

Diversity and Persistence in Indiana Higher Education: The Impact of Preparation, Major Choices, and Student Aid

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**Diversity and Persistence in Indiana Higher Education:
The Impact of Preparation, Major Choices, and Student Aid**

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Abstract

Using a longitudinal database on students who graduated from Indiana's public high schools in 2000 and enrolled in colleges the next academic year, this study examines the impact of student background, academic preparation, institution type, student aid, and college experience on persistence over the first two years of college. By uncovering differences in persistence patterns across diverse groups, we can illuminate factors that inhibit equal opportunity as well as propose policy "levers" that might improve opportunity. This paper challenges popular assumptions regarding parents' education for diverse students and universal models of persistence for all students. While it is apparent that the variables used in this study are associated with attainment by African American, Hispanic, and White students, the variations in findings on each group reveal critical issues, including disturbing relationships between academic major choice and persistence by diverse students.

**Diversity and Persistence in Higher Education:
The Impact of Preparation, Major Choices, and Student Aid**

The concept of the K-16 pipeline, a major focus in the policy literature on education, proposes a strong relationship between high school curriculum and college enrollment. Stimulated by reports from the U.S. Department of Education that used descriptive and correlation statistics to examine the relationship between high school curriculum and college enrollment (Choy, 2002; National Center for Education Statistics [NCES], 1997a, 1997b, 2001a, 2001b), many states, including Indiana (Indiana Commission for Higher Education [ICHE], 2003), have used this logic to promote new requirements for high school graduation and admission to public colleges and universities. The NCES reports focused in particular on the relationship between taking advanced mathematics courses in high school and enrollment in college but also pointed to parent education and the high school peer group. These policy arguments raise a number of complex questions for higher education institutions related to outreach, admissions, and retention.

These efforts to reform high schools have potential implications for diversity on college campuses. This paper takes a step forward in this research-based conversation about pathways for diverse students in K-16 systems by analyzing the impact of a high school curriculum and other policy-related variables on persistence by African Americans, Hispanics, and Whites enrolled in a state system of higher education. Using a class of students who graduated from Indiana's public high schools in 2000 and enrolled in college the next academic year, this study examines the impact of academic

preparation, student aid, and college academic experience on persistence in college. As background, we first describe the logical model used in the study in relation to the policy context for this study. This is followed by a discussion of research methods, findings, and a conclusion that considers implications for policy and practice in higher education.

Background

The policy debate on K-12 education is one of three major issues facing states and institutions of higher education as they adapt to the education policy environment of the early 21st century. The other crucial issues include concerns about public financing of students and public institutions and accountability of public institutions and student. As background, we consider how each of these issues relates to our study, then situate our research.

The K-16 Pipeline

Federal efforts to define a college preparatory curriculum could be a boon for higher education if the changes in curriculum really do enable more students to prepare for college. However, the efforts to transform high schools from the old comprehensive model to fit the new preparatory model raise questions about pathways into and through college. Do students preparing for the arts need the same type of preparatory curriculum as student preparing for math and science? Is it possible that the academic pathways into higher education are far more complex than conceptualized by the narrow pipeline concept?

Another *critical question*, and a focal point in this study, is *how might the efforts to change high school curriculum and graduation requirements influence educational opportunities for diverse groups?* Indiana has been in the forefront nationally on curriculum reform (St. John, Musoba & Chung, 2004a), therefore, it makes good sense to address this critical question by examining Indiana students. There is a great deal of evidence that minority students in general attend high schools that offer fewer advanced courses, but that high achieving minority college students often have had the opportunity to acquire these courses (Trent, Gong & Owens-Nicholson, 2004). From this perspective, there could be advantages to efforts to extend advanced curriculum to all high schools.

Efforts to reform the high school curriculum face many obstacles. There has been a historic problem with ensuring that predominantly minority high schools have teachers who are prepared to teach advanced courses, especially the advanced math courses that are central to the new rationale for academic preparation. Is it possible that these new policies, coupled with limitations in teacher preparation, could push more students out of the educational system altogether, causing higher drop-out rates? Indeed, a recent trend analysis of the impact of K-12 education policies on high school graduation rates in the states revealed that many of the new policies, including the requirement of more math courses for graduation and the implementation of math standards, were associated with lower high school graduation rates in states (St. John, Musoba & Chung, 2004a).

Therefore, studies of the relationships between academic preparation in high schools and success in colleges are important from a policy perspective in states. They can inform policymakers who are interested in promoting these new policies about

alternative conceptions of the policy, as well as provide information to college faculty and administrators who are trying to adapt to these new initiatives.

The Underlying Problem of Public Finance

Higher education in most states has been adapting to the decline in public support of colleges and college students. Over the past two decades, the purchasing power of federal Pell grants has declined by more than half, leaving large numbers of prepared students without financial access to four-year colleges (Advisory Committee on Student Financial Assistance [ACSFA], 2001, 2002; Fitzgerald, 2004; Lee, 2004; St. John, 2002). Tuition charges have also climbed in public colleges as a response to the decline in tax subsidies per student (Hauptman, 1990; St. John, 1994, 2003).

Some states have responded to these conditions by implementing merit-based grant programs (Heller, 2004). These programs remain controversial for a couple of reasons. A few studies have found that merit aid programs improve access for Whites and middle-income students, but not for minorities (Dynarski, 2002). Further, a recent time-series analysis of the impact of state grant programs confirmed that state funding for non-need grants was associated with improvement in college enrollment rates for high school graduates, but also revealed that funding for these programs was associated with higher high school drop-out rates (St. John, Chung, Musoba, Simmons, Wooden & Mendez, 2004), an undesirable consequence.

In addition, most states have failed to make sufficient investments in need-based grants to equalize opportunity for enrollment and persistence. The recent time-series study of state grant programs found that funding for need-based grants was substantially

and positively associated with college enrollment rates in the states without the negative influence on high school graduation rates (St. John et al., 2004). So it is crucial that states maintain a sufficient investment in grants to equalize enrollment and persistence rates for all students. There is substantial evidence that Indiana, the state being used as a basis for this study, has maintained equal opportunity for low-income students to enroll in four-year colleges (St. John, Musoba, Simmons & Chung, 2002; St. John, Musoba, Simmons, Chung, Schmit & Peng, 2004) and persist (Hu & St. John, 2001; St. John, Hu & Weber, 1999, 2000, 2001).

Thus, research on the academic pipeline to higher education should consider the role of finances along with the role of preparation. Indeed, a balanced approach to research is needed in persistence just as it is needed in access studies (St. John, 2002, 2003; St. John & Hu, 2004). This paper addresses these concerns by integrating variables related to student financial aid and high school persistence into a comprehensive persistence model.

The Push Toward Public Accountability

There has been relatively rapid movement toward accountability systems in public higher education in recent years (Zumeta, 2001). Most states have implemented some form of a reporting or accountability system for higher education that includes reporting on persistence rates (Zumeta, 2001), a pattern of policy practice that will probably accelerate if the federal government requires more emphasis on public accountability to maintain funding in student aid programs authorized under Title IV of the Higher Education Act.

The prospect that states will use accountability systems for funding further complicates efforts to untangle the effects of K-12 reforms and public finance strategies. If institutions receive more funding because they attract students who are already prepared for college, then this unintended consequence of public policy could undermine efforts to maintain or improve diversity in public higher education. It is crucial, therefore, that efforts be made to understand the effects of education and public finance policies on persistence by diverse students and low-income students of all types (St. John, Kline & Asker, 2001).

The Pathways Project funded by the Lumina Foundation for Education includes an assessment of the effects of preparation and student financial aid on the educational choices by students in the 2000 high school cohort in Indiana (St. John, Musoba & Chung, 2004b). The Pathways analyses provide an alternative to accountability systems that rely on persistence rates and other narrow indicators without adjusting for the complexity of the educational choice process of diverse groups. This paper provides analyses of continuous enrollment by African Americans, Hispanics, and Whites in the Indiana 2000 cohort and compares the results to the analyses of the populations as a whole.

Situating the Pathways Approach

There has long been interest in research on the impact of financial aid and other public policies on persistence by college students (Astin, 1975; Leslie & Brinkman, 1988; Murdock, 1989). In fact, studies that examine the impact of finances on persistence, appropriately referred to as financial impact models (St. John, Cabrera, Nora & Asker,

2000), predate the person-institution fit or involvement models proposed by Tinto and Bean.

The fit models proposed by Tinto (1975, 1987, 1993) and Bean (1980, 1983, 1985, 1990) have been widely tested and replicated (Braxton, 2000; Pascarella & Terenzini, 1991). These fit models have been adapted to include the role of perceptions of finances—the ability to pay or the financial reasons for choosing a college—along with financial effects (Cabrera, Nora & Castañeda, 1992, 1993; St. John, Cabrera, Nora & Asker, 2000; St. John, Paulsen & Starkey, 1996).

More recent studies have extended the inquiry into the relationships between fit, or involvement, and finances (St. John, 2004). Analyses that examine the effects of finances and perceptions of finances on academic and social involvement in college for high achieving students of color reveal that involvement is substantially influenced by finances. Further, the effects of variables related to finances and perceptions of finances on persistence were largely unaltered by the inclusion of variables related to academic and social involvement.

However, the adapted models that integrate consideration of finances and fit are not adequate to address the policy issues discussed above. To be useful for this task, a reconceptualization was needed. In this context, the student choice construct (St. John, Asker & Hu, 2001) was used as the logical guide for the development of a new set of analyses of student education choices (St. John, Musoba & Chung, 2004b). For traditional age college students, these analyses examine

- The impact of student background, academic preparation, and SAT scores (base variables for the cohort) and student aid packages on college choice;

- The impact of the base variables for the cohort plus the types of colleges they attended, their college academic experiences, and student aid packages on major choices;
- The impact of the base variables for the cohort, their college choices, their college academic experiences, their major choices, and student financial aid packages on persistence (in analyses of within-year, freshman-to-sophomore-year, and continuous enrollment).

By analyzing this sequence of choices, it is possible to untangle the diverse ways curriculum and finance policies influence the educational choices students make. This type of comprehensive study of student cohorts is necessary given the complex set of issues facing educational researchers who are concerned about K-16 policy. This report presents the analyses of the continuous enrollment of three race/ethnic groups and compares the results to the findings in the basic analysis of the entire population.

The easiest way for public institutions to raise persistence rates in response to new accountability standards would be to tighten admission standards. Given the expected rise in the size of the traditional aid cohort (NCES, 2003), colleges can tighten admissions and make marginal improvements in persistence as a result. However, not only would this approach overlook the most critical challenge in persistence, but it would increase inequalities in access. The model used in this study provides a mechanism that institutions can use to respond to this challenge. The persistence model used for the academic pathways analyses provides an alternative way of responding to political pressures for accountability, a way which examines the factors that influence educational opportunities, including persistence, for diverse students.

Research Approach

This study used a database on the 2000 college cohort of Indiana high school graduates, constructed from College Board questionnaires and SAT scores for all seniors in the cohort, student records reported by public and private colleges, and student aid records. These sources of information are generally available to colleges and universities, if they take steps to protect human subjects, and therefore the models used here can be replicated by other institutions and states.

In this study the persistence model (with variables outlined above) was used to examine continuous enrollment by African Americans, Hispanics, and Whites. There were substantially fewer Asians, Native Americans, and students in other race/ethnic groups in this sample, so these groups could not be separately examined. This section presents the specifications for the persistence model, describes the statistical methods used in the study, and discusses limitations of our approach.

Persistence Model Specifications

For the past several years, first-to-second-year persistence has been widely used in persistence studies, in part because institutions are concerned about retaining students. However, within-year persistence has provided a more viable approach to assessing the impact of public policies on retention, particularly finance policies. Using continuous enrollment during the first two years of college as a persistence outcome combines features of both approaches, responding to institutional concerns about retaining students with an explicit concern about examining the impact of public policies on attainment. The academic pathways analyses in this paper examine the influence of variables related

to student background, high school preparation, SAT scores, the types of institution attended, major choices, college academic experiences, and student aid. The database was constructed from College Board questionnaires and college student records from public and private colleges and state agencies in Indiana. An attempt was made to code variables in a way that would retain all possible cases by including categorical variables with a “missing value” category.

Background variables relate to gender, family income, parents’ education, and high school locale (Table 1). Income was derived from college enrollment records and state student financial aid records and, as a secondary source, from student self reports on College Board questionnaires. Students with low incomes and high incomes and missing incomes were compared to students in the middle group.¹ Parents’ education was derived from College Board data and student aid records. Students with missing information and parents’ education of a high school diploma or less were compared to students whose parents had attained at least some college, an approach that allows us to consider claims about first generation college students (e.g., Choy, 2002). Students who went to high school in urban or rural areas were compared to students from suburbs, towns, or missing locale information.

Academic Preparation variables relate types of high school diplomas (an indicator of the level of advancement of high school courses) and grades (an indicator of achievement). Students who completed Core 40 diplomas (a basic college preparatory curriculum), who received honors diplomas (requiring additional advanced math, language, and science), and who had missing information on curriculum were compared

¹ Approximately three equal-sized groups were created with low income defined as below \$30,000, middle income as between \$30,000 and \$70,000, and high income as over \$70,000 per annum.

to students with regular diplomas. College Board questionnaires on courses taken and college or financial aid application reports on the students' high school curriculum were used to derive diploma types. Students with A-grades (GPA of 3.66) or higher, C-grades (GPA 2.33) or lower, and missing grades in high school were compared to students with B-grades.

Data for variables related to *SAT scores* were derived from College Board reports of actual scores for Indiana high school students, and college enrollment records on SAT scores were a secondary source. Students with high scores (half a deviation above the mean on the combined score), low scores (half a deviation below the mean on the combined score), and missing scores were compared to students in the mid range (within one-half of a standard deviation). Because the College Board provided records for all public high school students, missing SAT scores probably mean the student did not take the SAT.

College Types compared students enrolled in different types of public colleges to students enrolled in two-year colleges. The types of four-year colleges in Indiana were: state universities, regional campuses of the two public systems, the urban university, public research universities, and private colleges (most of the independent colleges, excluding Notre Dame). The two-year colleges were in the process of merging into a community college system in 2000, the base year of enrollment for this study.

Majors were coded from institutional reports for the freshman year using the Classification of Instructional Programs (CIP) codes which were collapsed into 11 general categories. Students in the humanities, arts, science/math, social science, health,

business, education, computers, engineering, and other major fields were compared to students who were undeclared as freshmen.

College Academic Experiences variables relate to college grades, remedial education, enrollment status, and living on or off campus. Students with A-grades, C-grades or below, or missing grades were compared to students with B averages in college, using GPAs reported at the end of the freshman year. Students who had taken only remedial math, only remedial language, or both types of remedial courses were compared to students who did not take any remedial courses. Students who were full time in the first semester were compared to others. Students who delayed entry until the second semester of the freshman year were compared to fall starters. And students who lived on campus were compared to others who did not.

Student Aid variables were coded as packages. Students with grants but not loans, loans but not grants, grants and loans, or packages without loans or grants (usually including work-study) were compared to students who did not receive student aid. In addition, traditional age students who were legally self-supporting, according to student aid regulations, were compared to others as a means of controlling for differences in the amount of aid students were eligible to receive.

Statistical Methods

The persistence analyses include both breakdown statistics and regression analyses. The breakdowns compare basic statistics, means or rates, for persisting students and nonpersisting students in each race/ethnic group. Logistic regression analyses used generally accepted methods (Cabrera, 1994; Peng, So, Stage & St. John,

2002). The logistic analyses present a sequential set of logistic regression analyses. Variables related to background, high school preparation, SAT scores, the types of institution attended, major choices, college academic experiences, and student aid were entered in seven steps for each race/ethnic group. This approach allows for comparison of the significance of variables across models, providing a basis for exploring the meaning of changes in significance as confounding relationships (Peng, So, Stage & St. John, 2002).

Given that we present 21 logistic regression models, we decided to limit the statistics presented here for each model. We decided to present the odds ratios since they provide a reasonable measure of relative probabilities. In addition, we present three levels of significance (.01, .05, and .1). The last of these measures indicates a weak association and is discussed as such.

Three model statistics are presented for each logistic analysis (model chi square, Nagelkerke R^2 , and percentage correctly predicted). The Nagelkerke R^2 s are pseudo measures² of the amount of variance explained, provided by SPSS. The percentage correctly predicted provides an additional indicator of the quality of the model. The chi square indicates model fit. We used the pseudo R^2 as the general indicator of model quality since this measure is more generally understood among educational researchers.

Limitations

The analysis of extant data sources in persistence research was once rare in higher education research because of incomplete data and small samples, but it has become more generally accepted. The workable models approach (Somers, 1992; Somers & St. John,

² It is not possible to calculate a true R^2 in logistic regression.

1997; St. John, 1991, 1999; St. John & Somers, 1997), which uses extant data sources, has gained acceptance. Initially the workable models approach was developed to examine the relationship between financial aid and student attainment while controlling for related variables such as student background, academic preparation, college experience.

While the original proposal for the workable models approach to institutional research focused on the variables needed to estimate the effects of student aid on persistence, the paper also recommended the option of including majors, remedial courses, and interventions intended to improve persistence. This study extends the workable models approach to build a cohort of students to track from high school through their first two years of college. There are three limitations associated with the use of large-scale analyses using extant data sources.

First, there is usually a relatively large amount of missing data elements. For example, while the majority of Indiana high school students take SAT exams, some students who enroll in college do not. In addition, colleges may not report grades for students who drop out during their first term and for other reasons (e.g., for courses that are not given letter grades). We often coded missing values in their own category in order to retain all possible cases. This approach provides persistence rates that are reasonable, relative to other types of commonly reported rates. If we excluded student cases with missing information we would overestimate persistence, since institutions collect and retain more information for students who persist than for students who drop out. Further, if we limited our analyses to cases with no missing data we would seriously misestimate the effects of independent variables on persistence. We use our

understanding of these reporting anomalies in the discussion. However, we do not know all of the reasons for missing values, so readers should maintain caution relative to their own interpretations of the meaning of missing data.

Second, there can be anomalies in the reporting of data by different types of institutions. For example, community colleges are less likely to have undeclared majors (St. John, Musoba & Chung, 2004b). In addition, there are variations in grading policies, major programs, and aid packaging, along with the reporting of these data, across institutions. The combination of coding choices and the sequential method of analyses reveal some of these anomalies. We discuss these anomalies but cannot fully resolve inconsistencies.

Finally, the quality of state-level data collections could be improved, as is the case with federal-level data collections. Data collections are generally more likely to be improved over time if they are used. As part of the Pathways study and subsequent work, we provide analytic reports to collaborating colleges and universities and this could encourage improvement of databases over time.

Findings

The persistence analyses for Whites, Hispanics, and African Americans are presented separately. African Americans were discussed last because of the distinctive patterns evident in the group. Both breakdown statistics and regression results are presented and discussed.

Whites

The descriptive statistics on persistence rates for each variable in the model are presented in Table 1 for Whites. Sixty-five percent (65.4%) of the population persisted. Whites who attended state universities (72.8%), research universities (77.9%), and private colleges (67.8%) persisted at higher rates than in other types of institutions, i.e., urban universities, regional campuses, and community colleges. The persistence rates for Whites at regional campuses, and two-year colleges were similar (about 54%), and the urban university had the lowest rate (51.3%). These statistics suggest that the type of institution attended is significantly associated with persistence for Whites.

Whites in most major fields persisted at higher rates than those who were undeclared. More than 60% of the students in all major categories enrolled continuously, except for other majors (57.1%). These differences suggest that most declared majors are positively associated with persistence, compared to undeclared. Relatively large percentages of Whites were undeclared or had declared majors in business, other majors, and education. Science/math (72.8%), education (71.7%), arts (71.0%), and humanities (70.7%) had the highest persistence rates, and, intuitively, we would expect these majors to be positively associated with persistence.

Background variables had expected differentials in persistence rates for White students. High-income Whites persisted at a higher rate (72.7%) than other income groups. Students whose parents had at least some college persisted at a higher rate (71.8%) than students whose parents were less well educated. Students whose parents' education was missing or whose parents had less than a high school diploma persisted at

lower rates (51.4% and 49.5% respectively). From these statistics we might expect that both income and parents' education would be associated with persistence.

Academic preparation and SAT scores also have the expected association with persistence rates for White students. Students with honors diplomas had higher persistence rates than did students with Core 40, whose rates in turn were higher than those of students with regular diplomas. In addition, grades and test scores were hierarchically associated with persistence, with higher rates associated with high achievement on these indicators.

Similarly, college experiences were associated with persistence in ways that would be expected given the findings of National Center for Educational Statistics (NCES) studies (Choy, 2002; NCES, 1997a, 1997b, 2001a, 2001b;). Whites with higher college grades had higher persistence rates. Students with remedial courses persisted at low rates, as did students who delayed enrollment, attended part time, and so forth. In addition, students with grants only and loans only persisted at slightly higher rates than students who did not have aid.

If our goal was merely to use descriptive statistics to reach conclusions about educational attainment, then we might conclude that educational attainment is explained by parents' education and high school courses, as has been a central finding of federally funded research (Choy, 2002). However, it is crucial to control for historical events in the lives of students when examining student attainment, something NCES has failed to do (Becker, 2004; Heller, 2004). The sequential logistic regression analyses provide a means of examining the relative effects of background, preparation, and other variables

on attainment, which are highly related to continuous enrollment during the first two years of college.

The logistic regression analyses of continuous enrollment by White students revealed some expected relationships along with some that were not predicted from the descriptive statistics (Table 2). The discussion below considers each block of variables, looking across the sequence.

Family background variables of White students had the expected relationship with persistence, but there were some interesting nuances. Males were less likely to persist than females, but only before academic preparation variables were added to the equation (model 2). Similarly, low-income students were less likely to persist than middle-income students only before preparation was considered. However, high-income students were consistently more likely to persist. Students with missing income were less likely to persist after college choice was considered.³ Finally, students whose parents had a high school education or less or who had missing values on this variable were less likely to persist than those whose parents had at least some college—an expected relationship.

In addition, high school preparation and test scores had expected relationships with persistence by Whites. Students with honors and Core 40 diplomas were more likely to persist than students with regular diplomas. Further, students with A-grades were more likely to persist than students with B-grades, while students with low or missing grades were less likely to persist. However, the combination of background and preparation explained a relatively small portion of total variance, about one third of the

³ This finding is probably an artifact of institutional reporting. Community colleges were less likely to report incomes because their students were less likely to apply for student aid and enroll full time.

full model. So the claim that parents' education and high school curriculum are the primary causes of college persistence (Choy, 2002) seems off base.

The addition of SAT scores of White students did not contribute much to the predictive quality of the model, raising the R^2 by only .002. High SAT scores were positively associated with persistence and low scores had a negative association, both in comparison to mid-range scores, but only before college experiences were added. College achievement clearly had a more substantial influence than SAT scores on post enrollment success. Interestingly, students who did not take the SAT were more likely to persist after college achievement entered the model, further disputing the NCES (1997a) claim that taking SAT exams is necessary for higher education (see also St. John, 2002, 2003).

The type of college attended had a substantial influence on college persistence by White students. Attending state universities, private colleges, and research universities—the state's residential campuses—was positively associated with persistence in every step. In contrast, attending the urban university and regional campuses reduced the odds of persisting compared to being enrolled in community colleges.

Business and education major choices were positively associated with persistence, compared to being undeclared, for Whites. However, adding major choice to the model did not add substantially to the predictive power for the model, increasing the R^2 by only .003.

Academic experiences in college substantially improved the predictive power of the model, more than doubling the R^2 (by .141, from .135 to .276). High grades were positively associated with persistence, while low grades had a negative association.

Compared to not taking remedial courses, taking both remedial math and language arts courses had a positive association with persistence.

Finally, student financial aid was not significantly related to continuous enrollment. While coefficients for all but grants were negative, none were significant. It is apparent from these analyses that financial aid equalizes persistence opportunities for low- and middle-income students, controlling for other variables.

Hispanics

The overall persistence rate for Hispanics (59.4%, see Table 3) was lower than for Whites. Similar to Whites, Hispanics who enrolled in state universities (70.1%) and research universities (73.6%) persisted at higher rates than Hispanic students enrolled in other types of institutions.

There were substantial differences in persistence rates for Hispanics across majors. Arts (71.0%), business (70.8%), and math/science (70.0%) had the higher persistence rates. All majors other than computer science (44.0%) had higher persistence rates than undeclared. Therefore, it would be logical to expect most declared majors to be positively associated with persistence in the regression.

Background variables had expected associations in persistence rates of Hispanic students in many instances, but not all. Females had higher persistence rates than males. High-income students had higher persistence rates than other income groups. The persistence rates for the three levels of parent education were nearly equal (just above 60%), a somewhat surprising finding, but students with missing values, a small number

of students, persisted at a lower rate (46.8%). Hispanics from towns and suburbs persisted at a higher rate (65.5%) than their peers from other locales.

Academic preparation and achievement tests also had expected relationships with persistence rates for Hispanic students. Students with A-grades persisted at a higher rate (83.8%) than students with B-grades or lower. Students with either honors (81.2%) or Core 40 (65.4%) diplomas persisted at a higher rate than other students (46.4%). Students with high SAT scores also persisted at a high rate (75.0%).

Academic experiences in college also had expected relationships with persistence. Hispanic students with A-grades (85.3%) and B-grades (75.8%) had high persistence rates. However, Hispanic students with remedial math courses persisted at lower rates than those who did not, although students who did only remedial language arts coursework persisted at a higher rate than those who did not take remedial courses (66.7% and 61.4% respectively).

Hispanics with all types of aid packages persisted at higher rates than students who did not have aid. However, students with grants and loans persisted at a similar rate (59.4%) to the average for all Hispanics (59.4%), lower than for other aid recipients.

The regression analyses reveal patterns that are related to the descriptive statistics, but with some unexpected twists (Table 4). While background variables explained more variance for Hispanics than for Whites (R^2 of .065 for Hispanics in model 1 in Table 4, compared to .041 for Whites), only four variables were significant in any of the models. High incomes were consistently and positively associated with persistence for Hispanics. In contrast, students from urban and rural locales did not persist as well as students from suburban and town locales.

High school courses had a more substantial association with persistence for Hispanics than did high school grades. Both honors and Core 40 diplomas substantially improved the odds of persisting compared to regular diplomas. A-grades in high school were not significant once college experience was considered. SAT scores were not significantly associated with persistence. The first three steps explained less than half of the total variance explained by the model (R^2 in step 3 of .152 compared to .366 for model 7), casting further doubt on the NCES interpretations of national data (Choy, 2002; NCES, 1997a, 1997b, 2001a, 2001b;), given their many specification problems (Heller, 2004).

None of the variables related to college type was significant. Thus, while Hispanic students in research universities and state universities had high rates of persistence, there was not a significant causal association with the outcome.

Three of the majors were significantly and positively associated with persistence of Hispanic students. Majoring in the arts was positively associated with persistence before college academic experiences were considered. Business majors and students in other majors were more likely to persist than undeclared majors across the final three steps. These findings are somewhat in contrast to the descriptive analyses (Table 3) that showed science/math majors had a higher persistence rate. Apparently, high school curriculum was associated with the choice of science/math majors.

The addition of academic experiences in colleges explained a substantial portion of the variance in persistence of Hispanic students (increasing the R^2 from .188 to .361). A-grades had only a slight positive association with persistence (.1 alpha), while low

grades substantially reduced the odds of persistence. Taking remedial math and language arts courses substantially improved these odds of persisting.

The final step improved the model modestly (raising the R^2 by .005), but there were no significant aid variables for Hispanic students. The types of packages equalized the odds for aided students compared to students who did not receive aid.

African Americans

African American undergraduates in Indiana (see Table 5) had a substantially lower rate of continuous enrollment (53.3%) than the other groups studied. African Americans enrolled in state universities (66.7%), research universities (67.8%), and private colleges (60.4%) persisted at higher rates than students in the other institution types, a pattern consistent with the groups examined above.

In contrast to the other groups, however, African Americans with undeclared majors persisted at a higher rate (59.1%) than all major groups except social science (60.3%), science/math (59.3%) and the humanities (61.5%). Therefore, there is reason to hypothesize that these majors would have a positive association with higher persistence of African American students, but that some majors might be negatively associated with persistence. Interestingly, it is other majors and business majors that have the largest number of African American students.

The differences in persistence rates of African American students were not substantial for most background variables, at least compared to Whites and Hispanics. Females persisted at a higher rate (54.2%) than males, but the gender gap was not as large as that for Hispanics and was similar to that for Whites. The differences in persistence by

income groups, from 63.4% for high income to 50.3% for low income (and 44.0% for missing), was similar to the other groups. Students with missing incomes persisted at a lower rate (39.3%), possibly indicating they should have applied for aid. Yet the variability among the groups with reported parents' education was relatively modest, from 54.6% for students whose parents had high school education to 58.0% for college educated parents. Given the differences across groups in variability by family background, there is reason to question using a single set of metrics as an explanation for variation in enrollment rates. As a case in point, NCES concluded parents' education explains a substantial portion of variance in attainment (Choy, 2002; NCES, 2001a, 2001b), but the present analysis suggests parents' education should not be an especially strong predictor for African Americans.

There were substantial differences in the rates for variables related to academic preparation in high school for African Americans. Honors graduates persisted at 79.1%, while 75.2% of students with A-grades persisted. African Americans with low grades and regular diplomas persisted at substantially lower rates. There was also variation across the SAT groups with particularly low persistence among students who did not take the SAT. Therefore, there was reason to expect that preparation was influential in attainment, as NCES claimed (NCES, 1997a, 2001a, 2001b).

However, there were also substantial differences in rates for the variables related to academic experiences in college for African Americans. There was particularly high variation for A-grades (77.2%) and B-grades (75.8%) compared to C-or-lower grades and missing grades (39.2% and 30.4% respectively). Students with all types of remedial courses had lower rates than did students who did not take remedial courses. Consistent

with the other groups, students who enrolled full time persisted at a higher rate than those enrolled part time, and students who lived on campus also persisted at a higher rate than students who did not. Students who delayed enrollment persisted at lower rates.

African American students with financial aid packages persisted at higher rates than their peers who did not receive aid. Self-supporting students persisted at lower rates.

The sequential persistence regression analyses (Table 6) revealed some patterns similar to those for other groups as well as some that differed. Interestingly, background variables had much less association with persistence for African Americans than for Whites and Hispanics. Only two variables had anything other than modest associations in any step. In the first model, before preparation entered the equation, missing parents' education was negatively associated with persistence and it remained significant.⁴ In the last model, after the effects of student aid were considered, African American aid applicants with high incomes were more likely to persist than middle-income aid applicants. Given these findings, the NCES claim that background and parents' education explain a substantial portion of variation in enrollment and attainment for minorities (Choy, 2002; NCES, 1997a) seems especially misleading.

Two of the variables related to academic preparation were significant. African Americans who had completed the honors curriculum or Core 40 were more likely to persist than those who did not. This indicates that efforts to expand preparatory curriculum could influence access and success in college. However, grades were mostly insignificant with only a modest negative association for low grades in the early steps of the regression model. Nor were SAT scores significant, further debunking the notion that

⁴ This could be related to reporting peculiarities on College Board surveys, given that these questionnaires were the primary source of information on high school courses. Further, financial aid data was the secondary source, and some campuses showed lower aid applications.

taking the exam is somehow an explanation for differentials in attainment rates (e.g., Choy, 2002; NCES, 1997a).

Similar to the earlier analyses, attending the urban university reduced the odds of persisting compared to attending a two-year college—controlling for preparation and background. When first considered, African Americans at state universities and research universities were more likely to persist than African Americans at two-year colleges, but the significance disappeared once college experience was taken into account.

The biggest difference in the analyses of persistence by African Americans, compared to other groups, was for academic majors. Controlling for background, preparation, and college choice, African Americans who majored in business, health, education, and computers were less likely to persist than their peers. In addition, majors such as science and math or arts that were positively related to persistence for Whites were not significant, with negative coefficients for African Americans. These findings raise serious questions about engagement in learning within academic fields for African American students.

In most respects, the findings for variables on academic experiences in college for African Americans were comparable to those for other groups. C-or-lower grades and missing grades were negatively associated with persistence, compared to B-grades—controlling for other variables. Taking both remedial math and language was positively associated with persistence. These findings indicate a positive association both for grades and remedial education, consistent with the analyses of other groups.

The findings for African Americans living on campus were different than those for Whites and Hispanics. While this variable had been significant and positive in the

prior analyses, for African Americans, living on campus as a freshman was negatively associated with persistence. When coupled with the findings on major choices, it is apparent that African Americans engaged with their campus environments differently than most other students.

Finally, student aid had a more substantial influence on persistence by African Americans than by other groups. All types of packages except loans without grants raised the odds of persistence, compared to not having an aid package. This finding is in contrast to prior research which has found African Americans but not Whites to be negatively influenced by loans in persistence (Kaltenbaugh, St. John & Starkey, 1999). Overall, this analysis shows that financial aid continued to support uplift by the millennial class of African Americans in Indiana.

Conclusions

These analyses reveal substantial similarities and a few very important differences among the three ethnic groups in the factors that influenced persistence. The differences are most easily understood if viewed as being related to differences in the situated contexts of the lives of college students (St. John, 2003), an alternative to the more usual vantage point of seeking to uncover universal patterns (Braxton, 2000; Pascarella & Terenzini, 1991). By revealing differences in persistence patterns across diverse groups, we can illuminate factors that inhibit equal opportunity as well as highlight policy “levers” that might be able to improve opportunity. While it is apparent that the block of variables, or factors, are associated with attainment by all three groups, the variations in findings about each group reveal critical issues.

First, background variables were associated with persistence by all three groups, but there were substantially different patterns among the groups. In these analyses, Whites followed the general pattern espoused by NCES more closely than other groups. For Whites, having parents who had not attained a college education decreased the odds of academic success in college, while being from families with high income improved these odds. For Hispanics and African Americans, high income was a positive factor, but parents' education was simply not significant.

These differences are appropriately examined within the Indiana context, a state that has made an effort to place preparatory curriculum in all high schools, implemented a major postsecondary encouragement program, and provided and fulfilled a guarantee of adequate grant aid to 8th graders who took a pledge to prepare for college (St. John, Chung, Musoba & Simmons, 2004), a program that has had especially substantial effects on opportunities for African Americans (Musoba, 2004). For African Americans and Hispanics, having an adequate aid guarantee enables students to overcome the barriers related to parents' education and income, a condition that is not met nationally (ACSFA, 2001, 2002; NCES, 1997a, 2001a, 2001b; St. John, 2002, 2003).

Second, there was a consistent pattern of association between high school curricula and persistence in colleges. For all three groups, completing preparatory Core 40 or honors curricula had a sustained positive influence on persistence. High school grades did not have as substantial an influence for White students and had no significant relationship for African American or Hispanic, indicating that increasing the availability of advanced courses can expand opportunity, an interpretation that would be consistent

with the outcomes following the increase in opportunity in Indiana during the 1990s (St. John, Musoba & Chung, 2004a).

Third, taking the SAT and having high scores on these tests had an effect on educational opportunity for Whites in the earlier models but was not significant in the final model. For African Americans or Hispanics there were no significant gains from taking the SAT. Indiana is a state in which the majority of high school students take the SAT therefore a good sample to use in examining the influence of taking the SAT (St. John, Musoba & Chung, 2004b). Further, taking advanced courses was associated with high SAT scores in Indiana. These findings about the significance of curriculum as contrasted to grades and scores may be noteworthy for policymakers in other states as well.

Fourth, college choices influenced persistence for White and African American students. Attending state universities, private colleges, and research universities was consistently and positively associated with persistence compared to enrollment in two-year colleges, while attending regional campuses and the urban campus did not have this positive association for Whites. This was also significant in the early African American models, but only the negative association with the urban campus was significant in the final model, while for Hispanics, none was significant. In Indiana, the research universities, the private colleges, and the state universities have considerable residence halls, while the regional campuses and the urban campus do not. It is possible that the opportunity to live on campus makes a positive difference for White students. However, living on campus was negatively associated with persistence for African Americans and not significant in the other models, so readers should be cautious about reaching the

conclusion that on-campus residence is the answer. Other explanations merit consideration, including questions related to engagement in the academic side of the college experience.

Fifth, there were very substantial differences in the association between major choices and persistence across the three groups. For Whites and Hispanics a few majors had a positive association with persistence. However, for African Americans, several academic majors were negatively associated with persistence and there were no positive associations. These findings raise questions about engagement in academic programs and whether the content of major programs meets the expectations of African Americans. Since these analyses control for preparation and achievement, it simply is not possible or appropriate to reduce these findings to ability or preparation differences. Instead, these findings point to serious academic problems in Indiana higher education. Faculties in health, business, education, and computer science in particular need to consider why their majors do not support persistence by diverse students.

We hope that prejudice, however subtle or cover, is not the explanation for these differences in students' experience of academic programs in Indiana. These findings recall James Comer's autobiography (1989) in which he describes how stereotyping by faculty at Indiana University induced him to transfer to Howard University, a historically Black university. If this was a reflection on the past conditions of education in the state, we hope that these practices have changed or can change. At the very least, it is crucial that faculties at colleges and universities examine whether their major programs are discouraging to African Americans and, if they are, to explore alternative explanations

for these differences and to pilot test new academic strategies for creating more engaging curricula and academic experiences.

Sixth, there were many common patterns in the effects of college experiences across the three sets of analyses. High college grades were positively associated with persistence and low grades were negatively associated with this outcome. Yet African American and Hispanic students may not distinguish between A and B averages as precisely in the choice to persist. In addition, taking remedial courses in both language and math were consistently and positively associated with persistence. This means that achievement is important but support services can help students who have additional academic needs. These findings point to the fact that interventions aimed at improving student engagement in the learning environment can make a difference in educational opportunities for students across the race/ethnic groups.

Coupled with the findings on academic majors, these results suggest that faculty should not only assess whether minorities persist at lower rates in their programs but should also engage in experiments aimed at improving the odds of success. Students who have declared majors are generally the more able or prepared students with less need for remedial courses. Since African American students, like others, benefited from remedial courses in Indiana, the challenge is not only at the low end of the achievement continuum, but it is even more critical to engage high ability minority students. In the example above, James Comer went on to medical school and became an endowed professor at Yale (Comer, 1989). He found an engaging learning environment at Howard and went on to achieve his goals and to fulfill his grandmother's dreams for cross

generation uplift. Interventions that create more engaging learning environments for diverse students appear long overdue in Indiana.

Finally, there were differences in the effects of student financial aid across race/ethnic groups in Indiana, at least for the entering collegiate class of 2000. For Whites and Hispanics there were no significant financial aid variables suggesting aid may be helping to equalize opportunity, yet high income students were more likely to persist for all three ethnic groups. Because of the Twenty-first Century Scholars Program in Indiana, aid appears to be adequate for low-income students. Specifically, for African Americans, a group with a high percentage of low-income students, all types of packages with grant aid, including loans and grants, were positively associated with persistence. These findings on the impact of student financial aid packages further reinforce the interpretive approach of considering situated contexts (St. John, 2003; St. John, Asker & Hu, 2001). It is abundantly apparent that public finance policies do influence different groups in different ways. Because of their high poverty rate in Indiana, African Americans can benefit from Indiana's Scholars program more than Whites (Musoba, 2004). Further, excessive loans can be problematic for middle-income families who may question whether their expected earnings will grow sufficiently to justify continued borrowing. At the very least, these differences merit further and wider consideration, given the ongoing challenges facing educational opportunity for high achieving students of color (St. John, 2003).

Implications

These analyses provide further evidence that it is appropriate to consider the situated contexts that influence the ways in which students engage in their learning environments. There has been a strong emphasis in higher education on finding best practices for *all* students, a term that can be decoded to mean *White* students because of their dominant position. This is not to argue that racism and stereotyping are intentional acts. Rather, it is to assert that it is possible to construct inadvertently curriculum and learning environments that discriminate where the assumption of race neutrality is false when practices support majority students better than minority students.

This atmosphere of unintended discrimination may exist in Indiana higher education. The fact that African Americans in several applied majors do not persist as well as their peers with undeclared majors reveals a serious problem with the engagement of the best and brightest minority students. Controlling for preparation, college grades, and remedial courses, African Americans with majors in business, education, health, and computer science do not persist as well as their peers with undeclared majors. The causes cannot be cast off on the lack of parental education or low achievement. The challenge resides within the colleges and universities in the state.

Turner (1994) studied the racial climate for students of color at the University of Minnesota and found that “although the University of Minnesota provides supportive programs and implements policies intended to serve students of color, the campus climate continued to be ‘unwelcoming’ to students of color.” Turner further quotes the words of Ron Wakabayashi (Daniels, as cited in Turner, 1994) who expressed the sense of exclusion many students of color experience: “We feel that we’re a guest in someone

else's house, that we can never relax and put our feet up on the table" (p. 356). Daniels extends the analogy by saying that guests must follow the house rules, be on their best behavior, and do not have the freedoms that family members enjoy.

However, African American students often experience treatment that is much worse than the treatment experienced by typical houseguests. Feagin, Vera, and Imani (1996) detail some of the negative experiences African Americans have in predominantly White institutions. A central theme in their study is Black invisibility. Much like the main character of Ralph Ellison's book (1995), African American students in this study are not seen by "white professors, students, staff members and administrators . . . as full human beings with distinctive talents, virtues, interests and problems" (p. 14).

Related to the research of Feagin, Vera, and Imani are the findings of Smedley, Myers, and Harrell (1993) that most severe negative impacts to student performance were minority status stressors that "undermined students' academic confidence and ability to bond to the university." Therefore, it may be that in certain majors, African American students do not feel comfortable in the environment, others don't see African American students as full human beings, and all of these elements impact the African American students' academic confidence and ability to bond with the institution. While there is little doubt that high schools can be improved, higher education also has room for improvement.

Indiana is surely not alone in facing the challenge of improving opportunities for persistence by high-achieving minority students. This is the first state-level study to explore the role of preparation and achievement for a cohort of students within a state. It is possible that if other states take the steps to compile longitudinal databases, they too

will find serious challenges that impede the academic success of their students. The challenges they face may or may not be related to diversity. However, given the national shame of blaming low attainment of minorities on the preparation of their parents and the quality of schools students can attend (e.g., Choy, 2002; NCES, 1997a, 2001a, 2001b), it is time to reconsider what the challenges are and how they can be resolved.

When financial aid is adequate for low-income students, which has been the case in Indiana, then parents' education is no longer a major factor for African Americans. The value of cross-generation uplift is very highly held among African Americans (Allen-Haynes, St. John & Cadray, 2003; Walker & Snarey, 2004). This study shows that when adequate financial aid is provided, parents' education is not the barrier for African Americans and Hispanics that it is for Whites. It is time to put aside stereotypes about parents' education and underachievement of African Americans and address the challenge of creating engaging curricula and encouraging academic environments for African American undergraduates.

Table 1. Breakdown of Persistence Rates for Variables in Analysis of Continuous Enrollment of Fall or Spring Freshman thru Spring Sophomore for White Students

Variable	Category	Persistence of Fall to Spring Freshman			
		Persisters		Non Persisters ©	
		N	Row %	N	Row %
College Destination in Freshman Year	State Universities	3,356	72.8	1,251	27.2
	Regional Campuses	2,835	54.2	2,393	45.8
	Urban University	1,183	51.3	1,121	48.7
	Research Universities	6,335	77.9	1,793	22.1
	Private	2,356	67.8	1,118	32.2
	2-Year ©	2,681	54.6	2,228	45.4
Major in Freshman Year	Humanities	618	70.7	256	29.3
	Arts	764	71.0	312	29.0
	Science and Math	1,419	72.8	529	27.2
	Social Science	1,080	69.6	472	30.4
	Health	1,401	65.5	739	34.5
	Business	2,501	67.5	1,205	32.5
	Education	2,277	71.7	897	28.3
	Computer	530	61.4	333	38.6
	Engineering	1,205	68.1	565	31.9
	Others	2,757	57.1	2,072	42.9
	Undecided ©	4,194	62.4	2,524	37.6
Composite Gender	Male	8,565	63.8	4,854	36.2
	Female ©	10,181	66.9	5,048	33.1
	Missing ©			2	100.0
Composite Ethnicity	Native American				
	Asian American Pacific Islander				
	African American				
	Hispanic				
	White	18,746	65.4	9,904	34.6
	Other				
Composite Parent Income Level	Missing				
	Low (below \$30,000)	2,755	61.0	1,760	39.0
	Mid (\$30,000-\$70,000) ©	6,825	65.5	3,587	34.5
	High (over \$70,000)	7,020	72.7	2,632	27.3
Composite Parent Education Level	Missing	2,146	52.7	1,925	47.3
	Middle/Jr High school or Less	95	49.5	97	50.5
	High school	5,770	64.2	3,214	35.8
	College or beyond ©	10,118	71.8	3,983	28.2
Composite Locale	Missing	2,763	51.4	2,610	48.6
	City	3,346	66.0	1,727	34.0
	Suburban and town ©	8,525	66.6	4,267	33.4
	Rural	5,391	66.4	2,734	33.6
	Missing	1,484	55.8	1,176	44.2

(Table 1 continues on the next page.)

Table 1 (cont.). Breakdown of Persistence Rates for Variables in Analysis of Continuous Enrollment of Fall or Spring Freshman thru Spring Sophomore for White Students

Variable	Category	Persistence of Fall to Spring Freshman			
		Persisters		Non Persisters ©	
		N	Row %	N	Row %
Composite High School Diploma	Honors	6,954	81.5	1,583	18.5
	Core 40	6,665	66.7	3,327	33.3
	Regular or Missing ©	5,127	50.7	4,994	49.3
Composite High School GPA	A	5,383	82.0	1,178	18.0
	B ©	7,790	67.9	3,681	32.1
	C or Lower	2,714	56.1	2,120	43.9
	Missing	2,859	49.4	2,925	50.6
Composite SAT Scores	High	5,780	75.9	1,835	24.1
	Mid ©	6,252	69.1	2,801	30.9
	Low	3,803	58.7	2,677	41.3
	Missing	2,911	52.9	2,591	47.1
College Freshman GPA	A	5,241	81.6	1,179	18.4
	B ©	9,502	77.9	2,700	22.1
	C or Lower	3,873	42.2	5,294	57.8
	Missing	130	15.1	731	84.9
Remedial Coursework in Freshman Year	Remedial Math only	1,500	52.6	1,353	47.4
	Remedial Language Arts only	420	49.9	421	50.1
	Remedial Math and Language Arts	826	51.9	765	48.1
	No Remedial Coursework ©	16,000	68.5	7,365	31.5
Enrollment Status in First Semester	Full-time	17,332	68.2	8,083	31.8
	Part-time ©	1,414	43.7	1,821	56.3
Delayed Enrollment in Spring as Freshman	Delayed	1,294	49.0	1,347	51.0
	Not delayed ©	17,452	67.1	8,557	32.9
Housing Status in Freshman Year	On-Campus	8,134	75.1	2,701	24.9
	Others ©	10,612	59.6	7,203	40.4
Dependency Status	Indeterminate status ©	6,143	61.3	3,883	38.7
	Self-supporting	219	43.8	281	56.2
	Dependent ©	12,384	68.3	5,740	31.7
Aid Packages	Grants only	5,347	68.9	2,408	31.1
	Loans only	2,425	66.1	1,245	33.9
	Grants and Loans	3,656	69.7	1,590	30.3
	Other Packages	1,083	68.3	502	31.7
	None ©	6,235	60.0	4,159	40.0
Total		18,746	65.4	9,904	34.6

© is the reference category in regression.

Table 2. Logistic Regression Analyses of Persistence of Continuous Enrollment of Fall or Spring Freshman thru Spring Sophomore for White Students

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.
Male	0.876	***	0.982		0.952	*	0.941	**	0.959		1.104	***	1.101	***
Family Income Low	0.885	***	0.973		0.977		0.965		0.965		1.016		1.018	
Family Income High	1.319	***	1.220	***	1.207	***	1.167	***	1.165	***	1.142	***	1.129	***
Family Income Missing	0.969		1.002		1.021		1.064		1.067		1.237	***	1.232	***
Parent Ed. HS or less	0.751	***	0.806	***	0.824	***	0.858	***	0.855	***	0.895	***	0.897	***
Parent Education Missing	0.488	***	0.794	***	0.775	***	0.716	***	0.714	***	0.590	***	0.596	***
Locale City	0.974		0.962		0.955		0.932	*	0.934	*	0.994		0.994	
Locale Rural	0.985		0.971		0.973		0.958		0.960		0.969		0.970	
Locale Missing	0.888	**	1.242	***	1.243	***	1.207	***	1.203	***	1.107	*	1.119	**
HS Diploma Honors			2.820	***	2.610	***	2.286	***	2.286	***	1.815	***	1.811	***
HS Diploma Core 40			1.773	***	1.720	***	1.608	***	1.607	***	1.469	***	1.469	***
HS GPA A			1.619	***	1.508	***	1.440	***	1.447	***	1.130	***	1.129	***
HS GPA C or lower			0.773	***	0.793	***	0.820	***	0.823	***	0.883	***	0.880	***
HS GPA Missing			0.869	***	0.865	***	0.859	***	0.868	***	0.860	***	0.858	***
SAT Score High					1.122	***	1.054		1.065		0.948		0.944	
SAT Score Low					0.846	***	0.911	**	0.911	**	1.021		1.023	
SAT Score Missing					0.893	***	1.000		1.005		1.123	**	1.132	***
State Universities							1.276	***	1.230	***	1.211	***	1.216	***
Regional Campuses							0.769	***	0.763	***	0.820	***	0.823	***
Urban University							0.671	***	0.652	***	0.716	***	0.721	***
Research Universities							1.517	***	1.482	***	1.420	***	1.424	***
Private							1.213	***	1.174	***	1.196	***	1.202	***
Humanities									1.060		0.990		0.991	
Arts									1.304	***	1.074		1.076	
Science and Math									1.014		0.976		0.977	
Social Science									1.066		1.053		1.056	
Health									1.008		0.959		0.963	
Business									1.176	***	1.094	*	1.091	*
Education									1.327	***	1.171	***	1.174	***
Computer									1.020		1.097		1.100	
Engineering									1.020		0.976		0.979	
Others									1.017		1.008		1.007	
College GPA A											1.218	***	1.212	***
College GPA C or lower											0.229	***	0.229	***
College GPA Missing											0.072	***	0.072	***
Remedial Math only											1.033		1.034	
Remedial Lang. Arts only											1.029		1.033	
Remedial Math & Lang.											1.490	***	1.492	***
Full-time First Semester											1.545	***	1.545	***
Delayed Enrollment											0.744	***	0.744	***
On-Campus Housing											1.012		1.042	
Self-supporting													0.787	**
Grants only													1.025	
Loans only													0.979	
Grants and Loans													0.935	
Other Packages													0.908	
Number of Cases	28,650		28,650		28,650		28,650		28,650		28,650		28,650	
Model χ^2	870		2,450		2,500		2,890		2,944		6,393		6,404	
Nagelkerke R ²	0.041		0.113		0.115		0.132		0.135		0.276		0.276	
% Correctly Predicted	65.1		66.8		67.0		67.3		67.4		74.0		73.9	

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3. Breakdown of Persistence Rates for Variables in Analysis of Continuous Enrollment of Fall or Spring Freshman thru Spring Sophomore for Hispanic Students

Variable	Category	Persistence of Fall to Spring Freshman			
		Persisters		Non Persisters ©	
		N	Row %	N	Row %
College Destination in Freshman Year	State Universities	47	70.1	20	29.9
	Regional Campuses	161	54.0	137	46.0
	Urban University	20	44.4	25	55.6
	Research Universities	134	73.6	48	26.4
	Private	24	53.3	21	46.7
	2-Year ©	58	52.7	52	47.3
Major in Freshman Year	Humanities	16	66.7	8	33.3
	Arts	22	71.0	9	29.0
	Science and Math	21	70.0	9	30.0
	Social Science	26	65.0	14	35.0
	Health	27	54.0	23	46.0
	Business	68	70.8	28	29.2
	Education	36	67.9	17	32.1
	Computer	11	44.0	14	56.0
	Engineering	20	58.8	14	41.2
	Others	118	55.4	95	44.6
	Undecided ©	79	52.3	72	47.7
Composite Gender	Male	171	55.3	138	44.7
	Female ©	273	62.3	165	37.7
	Missing ©				
Composite Ethnicity	Native American				
	Asian American Pacific Islander				
	African American				
	Hispanic	444	59.4	303	40.6
	White				
	Other				
	Missing				
Composite Parent Income Level	Low (below \$30,000)	111	60.7	72	39.3
	Mid (\$30,000-\$70,000) ©	169	57.5	125	42.5
	High (over \$70,000)	115	71.4	46	28.6
	Missing	49	45.0	60	55.0
Composite Parent Education Level	Middle/Jr High school or Less	42	63.6	24	36.4
	High school	170	64.2	95	35.8
	College or beyond ©	151	62.1	92	37.9
	Missing	81	46.8	92	53.2
Composite Locale	City	100	55.6	80	44.4
	Suburban and town ©	253	65.5	133	34.5
	Rural	54	54.5	45	45.5
	Missing	37	45.1	45	54.9

(Table 3 continues on the next page.)

Table 3 (cont.). Breakdown of Persistence Rates for Variables in Analysis of Continuous Enrollment of Fall or Spring Freshman thru Spring Sophomore for Hispanic Students

Variable	Category	Persistence of Fall to Spring Freshman			
		Persisters		Non Persisters ©	
		N	Row %	N	Row %
Composite High School Diploma	Honors	108	81.2	25	18.8
	Core 40	176	65.4	93	34.6
	Regular or Missing ©	160	46.4	185	53.6
Composite High School GPA	A	88	83.8	17	16.2
	B ©	156	60.5	102	39.5
	C or Lower	113	60.8	73	39.2
	Missing	87	43.9	111	56.1
Composite SAT Scores	High	63	75.0	21	25.0
	Mid ©	139	64.7	76	35.3
	Low	136	59.9	91	40.1
	Missing	106	48.0	115	52.0
College Freshman GPA	A	93	85.3	16	14.7
	B ©	232	75.8	74	24.2
	C or Lower	111	37.6	184	62.4
	Missing	8	21.6	29	78.4
Remedial Coursework in Freshman Year	Remedial Math only	39	45.9	46	54.1
	Remedial Language Arts only	10	66.7	5	33.3
	Remedial Math and Language Arts	34	57.6	25	42.4
	No Remedial Coursework ©	361	61.4	227	38.6
Enrollment Status in First Semester	Full-time	408	61.5	255	38.5
	Part-time ©	36	42.9	48	57.1
Delayed Enrollment in Spring as Freshman	Delayed	41	43.6	53	56.4
	Not delayed ©	403	61.7	250	38.3
Housing Status in Freshman Year	On-Campus	167	73.6	60	26.4
	Others ©	277	53.3	243	46.7
Dependency Status	Indeterminate status ©	179	57.2	134	42.8
	Self-supporting	13	46.4	15	53.6
	Dependent ©	252	62.1	154	37.9
Aid Packages	Grants only	145	63.6	83	36.4
	Loans only	62	63.3	36	36.7
	Grants and Loans	79	59.4	54	40.6
	Other Packages	42	71.2	17	28.8
	None ©	116	50.7	113	49.3
Total		444	59.4	303	40.6

© is the reference category in regression.

Table 4. Logistic Regression Analyses of Persistence of Continuous Enrollment of Fall or Spring Freshman thru Spring Sophomore for Hispanic Students

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.
Male	0.762	*	0.764	*	0.766		0.757	*	0.719	*	0.741		0.757	
Family Income Low	1.201		1.223		1.215		1.158		1.192		1.284		1.168	
Family Income High	1.863	***	1.744	**	1.721	**	1.685	**	1.782	**	2.006	***	2.104	***
Family Income Missing	0.944		0.969		0.971		0.993		0.949		1.297		1.303	
Parent Ed. HS or less	1.247		1.385	*	1.390	*	1.372		1.417	*	1.369		1.309	
Parent Ed. Missing	0.763		1.149		1.169		1.068		1.214		0.843		0.849	
Locale City	0.651	**	0.584	***	0.580	***	0.578	***	0.561	***	0.539	***	0.505	***
Locale Rural	0.613	**	0.547	**	0.535	**	0.510	***	0.535	**	0.565	**	0.557	**
Locale Missing	0.578	**	0.858		0.871		0.822		0.802		0.789		0.732	
HS Diploma Honors			3.228	***	3.262	***	3.171	***	3.093	***	2.221	**	2.365	**
HS Diploma Core 40			1.903	***	1.914	***	1.936	***	1.919	***	1.609	*	1.647	**
HS GPA A			2.431	***	2.421	***	2.333	**	2.300	**	1.628		1.662	
HS GPA C or lower			1.245		1.277		1.338		1.264		1.358		1.392	
HS GPA Missing			0.938		1.008		1.077		1.034		0.905		0.954	
SAT Score High					1.135		1.110		1.124		1.134		1.143	
SAT Score Low					1.128		1.187		1.172		1.211		1.232	
SAT Score Missing					0.939		1.032		0.959		0.955		0.952	
State Universities							1.117		1.353		1.162		1.171	
Regional Campuses							0.672		0.748		1.114		1.149	
Urban University							0.511	*	0.595		0.735		0.785	
Research Universities							1.091		1.228		1.173		1.151	
Private							0.676		0.710		1.106		1.137	
Humanities									1.364		1.336		1.297	
Arts									2.371	*	1.887		1.736	
Science and Math									1.460		1.411		1.508	
Social Science									1.176		0.935		0.876	
Health									0.738		0.805		0.737	
Business									2.101	**	2.434	***	2.417	**
Education									1.510		1.414		1.409	
Computer									0.950		1.332		1.322	
Engineering									1.288		1.237		1.203	
Others									1.648	**	1.852	**	1.859	**
College GPA A											1.887	*	1.847	*
College GPA C or lower											0.202	***	0.200	***
College GPA Missing											0.107	***	0.109	***
Remedial Math only											0.891		0.858	
Remedial Lang. Arts only											2.748		2.948	
Remedial Math & Lang.											2.543	**	2.526	**
Full-time First Semester											1.123		1.130	
Delayed Enrollment											0.882		0.928	
On-Campus Housing											1.563		1.571	
Self-supporting													1.238	
Grants only													1.302	
Loans only													1.010	
Grants and Loans													0.905	
Other Packages													1.755	
Number of Cases	747		747		747		747		747		747		747	
Model χ^2	37		88		89		99		112		232		236	
Nagelkerke R ²	0.065		0.151		0.152		0.167		0.188		0.361		0.366	
% Correctly Predicted	62.2		64.5		65.5		66.8		67.7		74.7		74.8	

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5. Breakdown of Persistence Rates for Variables in Analysis of Continuous Enrollment of Fall or Spring Freshman thru Spring Sophomore for African American Students

Variable	Category	Persistence of Fall to Spring Freshman			
		Persisters		Non Persisters ©	
		N	Row %	N	Row %
College Destination in Freshman Year	State Universities	244	66.7	122	33.3
	Regional Campuses	154	47.5	170	52.5
	Urban University	114	41.5	161	58.5
	Research Universities	257	67.8	122	32.2
	Private	93	60.4	61	39.6
	2-Year ©	252	42.6	339	57.4
Major in Freshman Year	Humanities	32	61.5	20	38.5
	Arts	29	53.7	25	46.3
	Science and Math	54	59.3	37	40.7
	Social Science	73	60.3	48	39.7
	Health	86	49.4	88	50.6
	Business	188	54.8	155	45.2
	Education	72	51.4	68	48.6
	Computer	43	44.3	54	55.7
	Engineering	38	55.9	30	44.1
	Others	237	46.8	269	53.2
	Undecided ©	262	59.1	181	40.9
Composite Gender	Male	440	52.1	405	47.9
	Female ©	674	54.2	570	45.8
	Missing ©				
Composite Ethnicity	Native American				
	Asian American Pacific Islander				
	African American	1,114	53.3	975	46.7
	Hispanic				
	White				
	Other				
Composite Parent Income Level	Missing				
	Low (below \$30,000)	496	50.3	490	49.7
	Mid (\$30,000-\$70,000) ©	336	56.8	256	43.2
	High (over \$70,000)	187	63.4	108	36.6
Composite Parent Education Level	Missing	95	44.0	121	56.0
	Middle/Jr High school or Less	12	57.1	9	42.9
	High school	407	54.6	339	45.4
	College or beyond ©	516	58.0	374	42.0
Composite Locale	Missing	179	41.4	253	58.6
	City	773	54.9	635	45.1
	Suburban and town ©	209	53.5	182	46.5
	Rural	35	47.9	38	52.1
	Missing	97	44.7	120	55.3

(Table 5 continues on the next page.)

Table 5 (cont.). Breakdown of Persistence Rates for Variables in Analysis of Continuous Enrollment of Fall or Spring Freshman thru Spring Sophomore for African American Students

Variable	Category	Persistence of Fall to Spring Freshman			
		Persisters		Non Persisters ©	
		N	Row %	N	Row %
Composite High School Diploma	Honors	200	79.1	53	20.9
	Core 40	454	59.0	315	41.0
	Regular or Missing ©	460	43.1	607	56.9
Composite High School GPA	A	124	75.2	41	24.8
	B ©	454	60.7	294	39.3
	C or Lower	343	48.9	359	51.1
	Missing	193	40.7	281	59.3
Composite SAT Scores	High	74	64.3	41	35.7
	Mid ©	208	65.4	110	34.6
	Low	516	55.2	419	44.8
	Missing	316	43.8	405	56.2
College Freshman GPA	A	122	77.2	36	22.8
	B ©	516	75.8	165	24.2
	C or Lower	427	39.2	662	60.8
	Missing	49	30.4	112	69.6
Remedial Coursework in Freshman Year	Remedial Math only	144	41.6	202	58.4
	Remedial Language Arts only	45	35.2	83	64.8
	Remedial Math and Language Arts	187	46.8	213	53.3
	No Remedial Coursework ©	738	60.7	477	39.3
Enrollment Status in First Semester	Full-time	999	55.5	801	44.5
	Part-time ©	115	39.8	174	60.2
Delayed Enrollment in Spring as Freshman	Delayed	126	43.4	164	56.6
	Not delayed ©	988	54.9	811	45.1
Housing Status in Freshman Year	On-Campus	545	59.3	374	40.7
	Others ©	569	48.6	601	51.4
Dependency Status	Indeterminate status ©	214	50.6	209	49.4
	Self-supporting	62	39.2	96	60.8
	Dependent ©	838	55.6	670	44.4
Aid Packages	Grants only	386	52.1	355	47.9
	Loans only	92	54.1	78	45.9
	Grants and Loans	319	54.7	264	45.3
	Other Packages	163	63.9	92	36.1
	None ©	154	45.3	186	54.7
Total		1,114	53.3	975	46.7

© is the reference category in regression.

Table 6. Logistic Regression Analyses of Persistence of Continuous Enrollment of Fall or Spring Freshman thru Spring Sophomore for African American Students

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.	Odds R	Sig.
Male	0.920		1.037		1.034		0.987		0.963		1.044		1.053	
Family Income Low	0.817	*	0.895		0.907		0.928		0.927		0.991		0.933	
Family Income High	1.330	*	1.315	*	1.297	*	1.353	*	1.351	*	1.317	*	1.433	**
Family Income Missing	1.020		1.153		1.160		1.220		1.197		1.153		1.408	
Parent Ed. HS or less	0.939		0.987		1.002		0.992		1.000		1.026		1.011	
Parent Ed. Missing	0.549	***	0.721	**	0.747	*	0.675	**	0.684	**	0.617	***	0.639	**
Locale City	1.071		1.035		1.053		1.057		1.058		1.129		1.113	
Locale Rural	0.816		0.814		0.810		0.783		0.802		0.846		0.821	
Locale Missing	0.921		1.177		1.207		1.217		1.206		1.314		1.321	
HS Diploma Honors			3.445	***	3.370	***	2.940	***	3.015	***	2.685	***	2.636	***
HS Diploma Core 40			1.659	***	1.635	***	1.434	***	1.447	***	1.463	***	1.442	***
HS GPA A			1.412	*	1.382		1.336		1.348		1.102		1.091	
HS GPA C or lower			0.785	**	0.804	*	0.828		0.819	*	0.905		0.894	
HS GPA Missing			0.763		0.816		0.819		0.812		0.815		0.807	
SAT Score High					0.848		0.798		0.781		0.625	*	0.616	*
SAT Score Low					0.908		0.945		0.934		1.121		1.117	
SAT Score Missing					0.783		0.886		0.862		1.006		0.985	
State Universities							1.838	***	1.730	***	1.397		1.411	
Regional Campuses							0.963		0.916		0.759		0.735	
Urban University							0.647	***	0.627	***	0.627	**	0.619	**
Research Universities							1.500	**	1.496	**	1.382		1.338	
Private							1.398	*	1.380		1.582	*	1.484	
Humanities									1.014		1.097		1.119	
Arts									0.845		0.602		0.594	
Science and Math									0.594	**	0.715		0.733	
Social Science									0.934		0.884		0.883	
Health									0.675	**	0.683	*	0.665	**
Business									0.842		0.709	**	0.698	**
Education									0.659	**	0.641	**	0.647	**
Computer									0.731		0.671		0.649	*
Engineering									0.897		0.823		0.795	
Others									0.848		0.772		0.758	
College GPA A											1.101		1.099	
College GPA C or lower											0.227	***	0.229	***
College GPA Missing											0.167	***	0.171	***
Remedial Math only											0.789		0.784	
Remedial Lang. Arts only											0.841		0.855	
Remedial Math & Lang.											1.457	**	1.453	**
Full-time First Semester											1.132		1.070	
Delayed Enrollment											1.015		1.044	
On-Campus Housing											0.718	**	0.648	***
Self-supporting													0.670	*
Grants only													1.458	**
Loans only													1.380	
Grants and Loans													1.540	**
Other Packages													1.854	***
Number of Cases	2,089		2,089		2,089		2,089		2,089		2,089		2,089	
Model χ^2	49		155		158		204		214		442		452	
Nagelkerke R ²	0.031		0.095		0.097		0.124		0.130		0.255		0.260	
% Correctly Predicted	56.6		61.0		61.0		62.8		62.5		69.5		69.6	

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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