

WHAT REALLY INFLUENCES MINORITY ATTENDANCE? Sequential Analyses of the High School and Beyond Sophomore Cohort

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While the factors that influence college minority student attendance have been the subject of recent study, there remain unresolved questions about how different factors influence college attendance decisions of applicants from historically disadvantaged backgrounds. In particular, there is ambiguity about whether blacks are more or less likely to attend than whites and what factors might improve their attendance rates. This study uses two sets of logistic regressions to identify the factors that can promote minority attendance: a set that examines attendance by all high school seniors in the high school class of 1982 and a set that examines attendance by college applicants in this class. Consistent with prior research on student access, three factors are identified that can potentially improve college attendance by minority students: (1) improved academic preparation in elementary and high school; (2) increased aspirations for higher levels of educational attainment; (3) increased levels of financial aid. Public interventions that would improve any of these factors for minority high school students are likely to improve minority participation rates.

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During the 1980s there was substantial controversy about the factors that influence college attendance decisions. Doubts about the effectiveness of student financial aid in promoting student access, raised in part by research by Hansen (1983), initiated the controversy. However, concerns about declining minority student participation soon took center stage in the policy debates (e.g., Chaikind, 1987; Mingle, 1987; Pelavin and Kane, 1988; Wilson, 1986). While more recent research confirms the fact that financial aid has a positive influence on student enrollment decisions (Jackson, 1988; Leslie and Brinkman, 1988; St. John, 1990a, 1990b; St. John and Noell, 1989), ambiguities remain about black student attendance and how public policies can be manipulated to improve college attendance by the historically disadvantaged.

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The controversy stems from whether the decline in minority student enrollment is associated with changes in federal student aid policy (Wilson, 1986). The declines in federal grant programs are now well documented (Lewis, 1989) and can be linked to the timing of the decline in minority participation. The decline in black student participation began either in 1976 (Mingle, 1987), when the declining value of the college degree first gained notice (e.g., Freeman, 1976) and the total amount of grant aid, in constant dollars, began to decline (Lewis, 1989); or in 1978 (e.g., Chaikind, 1987; St. John and Noell, 1989), when the Middle Income Student Assistance Act (MISSA) first went into effect, and the focus for grant aid shifted to include middle-income students in addition to low-income students (St. John and Byce, 1982). The difference in dates is attributable to how Current Population Surveys (CPS) are interpreted. Some researchers (Mingle, 1987; Pelavin and Kane, 1988) examine current enrollment by the college-age population, whereas others (Chaikind, 1987; St. John and Noell, 1989) examine current or previous enrollment by the college attendance.¹

Regardless of how participation rates are measured, enrollments apparently declined in the late 1970s. Changes in funding for grant programs apparently had an influence. However, several of the studies of minority access focus on academic preparation and ignore or downplay the role of student aid (e.g., Mingle, 1987; Chaikind, 1987; Pelavin and Kane, 1988). Yet the role of student aid, along with other factors that promote minority student enrollment, needs to be further investigated.

This article seeks to identify factors that influence college attendance decisions by minority students. The article uses two sets of sequential logistic regressions to examine how enrollment decisions by blacks and Hispanics differ from enrollment decisions by whites and Asians: one set considering attendance decisions by high school seniors in the class of 1982, and the other attendance decisions by college applicants in this class. The article first considers background on the issues being investigated, and then the study approach, findings, and conclusions.

BACKGROUND

At least four approaches have been used in studies of trends in minority enrollment and participation² and the factors that influence these outcomes. First, most researchers use CPS data to examine participation rates for various population groups (Chaikind, 1987; Mingle, 1987; Pelavin and Kane, 1988; St. John and Noell, 1989). The analysis of these data clearly indicates that participation rates by minority students, especially blacks, have declined since the late 1970s. Second, a few studies have used Higher Education General Information Surveys (HEGIS) to examine enrollment trends by various minority groups

(e.g., Chaikind, 1987; Pelavin and Kane, 1988). HEGIS data show an increase in minority student enrollment, which is attributable to the increasing size of the minority population.

Third, a few studies attempt to identify factors associated with minority student participation using trend analyses of diverse educational data sets, such as the National Assessment of Educational Progress (e.g., Mingle, 1987; Pelavin and Kane, 1988). These analyses find that poor academic preparation is a limiting factor for minority students. Finally, a few studies attempt to examine various factors associated with minority student attendance using statistical models (e.g., Chaikind, 1987; St. John and Noell, 1989). This approach has the most potential in explaining how various factors interact to promote minority student enrollment. However, there are many issues related to how various factors combine to influence attendance that merit further scrutiny.

In his analysis of the High School and Beyond Database, Chaikind (1987) found that blacks were more likely to attend college than whites when other background factors were controlled for. This finding is consistent with prior research on postsecondary attainment, which consistently finds that minorities are more likely to attend when social and educational background are taken into account (e.g., Alexander and Eckland, 1975; Alexander, Holupka, and Pallas, 1987; Thomas, Alexander, and Eckland, 1979).³ This finding, however, does not mean that minority student participation rates cannot be influenced by student financial aid or other policy interventions.

In another study, St. John and Noell (1989) used HSB to examine enrollment decisions by all students and by minority students in the classes of 1980 and 1982. They used a four-step approach that examined (1) college attendance by all students; (2) college application by all students; (3) college attendance by applicants; and (4) college attendance by minority applicants. The final two steps examined applicants only, using a method similar to Jackson's (1978; 1988). St. John and Noell (1989) found that (1) black students were no more likely to attend than whites when the entire population was considered; (2) blacks were more likely than whites to apply for college; (3) minority applications were less likely to attend, a finding that should be of interest to policy makers; and (4) financial aid—all types—was positively associated with minority attendance. In a subsequent analysis, St. John (1990a) found that enrollment decisions by low-income applicants were price responsive to the amount of grant aid offered, but not the amount of loan aid offered. In combination these findings suggest that the decline in federal grant programs between 1976 and 1984 (Lewis, 1989) could have had a detrimental impact on minority student participation rates.

This article attempts to clarify further how various factors combine to influence minority student enrollment. More specifically, the paper examines why some studies have found that black students are more likely to attend college

than white students (e.g., Chaikind, 1987; Alexander, Holupka, and Pallas, 1987), while black applicants are less likely to attend than whites (e.g., St. John and Noell, 1989).

The logical model used for this article is derived from (1) educational attainment research that examines how social background factors influence college attendance (e.g., Alexander and Eckland, 1975; Alexander, Holupka, and Pallas, 1987; Thomas, Alexander, and Eckland, 1979) and (2) research that uses national databases to consider the impact of student financial aid on attendance (e.g., Jackson, 1978, 1988; Manski and Wise, 1983; St. John, 1990a; St. John and Noell, 1989). This approach is relevant for public policy because an objective of student aid programs is to promote access for the historically disadvantaged. The logical model for this study views attendance as a function of region, social background, ability/achievement, high school experiences, aspirations, and student financial aid. This model includes two factors not normally considered in attainment research: aspirations and student financial aid. Both of these factors have relevance to public policy on higher education. Student aid is important because state and federal student aid programs have been created to promote attendance. Aspirations is important because there is a growing emphasis on programs designed to influence the college aspirations of students in high school and junior high school (e.g., Hossler and Gallagher, 1987; Hossler and Stage, 1988; Stage and Hossler, 1989).

The decision to use a sequence of logistic regressions in this study was prompted by the fact that in prior studies there have been discrepancies in the direction and significance of the various factors that influence access. More specifically, some studies indicated that blacks are more likely to attend college than whites (e.g., Alexander and Eckland, 1975; Chaikind, 1987), whereas others do not (e.g., St. John, 1989; Jackson, 1988). The sequential logistic regressions can provide insight into how different factors interact to influence dichotomous outcomes (e.g., Mare, 1980; St. John, Kirshstein, and Noell, in press; Stevens and Swicegood, 1987) such as college attendance. The sequential logistic regressions are a predefined set of steps focusing on the same outcome, similar to stepwise ordinary least squares regression. This approach can help clarify the influence different factors have in affecting college enrollment.

RESEARCH APPROACH

This study assumes that college attendance decisions are influenced by the region students are from, their social background, their ability/achievement, their high school experiences, their aspirations, and student financial aid. These variables have been organized into six logical analytical steps. The article considers if and when the significance of different variables changes as the analysis progresses from one step to the next.

The first step includes the region in which the students attended high school,

a factor included in prior studies of minority enrollment (Chaikind, 1987; St. John and Noell, 1989). Region can have an influence for at least three reasons: (1) The ethnic composition of the population can vary by region; (2) the quality of schools can vary by region; and (3) the availability of postsecondary opportunity can vary by region. Region is considered as a first step because most students are born in a region and remain in that region until they reach college age. Thus, region can, in theory, influence other variables in the model and, therefore, should be considered as a first step, before other variables are entered into the model.

Second, family social background factors are considered (black, Hispanic, being male, family income, and mother's educational attainment). Blacks and Hispanics are examined because these populations are historically disadvantaged and attend at lower rates than whites and Asians (St. John and Noell, 1989). Gender (being male), family income, and mother's education, or related variables were chosen because they are usually considered in educational attainment research (e.g., Alexander and Eckland, 1975; Wolfle, 1985). Mother's education was selected over father's education or parents' education because (1) it consistently had a stronger influence on the outcome measure and (2) a large percentage of blacks are from single-parent homes and therefore this variable appeared to be the most logical choice.

Scores on a standardized test were included as the third step, as a proxy for achievement/ability. Many of the intervention programs for at-risk students focus on test scores as the ultimate outcome measure (e.g., Levin, 1988). The focus of some of these programs is to accelerate learning to improve achievement test scores. Therefore, test scores may be an indicator of achievement, rather than a measure of ability per se. If test scores for the at-risk school population can be improved by acceleration programs, then this strategy would offer another means of improving minority student participation in postsecondary education.

The fourth step considers high school experiences. The influence of being on an academic, college-preparatory track or being on a vocational track are compared to being in a general high school program. Grades are important as an indicator of achievement and because they are considered in college admissions decisions.

Postsecondary plans are included in the fifth step, as an indicator of aspirations. The analysis uses a question about plans asked during the senior year in high school. Postsecondary aspirations appear to be important to college attendance (Hossler and Stage, 1988; St. John and Noell, 1989). This is included as a fifth step because all of the prior variables can influence this outcome. Therefore, it is appropriate to consider its influence only after these other factors have been considered.

The final step, which was undertaken only for college applicants, considers whether or not applicants received a student aid offer. This variable is consid-

ered because this study is concerned about the types of interventions that can improve attendance by minority students and other disadvantaged populations. Consistent with prior research (e.g., Jackson, 1978, 1988; St. John 1990a; St. John and Noell, 1989), this study considers the influence of aid offers on attendance by college applicants.

Database

This analysis uses the High School and Beyond Sophomore Cohort, the high school class of 1982 (Sebring et al. 1987). The analysis considers only students who were enrolled as high school seniors in the academic year 1981–1982. The base year for HSB was the spring of 1980, the sophomore year for this class. The first HSB follow-up—conducted during senior year for the high school class of 1982—was used for data on social background, high school experience, and ability/achievement (Sebring et al., 1987). The second follow-up, collected in academic year 1983–1984, was used for information on student aid and college attendance. Since the HSB sophomore cohort contains students who dropped out after their sophomore year in high school, it was necessary to eliminate these additional cases from the file. A sample of 7,568 high school students had sufficient information on the first and second follow-ups to be included in this study. A subsample of 5,115 who were applicants (applied for or attended college) are examined in the applicant model. HSB contains information on family background, high school experiences, and college experiences not specifically examined in this study.

The HSB sophomore cohort has not been used extensively to examine the influence of student aid on access. It has been used to examine progress in student access in the early 1970s compared to the early 1980s (St. John and Noell, 1989) and to examine price response in enrollment decisions (St. John, 1990a). This analysis extends beyond these prior studies by examining the interactions among the factors that influence student attendance decisions.

Model Specifications

Appropriate variables were selected to represent each of the factors in the logical model. The outcome variable in each set of logistic regressions is whether or not a student attends college. In the first sequence of logistic regressions, a sample of the entire population of high school seniors in 1982 was used. In the second set, a subsample of applicants in this class was considered. High school seniors were considered applicants if they indicated they had applied for college as seniors in high school or if they attended the first year after high school. This approach is consistent with other studies of the impact of student aid on attendance decisions by college applicants (Jackson, 1978, 1988; St. John 1990a; St. John and Noell, 1989). The independent variables for each

set of logistic regressions was the same for each set of models, with the exception of student aid offers, which was considered only in the applicant models.

Three region variables were constructed from Census regions that students lived in as high school seniors. Northeast (a variable coded as "1") combines students from the New England and Mid-Atlantic states. North Central (coded as "1") combines the East North Central and West North Central states. South (coded as "1") contains students from the South Atlantic, East South Central, and West South Central states. Students from each of these regions are compared to students from the West (coded as "0" in each of the region variables)—which included students from the Pacific and Mountain states—in each model application.

Five variables were selected for social background, the second factor included in the model. Black and Hispanic students (both coded as "1") are compared to other students (coded as "0" on both ethnicity variables). Males (coded as "1") are compared to females (coded as "0"). Mother's education level, as reported by high school seniors, was coded as follows: "1" for less than high school; "2" for high school graduate; "3" for some college; "4" for college graduate; and "5" for graduate school.⁴ Finally, family income, as reported by students during their senior year, was coded using a seven-category scale included on the student form.

A composite variable for test scores on standardized achievement tests was used for ability/achievement, the third factor in the model. This variable was split into three groups: lowest quartile, middle two quartiles, and highest quartile.⁵

Three variables were selected for high school experience, the fourth factor. Students who were in an academic program (coded as "1") and a vocational program (coded as "1") in high school were compared to students in a general high school program (coded as "0" on both variables). High school grades used an eight-point scale with "mostly A's" as the highest score and "below D's" as the lowest score.

Postsecondary plans were included as a measure of postsecondary aspirations, the fifth factor in the logical model. This was a five-item scale ranging from "1" for no postsecondary plans, to "5" for advanced degree.

Student financial aid was treated as a "dummy" variable in the analyses of applicants (students who received aid were coded as "1" and compared to students who did not receive aid) and was not included in the analyses of high school seniors. Students who received aid offers from their first-choice or second-choice schools were counted as having received aid offers. This approach to measure the impact of student aid is consistent with prior analyses by Jackson (1978; 1988) of high school classes of 1972 and 1980. Aid was not considered in the model for all high school seniors because aid can be offered only to college applicants.

Statistical Methods

Given that the outcome measure was dichotomous—whether or not a student attended college—sequential logistical regressions were used. More specifically, a sequential set of logistic regressions was used in a stepwise procedure. This technique has been used frequently in recent years to look at the effects of different groups of variables on dichotomous outcomes (e.g., Mare, 1980; St. John, Kirshstein, and Noell, in press; Smith and Uchida, 1988; Stevens and Swicegood, 1987). The use of sequential logistic regression makes it possible to test the added effects that different groups of independent variables have on our ability to predict an outcome.

Delta- p statistics were calculated for each variable in each logistic regression using a methodology recommended by Petersen (1984). The delta- p statistic provides a measure of the change in the probability of the outcome that can be attributed to a unit change in a given variable in the model. For dichotomous variables, such as the receipt of an aid package, a significant delta- p statistic of .070 percentage points can be interpreted as meaning that receiving aid increases the probability of attendance by 7.0 percentage points. For a scaled variable, such as a grade-point average, a significant delta- p statistic of .015 can be interpreted as meaning a one-point change on that scale, such as a one-point improvement in grade point average would increase the probability of attendance by 1.5 percentage points.

In addition, significance levels of the betas of each variable in each model are presented, as well as the $-2 \log$ likelihood ($\log L$) statistic for each model. The $-2 \log L$ provides an indication of fit of the model; as smaller $-2 \log L$ represents a better fit of the model (Aldrich and Nelson, 1984). A proportional-reduction-in-error measure was calculated by subtracting the $-2 \log L$ statistic for the model from the $-2 \log L$ statistic for the model containing the intercept only and dividing the difference by the $-2 \log L$ statistic for the model containing the intercept only. This proportional-reduction-in-error measure is referred to as R^2 . An increasing R^2 between models indicates a reduction in unexplained error.

Limitations

Logistic regressions were selected because it was an appropriate methodology and HSB was selected because it was an appropriate database to use for this purpose. There are, however, some limitations in the study approach.

First, there are missing values for each variable used. No attempt was made to impute missing values. Instead it was assumed that missing values were randomly distributed.

Second, some of the variables used in the models were nominal scales (e.g., mother's education, family income, postsecondary education plans, and test

scores). No attempt was made to convert these to ordinal scales. Therefore, caution should be used when interpreting the delta- p statistics for these variables. For example, since income is reported in categories, and each category is not an equal dollar increment, it is not possible to attribute a specific change in the probability of attendance to a specific change (e.g., one thousand dollars) in family income.

Third, caution should be used when comparing the size of delta- p statistics for different variables. While the delta- p statistics provide a measure of the change in probability attributable to a unit change in a specific variable—and the relative size of these changes in probabilities can be compared—delta- p statistics are not standardized regression coefficients. The delta- p statistic should be interpreted in relation to the measure used for each independent variable in each step. Since the units of measure usually differ across variables in each logistic regression, cross-variable comparisons of delta- p 's normally should not be made. Thus, delta- p 's do not indicate which variables in a given model have the greatest impact on the outcome measure. The exceptions, of course, are the instances where independent variables are a similar unit of measure (e.g., for different regions): Each specified region can be compared to the unspecified region (e.g., being from the West) and, thus, the delta- p 's for the four regions can be compared.

FINDINGS

The findings are presented in two parts. The first set of logistic regressions, which examines college attendance by high school seniors, is analogous to sociological research on educational attainment. The second set of logistic regressions considers the factors that influence attendance by college applicants.

College Attendance by High School Seniors

As shown in Table 1, the addition of variables in each of the five steps increases our ability to predict college attendance. The reduction in the $-2 \log L$ statistic in each successive step indicates an improvement in fit as each group of variables is added. Also, all of the step comparisons were statistically significant, indicating an improved ability to predict the outcome, college attendance.

As we move from step to step, several interesting relationships emerge. First, while only two regions—Northeast and North Central—were significant in the first step, all three regions were significant in each subsequent step, and the size of the delta- p statistic for each region increases in each version of the model from step to step, which means that the influence of region increases as other factors are considered.

TABLE 1. Effects of Region, Social Background, Test Scores, Academic Preparation, and Aspirations on College Attendance, by Seniors in the High School Class of 1982

	Step 1	Step 2	Step 3	Step 4	Step 5
- 2 Log L:	10637.58	9954.90	9164.82	8377.76	7345.38
R ²	0.0046	0.0685	0.1424	0.2161	0.3127
Northeast	0.105**	0.119**	0.113**	0.147**	0.185**
North Central	0.084**	0.103**	0.115**	0.150**	0.183**
South	0.030	0.075**	0.108**	0.119**	0.130**
Black		0.002**	0.135**	0.149**	0.026
Hispanic		-0.060*	0.049	0.046	-0.010
Male		-0.096**	-0.116**	-0.050**	-0.040**
FamInc		0.028**	0.019**	0.018**	0.003
MAED		0.117**	0.092**	0.078**	0.042**
Test Score			0.248**	0.124**	0.037**
Academic Program				0.179**	0.082**
Vocational Program				-0.085**	-0.042*
HS Grades				0.113**	0.089**
PSE Plans					0.186**
Sample Size:	7568				
Baseline P:	0.546				

Sources: High School and Beyond Base Surveys and Follow-Ups.

*Significant at the .05 level

**Significant at the .01 level

Second, and more important, the two ethnicity variables change as we move from step to step. When background factors were first considered, in step 2, being Hispanic was significant and negatively associated with college attendance and being black was not significant. However, when test scores and high school experiences were added in steps 3 and 4, this situation changes: Being black is significant and positively associated with attendance and being Hispanic is neutral. The findings in step 4 are consistent with attainment research that considers background and high school experiences (e.g., Alexander and Eckland, 1975; Alexander, Holupka, and Pallas, 1987; Wolfle, 1985).

In the final step, when postsecondary plans are included, neither ethnicity variable is significant. Thus, the fact that blacks have high postsecondary plans, relative to their test scores and high school experiences, helps explain why blacks are more likely to attend when social background, test scores, and high school experiences are considered (steps 3 and 4).⁶ However, it should also be noted that being black is not significant in the final step.⁷

A third interesting aspect of the sequential models is that family income is significant and positively associated with college attendance in three of the four steps in which it is included, steps 2, 3, and 4.⁸ But family income is not

significant in the final step (5) when postsecondary plans are considered, which suggests that (1) high-income students have higher postsecondary aspirations, and (2) having high postsecondary aspirations can also help mitigate the negative influence of having a low income on college attendance.⁹ This finding further illustrates the potential benefits of programs aimed at increasing the postsecondary aspirations of junior and senior high school students.

The size and direction of the delta-*p* statistics for some of the variables in the final step are also noteworthy. First, being from any region other than the West increases the chances of attending college rather substantially, ranging from 18.5 percentage points for high school students from the Northeast to 13.0 percentage points for those from the South. It should be noted that being from the South per se does not increase the probability of college attendance (step 1), but is significant when combined with other factors.

Second, being male is significant and negatively associated with college attendance in each step. In the final step, when all other factors are considered, being male decreased the probability of college attendance by 4.0 percentage points.

Third, test scores are significant and positively associated with college attendance in the final step, but the size of the delta-*p* statistic decreases with each successive step in which it is included. This suggests that ability/achievement influence other variables in the model, such as high school grades and college aspirations, which would explain the drop in the size of the delta-*p* for test scores as we move from one step to the next.

Fourth, all three variables related to high school experiences are significant in both steps in which they are included; however, the size of the delta-*p* statistics decreases between step 4 and step 5, which means that having high postsecondary aspirations can partially mitigate the negative influence of low grades or poor preparation. In the final step, being in an academic program in high school increases the probability a high school senior will attend college by 8.2 percentage points; while being in a vocational program decreases the probability by 4.2 percentage points; and each point increase in high school grades increases the probability of attendance by 8.9 percentage points.

Finally, it should be noted that the influence of postsecondary aspirations is substantial; each unit increase in aspirations increases the probability of attendance by 18.6 percentage points. A student who aspires to gain a graduate degree would be 37.2 percentage points more likely to attend college than the same student would be if his or her aspirations were to obtain some college.

Attendance by College Applicants

It is necessary to consider the factors that influence attendance by college applicants because it is not possible to consider the impact of actual aid offers on students who do not apply for college. Therefore, in spite of the fact that we

TABLE 2. Effects of Background and Aid Offers on College Attendance by College Applicants in the Class of 1982

	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
-2 Log L:	3384.87	3323.63	3298.79	3250.12	3204.92	3114.80
R^2	0.004	0.022	0.029	0.044	0.057	0.084
Northeast	0.028*	0.030*	0.027	0.038**	0.038**	0.033*
North Central	0.031**	0.032**	0.033**	0.038**	0.040**	0.038**
South	-0.001	0.016	0.019	0.023	0.022	0.025
Black		-0.055**	-0.025	-0.016	-0.035*	-0.056**
Hispanic		-0.029	-0.011	-0.011	-0.015	-0.018
Male		0.007	0.003	0.016	0.014	0.012
FamInc		0.009**	0.008**	0.008**	0.006**	0.012**
MAED		0.115**	0.012**	0.010*	0.009	0.009
Test Score			0.034**	0.010	-0.001*	-0.004
Academic Program				0.008	-0.009	-0.016
Vocational Program				-0.009	-0.005*	-0.007
HS Grades				0.026**	0.022**	0.021**
PSE Plans					0.029**	0.027**
Aid Offer						0.070**

Sample Size: 5115

Baseline P : 0.885*Sources:* High School and Beyond Base Surveys and Follow-Ups.

*Significant at the .05 level

**Significant at the .01 level

cannot predict attendance by applicants as well as we can predict attendance by high school seniors, it is necessary to develop an applicant model if we are to use price-response measures for enrollment in planning models, which was an objective of this research (e.g., St. John, 1990a).

As shown in Table 2, the addition of new variables in each of the six steps in the analyses of attendance by applicants also increases our ability to predict college attendance. The reduction in the $-2 \log L$ in each successive model indicates improvement in the fit as each set of variables is added. Additionally, each successive model has a larger R^2 . However, the size of the R^2 in the final applicant step is substantially smaller than in the high school seniors' final step. This difference is probably due to at least three factors: (1) A larger percentage of applicants attend college; (2) the same factors that influence attendance by high school seniors also influence their application to attend college (St. John and Noell, 1989); and (3) therefore, students in the analyses of applicants are more similar to each other than are the students in the analyses of high school seniors.

As we move from step to step in analyses of college applicants, there are several noteworthy differences from the analyses of high school seniors. First, being from the South is not significant in any of the steps, while being from the Northeast and the North Central states is significant and positive in each step. However, being from the South is significant in some of the analyses of high school seniors.

Second, being black has a significant, negative association with attendance by applicants in three of the five steps in which it is considered. When background and region are considered (step 2), being black is significant and negative. When test scores and high school experience are added (steps 3 and 4), being black is not significant. Thus, when region, social background, test scores, and high school experiences are considered, black applicants have the same probability of attending as other applicants. However, when postsecondary aspirations are considered (steps 5 and 6), being black is again significant and negative. Presumably, this occurs because blacks have higher postsecondary aspirations than other applicants with similar test scores and high school experiences. Thus, while high aspirations improve the probability that black and low-income students will attend, having high aspirations alone does not guarantee their college attendance. The logical extension of this finding is that interventions designed to increase postsecondary aspirations of blacks and other disadvantaged students should also emphasize academic achievement.

Third, family income is significant and positive in each of the applicant models in which it is included.¹⁰ Further, the size of the delta-*p* statistic for family income increases in the final model, which suggests that the amount of aid available to low-income applicants in 1982 was not sufficient. This suggests that financial aid was not sufficient to mitigate fully the impact of low income on college attendance.

Fourth, postsecondary plans had a significant and positive association with attendance by college applicants. However, it should be noted that the size of the impact is substantially lower than it is for high school seniors. Therefore, it appears that aspirations have a stronger influence on which high school seniors apply to college than on which applicants attend, a point illustrated by recent analysis of the factors that influence college applications (St. John and Noell, 1989). In the final applicant step, each level of postsecondary plans increases the probability of attendance by 2.7 percentage points. An increase in two levels of aspirations, say the difference between planning to complete some college and planning to obtain a graduate degree, increases the probability that a college applicant will attend by only 5.4 percentage points.

Finally, it should be noted that the receipt of student financial aid has a significant and positive association with attendance by applicants. Receiving a financial aid offer increases the probability an applicant will attend by 7.0 percentage points, which is comparable to Jackson's finding on the impact of aid

offers (1978, 1988). When compared to other variables in the final applicant model, the size of the delta- p statistic for an aid offer is relatively large. Additionally, the R^2 increases by a larger amount between step 5 and step 6 than for the transition between any other two steps in analysis of attendance by applicants. Therefore, the impact of student financial aid on access appears to be substantial. Additionally, since the size of the negative delta- p statistics for family income and being black increases between step 5 and step 6, it appears that the amount of aid offered simply was not sufficient to optimize attendance by low-income or minority student applicants in the early 1980s.

CONCLUSIONS AND IMPLICATIONS

These analyses add some clarity to the factors that influence college attendance decisions by minority students. All of the variables in the model are significant in at least one of the sequential models for high school seniors. Therefore, the combination of variables included in the statistical models appears reasonable. Each sequential logistical regression step increases our ability to predict college attendance for both high school seniors and college applicants. Therefore, the differentiation among groups of variables as factors that influence college attendance also seems reasonable. The two sets of sequential logistic regressions, in combination, provide insight into how different factors interact to influence student attendance decisions.

The overall conclusion is that the college attendance behavior of blacks and Hispanics differs from other high school students. When only region, background, test scores, and high school experiences are considered, blacks are more likely to attend college. However, when postsecondary plans are also considered, being black is no longer positively associated with college attendance. Therefore, having high postsecondary aspirations appears to mitigate, at least partially, the impact of poor preparation (e.g., low test scores and low grades) for black high school students. Yet, black applicants are less likely to attend college than other applicants, except when high school experiences are considered without aspirations. Thus, aspirations alone are not sufficient to overcome poor academic preparation.

Hispanics, in contrast, are not as likely to attend college as black or students from other racial or ethnic groups. When only region and social background are considered, Hispanic high school seniors are less likely to attend college. However, when test scores and high school experiences are also considered, being Hispanic is not significant, which means that poor academic preparation keeps Hispanics from attending and they do not have the higher aspirations to help compensate for these deficiencies. Therefore, the low participation rates for blacks and Hispanics observed by many (e.g., Mingle, 1987; St. John and Noell, 1989; Wilson, 1986) do merit special consideration.

Based on these findings, it appears that at least three types of intervention strategies have the potential, at least, to improve minority student enrollment in postsecondary education. First, since academic preparation—test scores and high school grades—appears to create barriers for minority students, a finding of this study that is consistent with prior research (e.g., Mingle, 1987; Pelavin and Kane, 1988), intervention programs designed to improve achievement by high-risk students would appear to be an important long-term strategy for improving postsecondary attainment by minority students. In particular, the accelerated school approach developed by Levin (1988) and his colleagues at Stanford merits serious public attention. The acceleration approach appears to be effective at raising test scores by at-risk students in elementary (Levin, 1988) and middle (Hopfenberg, Levin, Meister, and Rogers, 1990) schools.

Second, since having high aspirations appears to mitigate some of the influence of poor academic preparation on college attendance by blacks, and has an especially consistent and positive influence on postsecondary persistence (St. John, 1990b), it would appear that programs that encourage minorities to plan for college (e.g., Hossler and Stage, 1988; Stage and Hossler, 1989) would be viable midterm strategies for promoting minority student enrollment. These programs provide information on opportunities and finances as early as middle school, when the predisposition to attend college is formed. Such programs probably would influence minority participation about three to five years after they were implemented.

Finally, it appears that student aid is an important factor in promoting minority student access. This finding is consistent with some prior research of minority student participation (St. John and Noell, 1989; Wilson, 1986). It should also be noted that enrollment decisions by low-income students are price responsive to grants but not to loans (St. John, 1990a). Therefore, the decline in federal grant programs between 1976 and 1984 (Lewis, 1989) could have contributed to the decline in minority student participation. This further suggests that increases in federal student grants targeted on low income could improve minority student attendance rates. In fact, of all the means available, increasing funding for student grant programs targeted on the low-income group may be the best way to promote minority access in the short term, say the next two to three years, and is also a necessary component of any long-term strategy designed for this purpose.

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NOTES

1. Both measures have some merit. In the Current Population Surveys (CPS), which were used in these studies, enrollment information by age group is reported in categorical form (currently enrolled, never enrolled, previously enrolled). If one is concerned only with the percentage of the population currently enrolled, then the measure used by Mingle (1987) is appropriate. If, on the other hand, one is concerned about access—that is, whether people in a given population ever actually attended—then it is appropriate to combine currently and previously enrolled. Regardless of the approach used, there was a peak in black student attendance in the late 1970s, before the Reagan administration.
2. To make distinctions clear in this study, “participation” refers to the percentage of a particular minority age cohort who attend (or have attended) college; while “enrollment” refers to the number of students in a particular minority group who are enrolled in higher education; “attendance” refers to the individual decision to attend a college or university; and “access” refers to a more general concept than each of the above.
3. There is quite a bit of variation in how ethnicity is treated in the attainment literature. Eckland and Alexander (1980), for example, treat “white” as a dummy variable and find being “white” is negatively associated with attendance. Other researchers combine black and Hispanic as dummy variables (e.g., Alexander, Holupka, and Pallas, 1987). However, regardless of their approach, these studies consistently find that minorities are more likely to attend than whites, when the influence of background and achievement on attendance are examined.
4. In preliminary analyses, three alternative variables were considered for parents’ education: mother’s education, father’s education, and parents’ education (a composite of father’s and mother’s education). Mother’s education was selected because (1) the ability to explain variance was greatest when this variable was used; (2) there was a high correlation between all three variables; and (3) logically we decided that mother’s values could have the strongest influence, given the large number of single-parent families.
5. This classification was used in the National Longitudinal Study and, since an objective of this research was to develop a model that could be used to compare the NLS and HSB cohorts, HSB was recoded using this format to obtain consistency. The cross-cohort comparisons were published earlier (St. John and Noell, 1989).
6. This also explains Chaikind’s (1987) finding that black students were more likely than whites to attend college.
7. This finding differs from Chaikind’s finding (1987) about blacks being more likely to attend. If he had considered aspirations, he may have reached a conclusion that blacks were not more likely to attend.
8. Educational attainment research generally does not consider income as a separate variable. Instead, it is usually combined in a composite measure of social economic status (SES) (e.g., Alexander, Holupka, and Pallas, 1987).
9. If a single SES variable had been used in this study, then the combined variable might still be significant in the final step, since mother’s education still is significant. The fact that the significance of family income does change across steps suggests the separate consideration of these variables has some merit, especially when analysis of financial aid is being considered.
10. However, mother’s education is not significant in each step. This reinforces the importance of separately considering the components of SES—income and parents’ education—especially

when the influence of student financial aid is being considered. In this case, the finding that income is significant implies that financial aid was not sufficient to overcome the barriers that result from low-income status.

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