits of graduating from a more selective college—in terms of attending graduate or professional school, advancing in one's career, and improving future earnings—outweigh the costs of ranking lower in

one's class. Therefore, in light of the mounting evidence, it does not seem reasonable to continue to use the mismatch argument as a justification for eliminating racial preferences in college admissions, which appear on the whole to benefit minority students.

Moreover, in *Grutter v. Bollinger* (2003), the U.S. Supreme Court declared that "student body diversity is a compelling state interest that can justify the use of race in university admissions" (p. 13). Student body diversity brings with it the potential for students from many different backgrounds to mix and mingle on campus, compare ideas and disparate perspectives, and help to maximize the educational benefits of diversity. Hispanic students in the NSCE data were much more likely to interact socially with non-Hispanic students than was the case for any other racial-ethnic group when interacting with other-race students. And Hispanic students were more likely than any other group to say they learned a lot from students whose racial and ethnic backgrounds differ from their own (Espenshade & Radford, 2009). These are encouraging outcomes that need to be nurtured for all students by college deans and vice presidents for campus life.

The prospects for Hispanic students at elite colleges, however, are not entirely favorable. Poorer academic performance relative to one's peers can lower academic self-confidence and cause minority students to forego intellectually challenging career fields (Cole & Barber, 2003). Furthermore, even *well-matched* Hispanic students suffer from academic underperformance. When compared with white students who have similar academic credentials and background characteristics, Hispanic students are significantly less likely to graduate in six years and more likely to graduate with lower cumulative class ranks. Although it is commendable that selective colleges have made efforts to

recruit underrepresented minority students, equal attention should be given to providing academic support for students once they are enrolled. College administrators should consider ways to increase the participation of minority students in classroom discussions and campus activities, as research has shown that students who feel more integrated into the college's academic and social environment are more likely to persist in school (Tinto, 1993; Cabrera, Nora, & Castañeda, 1993). One challenge to integrating minority students into campus life is that these students are more likely to have family responsibilities and off-campus work that draw them away from campus activities (Nora, Cabrera, Hagedorn, & Pascarella, 1996). Thus, school administrators may also need to seek ways to help minority students balance their multiple roles. They could, for example, increase on-campus work study opportunities or provide small grants for child care assistance or travel.

Identifying the characteristics of selective institutions that facilitate minority students' degree completion is one promising approach. Only for black students did we find a positive influence of school selectivity on graduation rates in our expanded model. Further research is needed to explore why black students have higher graduation rates when attending more selective institutions, and what factors account for this difference. In a study of black students at selective colleges, Small and Winship (2007) make progress in this direction, finding that institutional selectivity increases the likelihood of graduation for black students net of institutional wealth, expenditures on student resources, grading leniency, the number of black students on campus, and several other institutional variables. Other potential factors to explore include how minority students at selective institutions are affected by their peers, whether they are motivated by the

status of a degree from an elite institution, and whether they receive more personal attention from faculty and staff. We know of no qualitative studies on the mismatch hypothesis. Interviewing minority students about their experiences at selective colleges and universities would be a fruitful area for future research.

Although we conclude that affirmative action does not appear to harm minority students, it is also important to recognize that race-based affirmative action may have an imperiled life expectancy. Voters in California, Washington, Michigan, Nebraska, and Arizona have overturned the use of racial considerations in public education. Ward Connerly and his Civil Rights Initiative movement are making similar appeals to voters in other states. Former Florida Governor Jeb Bush substituted high school class rank performance for race-based affirmative action as criteria for admission to the state university system. Texas is still using its 10 Percent Plan, adopted once affirmative action was ruled unconstitutional. Even in the U.S. Supreme Court case involving affirmative action at the University of Michigan (*Grutter v. Bollinger*, 2003), the majority opinion written by Sandra Day O'Connor carried an implied sunset provision for race-based affirmative action after 25 years. And, of course, the Supreme Court has turned more conservative since 2003, suggesting the possibility of a different outcome if race-based affirmative action in higher education is revisited before 2028.

These trends point to the gradual asphyxiation of racial considerations in the admission process at selective colleges and universities. If racial considerations are eliminated, it would have at least two important consequences. First, substantially smaller proportions of Hispanic (and black) students would be admitted to the very top institutions of higher education in the United States. These campuses would look

increasingly white and Asian, as has happened at some California universities in the wake of Proposition 209. As the varieties of simulations reported in Espenshade & Radford (2009) have shown, no amount of tinkering with the selective college admission process, including substituting class-based for race-based considerations, has the same power to preserve racial and ethnic diversity on American college campuses as race-based affirmative action. Second, college completion rates for Hispanic students may decline. At least we know from straightforward tabulations of our data that graduation rates are highest at the most selective institutions, largely due to the expansive array of support services for students who encounter academic difficulty.

It would be foolhardy not to anticipate, or at least plan for, a day when racial preferences are no longer permitted. What do we do then? One must recognize that the primary reason race-based affirmative action exists is because of racial/ethnic gaps in academic achievement. Differences in academic outcomes between Latinos and whites appear long before post-secondary education. Hispanic average test scores in both reading and math are lower than white average test scores on the 2009 National Assessment for Educational Progress in both elementary and middle school (Aud, Fox, & Kewal Ramani, 2010). For example, the 4th-grade reading and math achievement gaps between white and Hispanic students were 25 points and 21 points, respectively, out of 500 points. Similar gaps show up in later grades. Moreover, Hispanic high school graduates in 2005 were less likely to have completed courses in geometry, algebra II, trigonometry, statistics, pre-calculus, calculus, biology, chemistry, and physics than Whites (Aud, Fox, & Kewal Ramani, 2010). For example, 6.3 percent of Hispanics had completed a calculus course, compared to 15.3 percent of whites. If achievement gaps

between Hispanic and white students and between black and white students could be closed, then race-based affirmative action could be eliminated with no harm to racial and ethnic diversity on college campuses (Espenshade & Radford, 2009).

Closing these gaps must be given a higher priority than the issue now receives. The thrust of the Obama Administration and Secretary of Education Arne Duncan is on school reform. No doubt schools are justly implicated in the achievement gap, but so are neighborhoods, peer groups, and families. So the challenge to teachers, school administrators, community leaders, parents, and politicians is to put the interests of the children first, to set the bar high, and to provide the resources that are necessary for success.

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Table 1. Descriptive Statistics[a]

Variables	All Groups[b]	Hispanic
Number of Observations	4,285	806
Graduation in Six Years or Less		
Yes	88.8	88.0
(No)	11.2	12.0
Percentile Class Rank at Graduation[c]	51.8	37.9
Race		
(White)	74.4	-
Black	7.7	-
Hispanic	4.5	100.0
Asian	13.5	-
Social Class		
Upper-Middle and Upper Class	55.8	36.3
(Middle Class)	34.2	36.2
Lower and Working Class	10.1	27.5
College Selectivity		
Most Selective Tier	20.6	43.6
Second Most Selective Tier	16.8	19.1
(All Other Colleges)	62.7	37.4
SAT Score[d]	-0.24	-0.40
Gender		
Female	60.0	54.3
(Male)	40.0	45.7
Cohort		
(1993)	47.6	49.6
1997	52.4	50.4
High School Class Rank		
Top 10%	47.5	51.5
Next 10%	18.4	16.4
(Bottom 80%)	9.6	8.1
No Response	5.6	7.5
No SDQ[e]	19.0	16.5

Table 1. Descriptive Statistics (Continued)

Variables	All Groups	Hispanic
High School GPA		
A+	19.9	27.1
A	27.8	26.5
A-	18.3	17.5
(B+ or lower)	14.1	10.5
No Response or Unknown	19.9	18.4
Immigrant Generation		
First Generation	9.1	23.4
Second Generation	15.9	44.1
Third Generation	13.1	19.1
(Fourth or higher) Generation	57.1	9.5
Generation Unknown	4.8	3.9
Employment During First Year of College		
Worked Less than 10 Hours a Week	14.3	16.9
Worked 10 or More Hours a Week	24.5	37.2
(Did Not Have a Job)	59.0	43.8
Unknown	2.2	2.1
Satisfaction with College Social Experience		
(Satisfied)	57.4	56.4
Not So Satisfied	40.6	42.1
Satisfaction Unknown	2.0	1.6
Home Ownership[f]		
Owned Home	90.1	82.8
(Not Owned Home or Unknown)	9.9	17.2
Homework Help[g]		
Often or Very Often	58.3	51.0
(Not Often or Don't Know or Unknown)	41.8	49.0
High School Type		
(Public School, Not Magnet)	68.1	53.9
Public Magnet School	6.4	9.6
Parochial School	8.4	17.6
Private School	14.8	16.7
Unknown Type	2.4	2.2

Table 1. Descriptive Statistics (Continued)

Variables	All Groups	Hispanic
Whether High School Was An Elite High School[h]		
Yes	5.4	4.5
(No)	94.6	95.5
First-Generation College Student Status		
(Not A First-Generation College Student)	80.4	70.3
First-Generation College Student	18.1	28.4
Status Unknown	1.5	1.4
Legacy Status		
Legacy	29.4	18.3
(Not a Legacy)	70.7	81.7
Recruited Athlete Status		
Athlete	19.6	17.2
(Not an Athlete)	80.4	82.8
Whether Received Financial Aid		
Received Aid	46.6	74.0
(Not Received Aid)	50.7	23.5
Unknown	2.7	2.5
Number of Advanced Placement (AP) Exams Taken		
(None)	26.2	25.2
One	17.1	14.8
Two	13.8	16.3
Three	11.4	15.7
Four	8.2	8.6
Five	5.9	5.0
Six	5.4	3.8
Seven	2.0	1.8
Eight or More	2.8	4.5
Unknown	7.2	4.5
Number of SAT II Exams Taken		
One or Two	8.6	5.0
(Three)	30.9	46.6
Four or Five	15.3	19.5
Six or Seven	3.2	2.0
Eight or More	0.2	0.2
Unknown	41.9	26.7

Table 1. Descriptive Statistics (Continued)

Variables	All Groups	Hispanic
Average SAT II Score		
(None Taken or Score Less than 650)	59.4	60.0
650 - 749	26.5	29.9
750 or higher	4.4	2.5
Score Unknown	9.7	7.6
National Merit or Achievement Scholar		
Yes	26.7	26.0
(No)	73.3	74.0
College Major		
(Humanities)	15.6	13.8
Natural Sciences	14.0	10.3
Social Sciences	22.0	33.0
Engineering	8.8	12.6
Other	27.0	16.3
Undeclared or Unknown	12.6	13.9
Attending A Women's College		
Yes	1.8	1.5
(No)	98.2	98.5

Source: National Study of College Experience

Notes:

a- Numbers represent weighted means or percentages, except the number of observations which are unweighted counts. Categories enclosed in parentheses represent reference groups in the regression analysis.

b- All Groups includes white, black, Hispanic, and Asian students.

c- Among those who graduate within six years.

d- Measured as the deviation from 1300, expressed in hundreds.

e- Students did not complete the voluntary Student Descriptive Questionnaire when they registered to take the SAT test.

f- Whether parents owned their home during respondent's senior year of high school.

g- Whether parents helped with homework during primary school.

h- Two seasoned admission deans at Princeton University identified 72 high schools in the United States (both public and private schools) as "among the most outstanding high schools in the country."

Table 2
Odds Ratio Results from Logistic Regressions Examining Six-Year Graduation Rates
Truncated Model[a], NSCE Matriculant Data: 1993 and 1997 Cohorts

Predictor Variables	All Groups[c]	White	Black	Hispanic
Race				
(White)	–	–	–	–
Black	0.55***	–	–	–
Hispanic	0.85	–	–	–
Asian	1.33	–	–	–
Social Class				
Upper-Middle and Upper Class	1.05	1.00	0.82	2.06**
(Middle Class)	–	–	–	–
Lower and Working Class	0.53*	0.39*	0.63***	1.29
College Selectivity				
Most Selective Tier	1.96**	2.15*	1.82***	1.16
Second Most Selective Tier	1.18	1.27	1.11	0.93
(All Other Colleges)	–	–	–	–
SAT Score[b]	1.07	0.99	1.22***	1.31**
Number of Observations	4,285	1,357	1,137	806
Prob > F	0.00	0.00	0.00	0.00

Source: National Study of College Experience.
Notes: All models use weighted observations. Reference categories are shown in parentheses.

a- This model controls for gender, cohort, high school class rank, and attending a women's college, although the coefficients are not reported.
b- Measured as the deviation from 1300, expressed in hundreds.
c- All groups includes Asian-American students.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 3
Odds Ratio Results from Logistic Regressions Examining Six-Year Graduation Rates
Expanded Model[a], NSCE Matriculant Data: 1993 and 1997 Cohorts

Predictor Variables	All Groups[c]	White	Black	Hispanic
Race				
(White)	–	–	–	–
Black	0.67	–	–	–
Hispanic	0.57**	–	–	–
Asian	0.73	–	–	–
Social Class				
Upper-Middle and Upper Class	0.65	0.54	0.63*	1.61
(Middle Class)	–	–	–	–
Lower and Working Class	0.75	0.65	0.87	1.18
College Selectivity				
Most Selective Tier	1.68	2.18	1.71*	0.64
Second Most Selective Tier	1.31	1.64	0.88	0.64
(All Other Colleges)	–	–	–	–
SAT Score[b]	1.06	1.04	1.13*	1.41***
Number of Observations	4,285	1,341	1,108	806
Prob > F	0.00	0.00	0.00	0.00

Source: National Study of College Experience.
Notes: All models use weighted observations. Reference categories are shown in parentheses.

a- This model controls for gender, cohort, high school class rank, high school GPA, immigrant generation, employment during first year of college, satisfaction with college social experience, whether parents owned their own home during respondent's senior year of high school, whether parents helped with homework during primary school, high school type, whether high school was an elite high school, first-generation college student status, legacy status, recruited athlete status, whether received financial aid, number of Advanced Placement (AP) exams taken, number of SAT II exams taken, average SAT II score, National Merit or National Achievement Scholar status, and attending a women's college, although the coefficients are not reported.
b- Measured as the deviation from 1300, expressed in hundreds.
c- All groups includes Asian-American students.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 4
OLS Regression Results for Percentile Class Rank at Graduation[a]
NSCE Matriculant Data: 1993 and 1997 Cohorts

Predictor Variables	All Groups[c]	White	Black	Hispanic
Race				
(White)	–	–	–	–
Black	-15.9***	–	–	–
Hispanic	-13.6***	–	–	–
Asian	-9.8***	–	–	–
Social Class				
Upper-Middle and Upper Class	3.3	4.8*	-3.7*	0.5
(Middle Class)	–	–	–	–
Lower and Working Class	-1.7	-1.1	-1.8	-7.7***
College Selectivity				
Most Selective Tier	-18.9***	-18.4***	-15.5***	-17.7***
Second Most Selective Tier	-15.7***	-14.8***	-5.1*	-18.2***
(All Other Colleges)	–	–	–	–
SAT Score[b]	5.5***	5.3***	6.7***	3.3***
SAT Score Squared	-0.6*	-1.2**	0.4	-0.3
Number of Observations	3,711	1,205	900	706
R-Squared	0.32	0.32	0.29	0.30

Source: National Study of College Experience.
Note: All models use weighted observations. Reference categories are shown in parentheses. This model controls for gender, cohort, high school class rank, high school GPA, immigrant generation, employment during first year of college, satisfaction with college social experience, whether parents owned their own home during respondent's senior year of high school, whether parents helped with homework during primary school, high school type, whether high school was an elite high school, first-generation college student status, legacy status, recruited athlete status, whether received financial aid, number of Advanced Placement (AP) exams taken, number of SAT II exams taken, average SAT II score, National Merit or National Achievement Scholar status, college major, and attending a women's college.
a- For those who graduate within six years.
b- Measured as the deviation from 1300, expressed in hundreds.
c- All groups includes Asian-American students.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$