The Review of Higher Education
Summer 2005, Volume 28, No. 4, pp. 455–474
 (ISSN 0162-5748)

Predicting College Success with High School Grades and Test Scores: Limitations for Minority Students

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"It's a wonderful, wonderful day—a victory for all of higher education, because what it means at its core is that affirmative action may still be used and the court's given us a road map to get there" (CNN, 2003). This was the response of Mary Sue Coleman, president of the University of Michigan, shortly after the U.S. Supreme Court's rulings on *Grutter v. Bollinger* and *Gratz v. Bollinger,* the cases questioning the role of affirmative action in college admissions. Though the rulings supported broad definitions of academic merit that include such factors as race or gender, they also struck down the more rigid point system used by the University of Michigan with

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its undergraduate applicants. A few months after these rulings, the "comprehensive review" process used at the University of California, Berkeley came under fire as critics noted that Berkeley denied too many students with high SAT scores in favor of some with lower scores (Hebel, 2003; Hong, 2003).

At issue throughout these cases are competing definitions of merit: one more narrowly focused on points (high school grades) and scores (SATs), and a second unable to use point systems, yet aiming to more broadly consider factors such as race and gender (affirmative action) or special talents and experiences with adversity (comprehensive review). To be successful, any road map to effective use of affirmative action or comprehensive review needs a deeper understanding of the nuances of the relationships between standardized tests, high school grades, and college success.

Common arguments regarding standardized tests and students of color suggest that test bias presents an unfair disadvantage to students of color. However, recent studies suggest that differences in the predictive strength of test scores for academic achievement may be due to factors other than test bias (Fleming, 2002; Fleming & Garcia, 1998; Hoffman, 2002). We posit that such factors influence the ability of standardized tests to predict success not only for racial minority students, but also for religious minority students. The purpose of this study is to compare the predictive strength of high school grades (a measure of achievement) and standardized tests (a measure of aptitude and ability) for racial and religious cohorts of students attending a predominantly White Lutheran university.

LITERATURE REVIEW

A significant body of literature shows that both high school grade point averages (GPAs) and scores on standardized tests such as the SAT or the ACT are generally strong predictors of student success in college for students of all races (Astin, Korn, & Green, 1987; Fleming, 2002; Kim, 2002; Moffat, 1993; Ramist, Lewis, & McCamley-Jenkins, 1993; Tross et al., 2000; Waugh, Micceri, & Takalkar, 1994; Wolfe & Johnson, 1995; Zheng et al., 2002). Several studies also suggest that high school grades are better predictors of success than standardized test scores (Hoffman, 2002; Munro, 1981; Zheng et al., 2002). More recent efforts have examined academic achievement, retention, and student satisfaction independently as measures of success.

ACADEMIC ACHIEVEMENT

Several studies found that high school grades more accurately predict academic achievement than any other factor (Camara & Echternacht, 2000; Fleming, 2002; Fleming & Garcia, 1998; Hoffman, 2002; Munro, 1981; Tross

et al, 2000; Zheng et al., 2002). Additional research demonstrates that standardized tests are related to academic achievement, though the relationship is not as strong as for high school GPA. The gap between the predictive strength of test scores and high school grades for academic achievement in college widens for several minority groups (Hoffman, 2002; Moffat, 1993; Nettles, Millet, & Ready, 2003). Gregory Moffat (1993), for example, found that the SAT was a valid predictor of achievement for White students under age 30, but not for Black students or students over age 30. Michael T. Nettles, Catherine M. Millet, and Douglas D. Ready (2003), after controlling for socioeconomic differences between Blacks and Whites, found that this gap narrowed significantly, though not completely. Jacqueline Fleming and Nancy Garcia's (1998) study of Black students at eight predominantly White institutions (PWIs) found a difference of only 1.8% in the variance of college grades between White and Black students admitted on the basis of aptitude tests. These differences in predictive strength may be due to differences in the environment after matriculation, not just differences in the tests. Though the variance is minimal, two recent studies show that test scores predict academic achievement better for Black students, especially Black men, who attend historically Black colleges and universities (HBCUs) (Fleming, 2002; Fleming & Garcia, 1998).

Retention

Much of the early research addressing retention as a measure of success was based on Vincent Tinto's (1975, 1993) model of withdrawal, which considers the degree of fit between individual students and the college environment, as mediated by academic and social involvement. These studies simultaneously assessed the influence of high school grades and test scores on retention (Munro, 1981; Pascarella & Terenzini, 1983). Ernest Pascarella and Patrick Terenzini (1983) found that students' experiences after they arrive on a college's campus are more important than students' background characteristics when considering persistence; high school GPA and test scores had no direct influence on persistence. Barbara Munro (1981) came to a similar conclusion and suggested that precollege characteristics including high school grades and test scores helped in predicting college integration for students but did not have a direct effect on "dropout decisions" (p. 133). More recent research reflects inconclusive results on the relationship between high school grades and test scores with college retention. Alexander Astin, Lisa Tsui, and Juan Avalos (1996) found that students with stronger high school GPAs and higher test scores are more likely to graduate. However, other studies found only the influence of high school GPA to be statistically significant (Hoffman, 2002; Waugh et al., 1994).

More recent theories regarding minority student retention address the importance of positive validation experiences (Rendón, 1994; Rendón,

Jalomo, & Nora, 2000; Saggio, 2003), especially when related to students' abilities to apply academic skills in unfamiliar and potentially unfriendly environments (Attinasi, 1989; Throgmorton, 1999; Tracey & Sedlacek, 1987). Such experiences may be related to the satisfaction of minority students.

Satisfaction

Much of the relevant research addressing student satisfaction focuses on racial hardships that minority students face when attending PWIs (Brown, 2000; Loo & Rolison, 1986; Schwitzer, Griffin, Ancis, & Thomas, 1999). Key challenges facing minority students include under-representation and a sense of alienation (Loo & Rolison, 1986; Schwitzer et al., 1999). Tamara Brown's (2000) study researching the satisfaction of African American students at PWIs noted that both academic and social support from an institution play crucial roles in student satisfaction, and emotional support plays a more influential role for women than for men. Chalsa Loo and Garry Rolison (1986) found both academic and social support critical to satisfaction; their study assessing all races found that satisfaction with academics generally compensates for the feelings of social isolation and underrepresentation experienced by minority students. Research by John Hoffman (2002) indicated that satisfaction can be linked to patterns of cocurricular involvement, especially for non-majority students.

Involvement

With few exceptions, recent studies suggest that student involvement positively mitigates the relationship of precollege characteristics including high school GPAs and test scores with each of the above-noted measures of student success (Astin, 1993; Grayson, 1997; Hanson & Swann, 1993; Hoffman, 2002; Kuh, 1993, 1995; MacKay & Kuh, 1994; Pritchard & Wilson, 2003; Rodriguez et al., 2000; Tross et al., 2000). Additional literature considers differences in the level and influence of involvement for African Americans attending HBCUs as compared with PWIs. Several authors suggest that Black students become more involved, and thus more successful, at HBCUs (Allen, 1987; Wagener & Nettles, 1998). Other studies found the opposite to be true for students of color attending PWIs (Loo & Rolison, 1986). Involvement for students of color, especially those attending PWIs, seems to be especially influential on student success. Hoffman (2002) found that cocurricular involvement had a strong positive effect on academic achievement and retention for students of color. His study further found that cocurricular involvement had a negative relationship with student satisfaction for students of color, but leadership involvement for these same students had a strong, positive effect. Work by E. Michael Sutton and Walter Kimbrough (2001) showed that involvement in Greek organizations for Black students attending PWIs was positively related with academic achievement.

Religious Differences

Few studies have addressed the impact of religious differences on student success. William Vélez (1985) used extensive controls of precollege characteristics, including religion, to study persistence to graduation and found that Jewish students were more likely to graduate than peers from other religious cohorts. Alexander Astin (1993) found that both Jewish and Roman Catholic students were more likely than their born-again Christian peers to complete a college degree. Research by Hoffman (2002) showed that high school GPAs were stronger predictors and test scores weaker predictors of academic achievement for non-Lutheran students attending a Lutheran university. This pattern matched the results for students of color attending the same predominantly White institution. Hoffman suggested that "prior achievement (high school grades) may be a stronger predictor of success than ability (test scores) for students facing elements of intolerance in the university" (p. 735). While the results are interesting, the study used a small sample and, given the statistical tools employed, has limited generalizability.

Method

The purpose of this study was to gain a more nuanced understanding of the influence of various precollege characteristics on student involvement and student success for various racial and religious cohorts of students. We paid special attention to differences between measures of aptitude/ability (SAT scores) and prior achievement (high school grades) as predictors of college involvement and success. To guide our study, we posed three hypotheses:

1. In the context of a predominantly White Lutheran university, differences in patterns of involvement and success between White students and students of color will be mirrored between Lutheran and non-Lutheran students.
2. Measures of achievement such as high school grades will be stronger predictors of academic achievement for non-majority students—those facing higher levels of culture shock upon college entry.
3. Measures of ability and aptitude such as standardized tests will be stronger predictors of academic achievement for majority students—those facing low thresholds of culture shock upon college entry.

Setting

We conducted our study at a private Lutheran university in the Southwest. The student body at this university is predominantly White (74.5%) and Lutheran (50.1%). Whereas the Lutheran majority among students is slight, Lutheran influence is strong, since 100% of the full-time faculty are

members of the Lutheran church and the church formally owns and operates the university. As previously noted, a strong body of evidence demonstrates that students of color face unique and accentuated barriers when matriculating to PWIs (Allen, 1987; Attinasi, 1989; DeSousa & Kuh, 1996; Flores, 1992; Loo & Rolison, 1986; Rendón, 1994; Throgmorton, 1999). In contrast, minimal research examines similar religious differences.

Two key assessments performed by external professionals at this site support the thesis that non-Lutheran students also face unique challenges in this setting. In the first, Tommy Lee Woon (1998) noted that "tension about religious differences was the most dominant sociocultural concern in almost every student focus group" (p. 7). A follow-up study conducted in 2003 found little change: "Non-Lutheran members feel alienated or less-than-full participants in the [university] experience" (Yoshino, 2003, p. 7).

Sample and Data Collection

Eight hundred sixty-three full-time degree-seeking students completed the fall semester of 2000. Of these, high school GPAs or SAT scores were unavailable for 174 (20%) students, all transfers. Satisfaction data for an additional 167 students were also unavailable. The resulting sample of 522 (60.5%) was highly similar to the population as a whole with the single exception of underrepresented transfer students. We gathered data for this sample by merging information from two sources into a single database, obtaining information on race, religious affiliation, sex, residence, class, grades, and retention from university files. Satisfaction data were drawn from the Student Opinion Survey (SOS).

The Evaluation and Survey Services (ESS) Department of ACT developed the SOS. The purpose of the survey is to "explore enrolled students' perceptions of an institution's programs, services, and environment" (ACT, 1998, p. 7). Nearly 50,000 students attending over 100 private colleges in 29 states complete the survey annually. Students at the study site complete the survey each year as a part of the spring semester registration process.

The SOS is a highly reliable instrument. A factor analysis study of the SOS revealed factor structures highly similar to groupings used in the instrument, thus providing evidence for the validity of item groupings and subsection scores (Valiga, 1990). Cronbach's alpha for the sample of 522 used in this study was 0.97.

VARIABLES

1. Race. We coded data for race in two ways. In the first set, students of color were coded as 0 and White students as 1 for the analysis of the entire sample. In the second set, we categorically coded the following groups: Asian or Pacific Islander (0); African American (1); Latino (2); Other (3); Refused

(4); and White (5). These groupings were taken from data collected using Integrated Postsecondary Education Data Systems (IPEDS) categories.

2. Religion. Given the lack of religious diversity at the setting, we focused on differences between Christians of various denominations attending the predominantly Lutheran university. Religion was coded in the same way as race: the first set of data coded 0 for non-Lutheran students and 1 for Lutheran students, and the second set categorically coded students as Catholic (0), Lutheran (1), Non-Christian (2), Non-denominational Christian (3), Other (4), or Mainline Protestant (5).

3. Sex. Sex was coded 0 for males and 1 for females.

4. Hours worked. Students self-reported the average number of hours worked per week in the Student Opinion Survey. The researchers coded responses in six categories: 0 (0), 1–10 (1), 11–20 (2), 21–30 (3), 31–40 (4), and more than 40 (5).

5. Aid. Students self-reported receipt of aid (yes or no) in the SOS. The researchers coded "no" responses as 0 and the "yes" responses as 1.

6. High school achievement. We used students' high school grade point averages for this variable.

7. Ability. We used composite SAT scores as the measure for student verbal and mathematical reasoning ability.

8. Housing. Housing was a dichotomous variable in which we distinguished between students living off campus (0) and those living on campus (1). University policy requires all students to live either with parents at home or in the residence halls.

9. Class. We coded class-level as 0 for first-year students, 1 for sophomores, 2 for juniors, and 3 for seniors.

10. Involvement. We used students' self-reported use of services and activities as their measure of involvement.

11. College academic achievement. Academic achievement was a continuous latent variable with factor loadings for two measured variables: fall and spring term GPA.

12. Retention. We coded this dichotomous variable 0 for students who withdrew and 1 for students retained from fall-to-fall.

13. Satisfaction. Student satisfaction was a continuous latent variable with factor loadings from three sets of measured variables: one set for satisfaction with college services, one for satisfaction with the college environment, and one for overall satisfaction with the college in general.

Data Analysis

Figure 1 reflects the *a priori* path analysis model (the model developed from theory and research literature, not from statistical patterns in the current sample) that we tested in this study. This model uses the separation of

academic and social involvement that Vincent Tinto suggests (1975, 1993) but expands his definition of success to include academic achievement and satisfaction in addition to retention. We used confirmatory factor analysis (CFA) to compare naturally emerging structures within the data with the theoretical structures posited in the *a priori* model for the latent constructs of academic achievement and student satisfaction.

We then conducted several tests of fit for the overall measurement model. Because the chi-square is prone to falsely confirming model fit with smaller samples, we used four fit indices to evaluate the measurement model. Li-tze Hu and Peter Bentler (1999) suggested the following cut-off values for good models: Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) values greater than .95, root mean square error of approximation (RMSEA) values less than .06, and standardized root mean square residuals (SRMR) of less than .08.

After testing the model, we analyzed it using structural equation modeling (SEM) with both latent and observed variables. SEM simultaneously regresses the measured and latent variables in a path model. Thus, we simultaneously regressed each of the involvement measures using maximum likelihood estimation on each of the nine input variables. The three success measures were regressed on the nine input variables and the two involvement measures.

The results revealed the influence of each of the inputs on the involvement measures, while statistically controlling for the effects of the others. The results further showed the influence of the inputs and the involvement measures on success while controlling for the influence of the other inputs and the involvement measures. SEM is stronger than standard regression techniques including stepwise and hierarchical regression because theory drives the introduction of statistical control into the model and indirect effects may be considered.

RESULTS

Model Fit

The initial testing of the measurement models had weak results. However, modifications of the measurement model excluding the variables for receipt of financial aid and average number of hours worked significantly improved model fit. This alteration may reflect weaknesses in these two measured variables. The Student Opinion Survey codes receipt of aid dichotomously, yes or no. Strong model fit considering the influence of aid may require measurement variables that consider the amount of aid received, different forms of aid packaging, and differences between receipt of need-based and merit-based aid. Measurement variables considering the

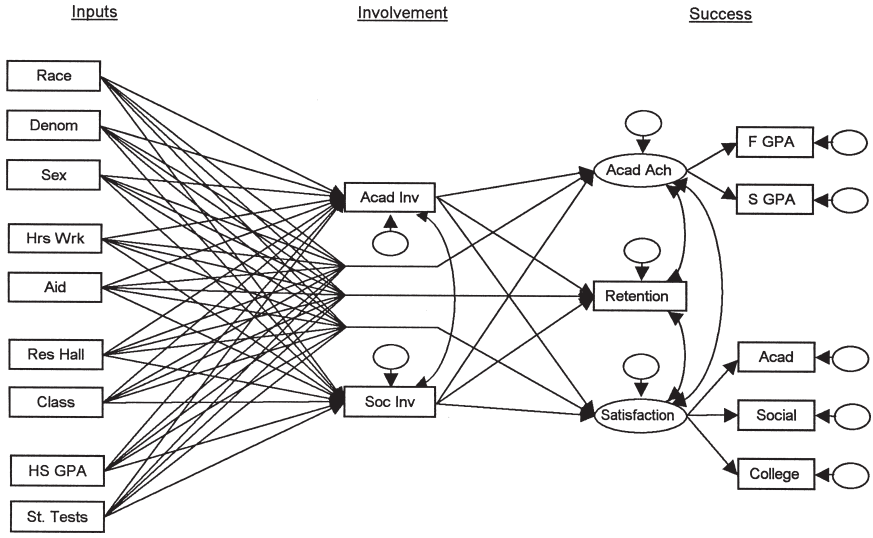

Figure 1. The a priori *path analysis model: influence of input items on measures of success as mediated by academic and social involvement. Standard practice presents directly measured variables in boxes and latent variables in ovals. Direct relationships are presented using straight arrows; simple correlations are presented using curved arrows.*

average number of hours worked may need to consider differences between on-campus work (e.g., work study programs) and off-campus employment. We eliminated cohorts for which all four fit indices did not meet Hu and Bentler's (1999) minimum cut-off values from final consideration. Poor fit for these models is likely the result of small sizes for the rejected cohorts. Table 1 reviews the CFA analysis for each of the cohorts tested using the revised model.

Influence on Student Involvement

Table 2 reviews the influence of the input characteristics on reported use of academic and social services. Several sets of results support the hypothesis that involvement and success differences between White students and students of color would be mirrored between Lutheran and non-Lutheran students. The influence of class-level on use of academic services was strong for students of color (.24) and non-Lutheran students (.18), but moderate for White students (.13) and statistically insignificant for Lutherans. Likewise, the influence of living in the residence halls on social involvement was significantly stronger for students of color (.53) and non-Lutherans (.41) than for White students (.35) and Lutherans (.33). The influence of living

TABLE 1

EVALUATION OF THE MEASUREMENT MODEL: FIT INDICES

Sample Cohort	*N*	*CFI*	*TLI*	*RMSEA*	*SRMR*
Accepted Cohorts					
Entire sample	522	.99	.96	.05	.03
White cohort	401	.99	.97	.04	.03
Students of color	121	.99	.99	.03	.04
Lutheran cohort	269	.99	.97	.04	.03
Non-Lutherans	253	.99	.99	.02	.03
Rejected Cohorts					
Latino cohort	54	.94	.84	.08	.06
Catholic cohort	52	.93	.90	.07	.05
Mainline Protestant	53	.96	.94	.07	.06
Nondenominational	114	.95	.93	.00	.03

Note: Strong model fit is reflected by (a) a CFI and TLI values greater than .95, (b) a root mean square error of approximation (RMSEA) of less than .06, and (c) a standardized root mean square residual (SRMR) of less than .08.

in the residence halls on academic involvement was strong for students of color (.31), but weak and significantly nonsignificant for White students. While not at a statistically significant level, the pattern is similar to that for Lutherans and non-Lutherans. These results thus provide moderate support for the shared experience of racial and religious minorities. However, the opposite pattern exists for the influence of high school grades on involvement. Here, the influence is strongest for White students and non-Lutherans, but weaker or statistically nonsignificant for students of color and Lutherans.

Influence on Student Success

Table 3 reviews the direct relationships of the input characteristics and involvement with the three success measures. Like the influence on student involvement, the results provide moderate support for the hypothesis that involvement and success differences between White students and students of color would be mirrored between Lutheran and non-Lutheran students. The positive influence of living in the residence halls on satisfaction was significantly stronger for students of color (.32) and non-Lutherans (.28) than for their White (.19) and Lutheran (.09) peers. The relationship between high standardized test scores and satisfaction was actually negative for both students of color (-.32) and non-Lutherans (-.11), but positive for

Table 2

Direct Influences on Success Measures

Variable	*Entire Sample*	*Whites*	*Latinos*	*Lutherans*	*Non-Lutherans*
Race					
Acad. inv.	-.02	—	—	.00	.03
Social inv.	.00	—	—	-.02	.15*
Denomination					
Acad. inv.	-.01	.01	-.15	—	—
Social inv.	.08*	.13*	-.10	—	—
Sex					
Acad. inv.	.07*	.05	.23*	.08	.05
Social inv.	.00	.00	.13	-.05	.07
Residence					
Acad. inv.	.08*	.04	.31*	.06	.10
Social inv.	.37*	.35*	.53*	.33*	.41*
Class					
Acad. inv.	.14*	.13*	.24*	.10	.18*
Social inv.	.13*	.13*	.14	.16*	.10*
HS GPA					
Acad. inv.	.14*	.17*	.06	.13*	.16*
Social inv.	.12*	.13*	.01	.08	.16*
SAT					
Acad. inv.	.03	.04	.07	.02	.05
Social inv.	-.04	.03	-.07	-.04	.01

*$p < .05$

White students (.08) and Lutherans (.10). That said, only the first of these four values emerged at a statistically significant level.

Achievement. The results provide partial support for the second hypothesis of this study. When compared with the sample as a whole (.30), high school grades were a stronger predictor of academic achievement for students of color (.33) and non-Lutheran students (.34), but a weaker predictor of grades for Lutheran students (.26). The unexpected result was that high school grades also became a stronger predictor of academic achievement for White students (.34). High school grades served as a strong and statistically significant predictor of retention for students of color, but not for non-Lutherans or either of the majority cohorts. Interestingly, high school grades had a negative relationship with satisfaction for all cohorts. This negative relationship was stronger for White (-.11) and Lutheran students (0.10), though only the White value was statistically significant.

TABLE 3

DIRECT INFLUENCES ON SUCCESS MEASURES

Variable	*Entire Sample*	*Whites*	*Latinos*	*Lutherans*	*Non-Lutherans*
Race					
Acad. ach.	-.13*	—	—	-.19*	-.06
Retention	-.08	—	—	-.02	.02
Satisfaction	.11*	—	—	.24*	.14*
Denomination					
Acad. ach.	.01	.11*	-.07	—	—
Retention	.12*	.19*	.21*	—	—
Satisfaction	-.04	-.10	.08	-.01	-.04
Sex					
Acad. ach.	.14*	.13*	.16	.19*	.06
Retention	-.02	-.04	.24*	-.01	-.03
Satisfaction	-.04	-.05	.27	-.01	-.04
Residence					
Acad. ach.	-.01	-.03	.01	.03	-.05
Retention	-.02	.02	-.28*	-.08	.02
Satisfaction	.19*	.19*	.32*	.09	.28*
Class					
Acad. ach.	.17*	.17*	.07	.18*	.16*
Retention	.18*	.16*	-.05	.18*	.19*
Satisfaction	.18*	.21*	.54*	.17*	.21*
HS GPA					
Acad. ach.	.30*	.34*	.33*	.26*	.34*
Retention	.04	.03	.22*	.05	.03
Satisfaction	-.07	-.11*	-.04	-.10	-.05
SAT					
Acad. ach.	.22*	.18*	.18*	.24*	.18*
Retention	.00	.00	.00	.04	-.03
Satisfaction	-.05	.08	-.32*	.10	-.11
Acad. inv.					
Acad. ach.	.11*	.08	-.03	.11*	.10
Retention	.00	.07	-.28	-.15*	.09
Satisfaction	.12*	.08	-.06	.06	.15
Social inv.					
Acad. ach.	-.08	-.06	-.03	-.09	-.07
Retention	.11*	.04	.31	.20*	.05
Satisfaction	-.04	-.03	.05	-.03	-.04

*$p < .05$

Aptitude/Ability. The relationship of SAT scores to academic achievement was weaker for students of color (.18) and non-Lutherans (.18) than for the sample as a whole (.22), but stronger for Lutheran students (.24). As with achievement, the predictive strength of SAT scores for White students (.18) more closely matched that of the non-majority students than of the Lutheran students. These results provide moderate support for the study's third hypothesis. An interesting negative relationship between SAT scores and satisfaction emerged for students of color (-.32) and non-Lutherans, (-.11), though the latter value fell just short of being statistically significant at the $p < .05$ level. The values for both majority cohorts were positive, though not statistically significant.

Students of Color. Several unique relationships emerged solely for students of color. The strongest of these was a counterintuitive negative relationship between living in the residence halls and retention (-.28). An additional negative indirect relationship between living in the residence halls and retention, as mediated by academic involvement (-.09), fell just short of the cut-off for statistical significance. A second set of relationships showed that women of color were more likely to use academic services (.23) and persist from year to year (.24).

The influence of class level for students of color is also worthy of note. While class level had a strong, statistically significant influence on academic achievement and retention for each of the other three cohorts, the influence for students of color was statistically nonsignificant, and negative. The influence of class-level on satisfaction, however, was more than twice as strong for students of color (.54) than for any of the other cohorts.

Discussion

The results of this study provide moderate support for each hypothesis, though further investigation is clearly necessary. The experience of students of color and non-Lutheran students at this institution is similar in several instances, most notably in the connection between living on campus and involvement and in terms of several relationships with the satisfaction outcome measure. For non-majority students, those likely facing greater culture shock because of race or religion, high school grades became stronger predictors and test scores became weaker predictors of academic achievement when compared with the entire sample and with the Lutheran cohort. Interestingly, these relationships for the White cohort more closely mirrored those of the non-majority cohorts than of Lutherans. Furthermore, the experience of students of color is unique in many ways and not entirely analogous to that of non-Lutherans.

Some researchers (Throgmorton, 1999; Tracey & Sedlacek, 1987) have suggested that the key to success for students of color is finding means to

apply academic skills in unfriendly environments. Louis Attinasi Jr. (1989) posited that involvement at a university for Mexican American students is important, not for its integrative properties, but because it assists students in "developing specific strategies for negotiating the physical, social, and cognitive/academic geographies" of the university (p. 267). Stated another way, the more foreign the cultural geography of a college or university to a potential student, the more important it is to have a cultural road map. Additionally, several theorists suggest that validation by significant others is vital for students of color trying to find and create their own way (Rendón, 1994; Rendón, Jalomo, & Nora, 2000; Saggio, 2003). Such validation experiences may positively influence satisfaction.

Given the results of this study, it may be that prior achievements, as measured by high school grades, coupled with satisfying validation experiences better enable non-majority students to find and create their own way than do their natural abilities or aptitudes, as measured by standardized tests. Recent studies demonstrating that standardized tests are stronger predictors of academic achievement for Black students who attend HBCUs (Fleming, 2002; Fleming & Garcia, 1998) support this thesis. In settings where students of color are not the minority and where it is reasonable to believe that matriculation does not present a significant level of culture shock, standardized tests become stronger predictors of academic achievement.

The potential impact of this thesis on the use of standardized tests in admissions decisions is significant. For any institution wishing to diversify its student body—whether from a current position of being predominantly White, predominantly Black, or predominantly Lutheran—the use of standardized tests may be counterproductive. Given that large numbers of prospective students symbolically equate success on standardized tests with merit for acceptance, deemphasizing or eliminating consideration of test scores would be a politically sensitive move on the part of colleges and universities.

However, as standardized tests are strong predictors of success for some students, we would not necessarily or categorically recommend eliminating their use in all settings. Instead, colleges and universities may need to do a better job of educating constituents about the multiple sets of factors that must be balanced in determining merit and shaping student bodies. Indeed, such inquiry may become a core component of the road map to more effective use of affirmative action or comprehensive review programs.

Further Investigation

The methodology of this study is neither sufficiently strong to generalize the results to students attending dissimilar institutions such as community colleges or public universities, nor to other minority groups such as stu-

dents with disabilities or gays and lesbians. However, support for the underlying thesis of the study should warrant similar studies in different settings and with broader sets of students. Religious difference may not be as stark a cultural difference at public institutions as it is at faith-based institutions, but neither should it be quickly dismissed. Lewis Schlosser and William Sedlacek (2003) note that, though religiously pluralistic, most public universities build their academic calendar around the Christian calendar of holidays, thus privileging some students and not others. Muslim students, for example, need to create unique road maps to navigate the terrain of their education while honoring the holidays of their faith, a task not required of their Christian peers. Given this cultural difference along with others, do high school grades become stronger predictors of success than standardized tests for Muslim students? This question is worth investigating.

The strong relationship between living on campus with both student involvement and student satisfaction is also worthy of note for access-minded institutions, especially in light of the counterintuitive negative relationship between living on campus and persistence for students of color. Strong positive relationships for students living on campus equate to strong negative relationships for students who commute. Given shifting trends toward larger numbers of commuting students or simply creating policies that require or encourage students to live on campus will not suffice. This is especially true as the cost of such residency can be a barrier to attendance for many students. Instead, colleges and universities may need to explore what factors about living on campus aid students in navigating their journeys to academic success and examine how this knowledge can be applied in programs tailored for commuting students.

Limitations

Several limitations to this study warrant specific mention. Data for several variables were self-reported. Many researchers have questioned the validity of such data. C. Robert Pace (1985) suggests that self-reported data are generally valid if (a) the requested information is known to the student, (b) questions are clear, and (c) students believe the questions are worthy of a serious response. The self-reported data used in this study meet each of these criteria. As involvement is a key means by which students learn and become successful in college, more sophisticated measures of student involvement should be used in future studies. This study measured involvement simply with self-reported use of services and did not address either frequency of use or engagement while using services. Given the weakness of this involvement measure, inputs accounted for little of the variance in use of services.

Given model fit limitations, we did not consider the influence of financial aid or the amount of time spent working outside the university. Numerous researchers note the importance of including such measures in statistical models (Cabrera, Nora, & Castaneda, 1992; Hanson & Swann, 1993), especially models exploring the unique influence of precollege and institutional factors on the retention of students of color (Nora, 1990).

A final limitation is that transfer students were significantly underrepresented in this study. Universities generally make greater use of transcripts from previous colleges when considering transfer admission, but many colleges and universities routinely use high school grades and standardized test scores as well. Transfer students may actually face greater culture shock, given the lack of orientation programs to assist in the transition from one institution to another.

Conclusion

In the preface of their foundational work, *The Shape of the River,* William Bowen and Derek Bok (1998) critique the common metaphor of the admissions pipeline:

> This image is misleading, with its connotation of a smooth, well defined, and well understood passage. It is more helpful to think of the nurturing of talent as a process akin to moving down a winding river, with rock-strewn rapids and slow channels, muddy at times and clear at others (p. xxi).

Successful navigation requires accurate maps, often maps that are created along the way as much as they are defined by those who led the way. This process is especially tricky for students engaged with institutional cultures quite unlike their own. For these students, prior achievement seems to be a key to successful navigation. However, standardized tests continue to hold great symbolic power in determining which students merit access to this journey. Thus, another road map is needed—one guiding institutions that are charting the unfamiliar waters of affirmative action and comprehensive review in admissions practice. In June 2003, the U.S. Supreme Court began to sketch a map to and through these waters. Simple formulas and point systems will not suffice. In light of this study and the work of others, neither will simple methods of comparing test scores.

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