

# Understanding the Racial Disparity in Graduation Rates at a Large Ivy League University

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## Abstract

This paper examines the graduation rate disparity between members of underrepresented minority groups (African Americans and Hispanics) and their white and Asian peers at a large Ivy League university. To accomplish this, we use data from a variety of sources, including confidential institutional data on admissions and financial aid as well as publicly available data from the National Center for Educational Statistics and the College Board. We examine the extent to which high school and neighborhood characteristics may be responsible for the disparity. Specifically, we are interested in how the presence of members of a person's own racial group in high school affects his or her college-level performance, especially for blacks and Hispanics. We find that these own-race effects do not play a significant role in determining graduation probability. We also find that neighborhood characteristics such as the poverty rate and school characteristics such as per-pupil expenditure are not significant. However, it is shown that the institution's opportunity program plays an important role in fostering the academic success of black students, and a modest role in ensuring that they graduate. We also show that students who are financial aid recipients tend to have a slightly lower graduation rate than non-aid recipients, which shows that graduation success is somewhat linked to a family's financial situation. While our best model is able to explain virtually the entire Hispanic-white gap, we are only able to explain 43 percent of the black-white gap, suggesting that other non-quantifiable factors are at work.

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## 1. Introduction and Study Objectives

Many in the academic community express concern that the six-year graduate rate averages 55 percent at America's colleges and universities.<sup>1</sup> If one considers the experience of certain ethnic and racial groups, an even more sobering situation is revealed. The six-year graduation rate for Hispanics is 42 percent, while that for African-Americans is only 39 percent (IPEDS, 2002). At Ivy League institutions, such as the one considered in this study, graduation rates have historically been much higher, and yet, substantial racial differences in graduation rates persist. These institutions as a whole graduate 95 percent of their students within six years, but only 92 percent of Hispanic students and 89 percent of African-American students (IPEDS, 2002). Unfortunately, those statistics do not tell the entire story.

At the institution that is the focus of this study, overall six-year graduation rates have increased from a low of 83 percent for the entering cohort of 1980 to approximately 92 percent for the entering cohort of 1997 (Alvord, 2004). In addition, the racial gap between whites and underrepresented minorities narrowed during this same time period, from 17 percentage points in 1980 to 7 percentage points for the fall 1997 cohort (Alvord, 2004). Though much progress has been made in improving graduation rates across the board, and specifically among underrepresented minority populations, there remains the issue of explaining the residual gap, especially the large differences observed between blacks and whites.

In this paper, we set out to explain the graduation rate gap using institutional data merged with data on students' high school characteristics. We find that the poverty rate of a community, amount of money spent on a per-student basis for a school district, or the proportion of students of one's own race in his or her high school all have little or no effect on a student's probability of

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<sup>1</sup> These graduation rates are based on data reported by individual institutions and do not account for students who transfer to other schools but still complete a degree within six years (Adelman, 1999).

graduating within six years. In addition, we find that black students, relative to other students, benefit most from participation in the institution's opportunity program, which provides an array of support services and culturally oriented activities targeted at recruiting, retaining and graduating minority students. We show that students who are financial aid recipients tend to have a slightly lower graduation rate than non-aid recipients, which is viewed as a reflection of the fact that income and graduation success are probably correlated. Gender also plays a large role in the graduation gap - females have substantially higher graduation probabilities than males, especially in the case of black females, who are ten percentage points more likely to graduate than are black males. Finally, while our model was able to explain virtually the entire Hispanic-white gap, we were only able to explain about 43 percent of the black-white gap. This leads us to conclude that other factors, presumably cultural factors, may be the driving force behind the residual gap.

In Section 2, we review the previous literature on dropout behavior and the determinants of achievement for members of underrepresented minority populations. In Section 3, we describe the data, variables and estimation methods used in our results. Section 4 presents our key findings. Section 5 presents a discussion of our results and relates them back to previous findings. Section 6 concludes with policy implications and suggestions for future research.

## **2. Literature Review**

Much work has been done on the issues of college dropout and graduation in various contexts. Tinto (1975) was among the first to synthesize a theory of student dropout. He postulates that dropout is a longitudinal process characterized by interactions between an individual and the academic and social systems of the college. As a result of those interactions, a

student will modify her goals and level of commitment to her institution, leading to either persistence or dropout. Most importantly, he postulates that individuals act on their perceptions, which may or may not mirror reality. Thus, if an individual feels that she is not sufficiently integrated into the intellectual and social fabric of her school, without other intervention he or she may drop out. Tinto argues that socioeconomic status, family background, parental expectations, gender, high school performance, and high school characteristics are all important factors to account for. Other important factors may include an individual's membership in a subculture (Tinto, 1975). Indeed, recent research confirms the importance of all these factors in explaining the black-white achievement gap.

Linda Datcher-Loury (1989) used data from the ETS-Head Start Longitudinal Study concludes that much of the variation in achievement among low-income blacks is due to differences in behavior and attitudes amongst families. Vartanian and Gleason (1999) examine neighborhood conditions on high school dropout and college graduation rates. From their investigation of data from PSID, they find that positive neighborhood conditions have a positive influence on educational attainment. However, the methods by which these effects play out differ for whites and blacks. For whites, they found that neighborhood conditions are significantly positive and nonlinear, since the benefits accrue mostly to advantaged white youth who live in the best neighborhoods. For blacks, however, neighborhood characteristics have no significant effects on attainment.

Bowen and Bok (1998) discuss dropout among blacks as well. They find that most students drop out for reasons other than academic difficulty, such as feelings of non-belonging or an inability to relate to other students. Furthermore, they find that socioeconomic status has a much stronger effect on the graduation rates of blacks than on other groups. They also note that

SAT scores tend to overpredict academic success for blacks. In other words, black students actually perform worse academically than their SAT scores would predict. In addition, blacks on average have lower GPAs than whites.<sup>2</sup>

In this paper, we attempt to add to the body of literature on the subject by using information from the entering cohorts of 1997, 1998 and 1999 to examine the black-white (and to a lesser extent, the Hispanic-white) graduation rate gap at this institution. We hypothesize that though family income, parental education, SAT scores and high school GPA all matter in reducing the gap (see, for example, Nelson et. al, 2006), high school characteristics and other cultural and neighborhood related factors may play an important role in explaining the remainder of the gap.

### **3. The Data**

The data in our study come from a variety of sources. Academic, admissions and financial aid data were obtained from a confidential administrative data set compiled by the university's department of institutional research, which included data from the admissions office, financial aid office, and the smaller academic units of the university. This was merged with data from the *Common Core of Data* provided by the National Center for Education Statistics, data on private schools obtained from *Peterson's Private Secondary Schools*, and supplemental data gathered via a search of high school web pages during the summer of 2005. Some data on high school characteristics also came from the College Board. Our dataset includes information on students who are members of the entering cohorts of 1997, 1998 and 1999.

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<sup>2</sup> See Chapter 3 in Bowen and Bok for a more detailed treatment of the test-score issue. Also see various articles in Jencks and Phillips (1998).

### 3.1 Descriptive Statistics

Our dataset consists a total of  $n = 9577$  observations for students in the 1997, 1998 and 1999 entering cohorts. Due to their small sample size, we did not consider the situation of Native American students at the university. Table 1 shows institutional graduation rates by race and graduation status. It can be seen from the table that a larger proportion of black and Hispanic students require a fifth or sixth year of study in order to graduate. This can be partially attributed to the fact that some members of these groups are advised to take a lighter course load during their first year as they adjust to the university.<sup>3</sup>

**Table 1: Cumulative Graduation Rates, By Race and Year of Graduation, Percent**

<b>Graduated in Year / Race</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Did not Graduate within 6 Years</b>
<b>White</b>	84.8	92.2	93.1	6.9
<b>Black</b>	67.8	80.7	82.5	17.5
<b>Hispanic</b>	74.5	85.2	87.3	12.7
<b>Asian</b>	84.2	91.1	92.3	7.7
<b>Native American</b>	54.2	70.8	77.1	22.9
<b>Noncitizen</b>	71.4	85.0	86.9	13.2
<b>All Groups</b>	<b>82.6</b>	<b>90.6</b>	<b>91.8</b>	<b>8.2</b>

Table 2 shows dropout rates by race. Dropping out in Year 1, for example means the student could have left the institution anytime during the first year and did not return for a second year. This computation does not include “stop-outs,” students who dropped out in a given year and took a year or two off before returning to their studies. It is important to note that contrary to common belief, the majority of student attrition does not occur in the first year, which is consistent with the notion of dropout as a longitudinal, cumulative process.

The university has instituted a set of programs to ensure that minority students are able to adjust to the school’s environment and graduate at a rate similar to that of their peers. These

<sup>3</sup> The university guarantees these students five years of financial aid.

**Table 2: Cumulative Dropout Rates, By Race and Year of Study, Percent**

<b>Dropping out by end of year / Race</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5 and beyond<sup>4</sup></b>
<b>White</b>	2.0	3.5	4.3	5.1	6.9
<b>Black</b>	2.8	5.4	8.6	11.9	17.5
<b>Hispanic</b>	2.2	4.3	6.5	8.9	12.7
<b>Asian</b>	1.4	2.9	4.5	5.6	7.7
<b>Native American</b>	4.2	8.3	12.5	20.8	22.9
<b>Noncitizen</b>	6.1	7.5	9.9	10.3	13.2
<b>All Groups</b>	<b>2.1</b>	<b>3.7</b>	<b>4.9</b>	<b>6.0</b>	<b>8.2</b>

include supplemental academic assistance, cultural programming, advising, financial assistance, and other support services to ensure that minorities are able to do their best at the university.

Eighty-five percent of black and 70 percent of Hispanic undergraduates participate in the institution's opportunity program, while 10 percent of black and 9 percent of Hispanic undergraduates participate in the state's opportunity program.<sup>5</sup> This program's goal is to provide a broad range of services to state residents who, due to academic and economic circumstances, would otherwise be unable to attend a postsecondary educational institution. Statewide, the median income of participants' families is \$20,801, with blacks comprising 34 percent and Hispanics comprising 41 percent of program participants.<sup>6</sup>

### *3.2 Variables*

Our dataset consists of a variety of variables that seek to describe demographic, admissions and high school and community level characteristics. Demographic variables include citizenship status, gender, and race. Admission variables include school of study at the

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<sup>4</sup> While information is not available for the Fall 1998 and 1999 cohorts, we do know that 7.4 percent of the fall 1997 attrition group either earned a degree at this institution after the six-year study window or were still enrolled as undergraduates as of 2004 (Alvord, 2004).

<sup>5</sup> Overall, 7.75 percent of students (of all racial groups) participate in both the state and institutional opportunity programs. Less than one-tenth of one percent of white students participated in either program.

<sup>6</sup> *Introduction to 'State Opportunity Program' website*

university, age at admission, legacy status, recruited athlete status, SAT admission scores, ACT admission scores, and high school rank (expressed as a percentile). Opportunity variables include a dummy variable that indicates whether a student has been granted financial aid and a dummy variable indicating opportunity program participation, in either/both the state and institution's programs. High school level data include information on high school size, the racial makeup of the high school, poverty rates, and per pupil-expenditure for public high schools in the sample. This also includes a variable on median household income for the private schools in our study. Our primary dependent variable is an indicator variable describing whether or not a given student graduated from the institution within six years of enrollment. We also use the same explanatory variables and cumulative GPA as a dependent variable to better understand the contribution of those factors to success in coursework, an important predictor of graduation success. A table of variables and their definitions can be found in the Appendix.

### *3.3 Methods and Variables*

Following the lead of many scholars who conclude that cultural factors are of importance in understanding the black-white graduation rate gap (e.g. Phillips et. al, 1998), we attempt to examine the link between the racial makeup of one's high school and success. We do this by interacting a student's race with the racial makeup of the high school, but only for his own race. For example, to understand the effect of increasing the number of blacks in a school on the graduation rate prospects of a black student, we use the variable *blackXhsblack*, which is the percentage of African-American students in a high school if a student is black, and zero otherwise.



We begin by fitting OLS models to the data, starting with a very basic model of demographic variables and building up to the full model specification. Model 1 includes race, gender, and citizenship variables. In Model 2, we add information on the student's college at the institution (e.g. Arts and Sciences, Engineering, etc.).<sup>7</sup> In Model 3, we add admissions characteristics - recruited athlete status, legacy status, SAT and ACT scores, rank in class. Model 4 adds information on parental contribution and participation in equal opportunity programs. In Model 5, we add pertinent high school and neighborhood characteristics such as median income, the poverty rate, and high school per-pupil expenditure. Finally, Model 6 adds the own-race interactions. In each case, we include dummy variables for non-reporting as necessary. Our results are presented below. (Odds-ratios based on analogous logistic regression models are included in the Appendix.)

## **Results**

### *4.1 Graduation Rate Regressions*

Table 3 shows the effects of race on graduation probability relative to the omitted category, whites, resulting from each model specification. As expected, Model 5 leads to the greatest reduction in the coefficients on each race group. The results of Model 6 were not included in this table due to the effects introduced by the interacted high school race variables. Both models 5 and 6 were run separately for each racial group, and these models, which differ significantly from one another, are presented in Tables 5 and 6.

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<sup>7</sup> To protect institutional confidentiality, we do not report college level effects. However, in coding these variables, Architecture majors were omitted from the model due to the fact that theirs is a five-year program, as opposed to most other programs at the institution which can be completed within four years.

**Table 3: Race Coefficients on Various Model Specifications**

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
<b>Black</b>	-0.1093 (8.13)**	-0.1035 (7.72)**	-0.0769 (5.33)**	-0.0590 (3.48)**	-0.0566 (3.33)**
<b>Hisp</b>	-0.0594 (4.93)**	-0.0559 (4.66)**	-0.0393 (3.14)**	-0.0258 (1.77)	-0.0248 (1.70)
<b>Asian</b>	-0.0068 (0.89)	-0.0048 (0.62)	-0.0074 (0.93)	0.0014 (0.15)	-0.0020 (0.22)
<b>Natam</b>	-0.1625 (4.14)**	-0.1639 (4.20)**	-0.1378 (3.51)**	-0.1169 (2.92)**	-0.1125 (2.81)**
<b>Observations</b>	9577	9577	9577	9577	9577
<b>R-squared</b>	0.01	0.03	0.03	0.03	0.04

**Absolute value of t statistics in parentheses**  
**\* significant at 5%; \*\* significant at 1%**

Indeed, holding other factors constant, there are characteristics specific to each racial group. For example, while there is a slight advantage for females of all groups, this effect is most pronounced for black females, who are 10 percentage points more likely to graduate than are black males. There is some evidence that the institution’s opportunity program benefits blacks, with black students who participate 13 percentage points more likely to graduate than blacks who do not participate. However, it does not seem to significantly affect the progress of students of any other race. “Legacies”, recruited athletes and private school students are no more or less likely to graduate than are other students, a result documented in other graduation studies at the university (Alvord, 2004).

High school rank seems to matter overall, and is most significant for Asians as a group. High school size is not significant. SAT verbal scores do not play a role in predicting graduation; however math scores do, at least for whites. ACT scores do matter overall, but not for members of any specific subgroup. (Also note that while most students take the SAT, a small number of applicants opt for the ACT instead, and still others take both tests, so this result should be interpreted with caution.) Students who were granted financial aid had a slightly lower probability of graduation which is merely a reflection of the effects of their family income status

on graduation. However, this effect was not significant for blacks, Hispanics and Asians. Finally, we find that the poverty rate, high school size and per-pupil expenditure for public high school students, and median household income for private school students are all not significant predictors of graduation from the university.

#### 4.2 GPA Regressions

One important predictor of graduation for a given student is his/her cumulative GPA. Cumulative GPA is a measure of how well a student has done at the institution. Grades at this school are higher in sophomore level classes than in freshman level classes, junior level classes than sophomore level classes, and senior level classes than junior level classes (Parekh, 2002). Cumulative GPA is measured as of graduation, or the last semester that the student was enrolled at the university. To control for the year in school (freshman, sophomore, junior, senior) in which the measurement is taken, indicator variables for the year since entry to the university are included in the analyses. Table 4 summarizes the coefficients that show, holding other variables in the model constant, how a student's race/ethnicity affects his/her cumulative GPA.

**Table 4: Race coefficients of various GPA model specifications**

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
<b>black</b>	-0.4335 (19.50)**	-0.4512 (20.72)**	-0.2638 (12.05)**	-0.2575 (10.04)**	-0.2567 (10.01)**
<b>hisp</b>	-0.2572 (13.28)**	-0.2684 (14.15)**	-0.1528 (8.21)**	-0.1494 (6.96)**	-0.1488 (6.93)**
<b>asian</b>	-0.0518 (4.32)**	-0.0529 (4.44)**	-0.0795 (6.85)**	-0.0804 (5.97)**	-0.0882 (6.51)**
<b>natam</b>	-0.4243 (6.29)**	-0.4404 (6.68)**	-0.2866 (4.62)**	-0.2812 (4.46)**	-0.2804 (4.46)**
<b>Observations<sup>8</sup></b>	8484	8484	8484	8484	8484
<b>R-squared</b>	0.08	0.12	0.23	0.23	0.24

**Absolute value of t statistics in parentheses  
significant at 5%; \*\* significant at 1%**

<sup>8</sup> The sample sizes are smaller in Table 4 than they were in Table 3 because the GPA regressions are restricted to those students who graduated within six years.

**TABLE 5: OLS REGRESSION RESULTS – MODEL 5**  
**(Includes all variables except own-group race interactions)**  
**Dependent Variable: Gradin6**

	<b>All Students</b>	<b>White</b>	<b>Black</b>	<b>Hispanic</b>	<b>Asian</b>
<b>nonuscitizen</b>	-0.0627 (4.14)**				
<b>black</b>	-0.0564 (3.33)**				
<b>hisp</b>	-0.0247 (1.70)				
<b>asian</b>	-0.0016 (0.17)				
<b>natam</b>	-0.1123 (2.81)**				
<b>female</b>	0.0379 (6.26)**	0.0322 (4.40)**	0.1045 (2.65)**	0.0505 (1.64)	0.0269 (1.85)
<b>legacy</b>	0.0098 (1.09)	0.0115 (1.25)	0.1132 (1.11)	-0.0937 (1.29)	-0.0082 (0.22)
<b>recruitedathl</b>	0.0041 (0.36)	0.0059 (0.49)	-0.0802 (1.00)	-0.0671 (0.80)	0.0224 (0.44)
<b>SATV</b>	-0.0034 (0.78)	-0.0063 (1.09)	-0.0359 (1.25)	0.0070 (0.30)	0.0074 (0.78)
<b>SATM</b>	0.0168 (3.15)**	0.0181 (2.75)**	0.0518 (1.63)	-0.0230 (0.88)	0.0009 (0.07)
<b>ACT</b>	0.0062 (2.59)**	0.0046 (1.48)	0.0231 (1.54)	0.0185 (1.84)	-0.0015 (0.22)
<b>hsPERC</b>	-0.0014 (2.90)**	-0.0013 (2.21)*	0.0013 (0.57)	-0.0038 (1.65)	-0.0041 (2.82)**
<b>fa_granted</b>	-0.0272 (4.26)**	-0.0292 (3.97)**	-0.0085 (0.15)	-0.0350 (0.96)	-0.0141 (0.97)
<b>Univ_Opp_Prog</b>	-0.0123 (1.11)	0.0738 (0.83)	0.0860 (1.64)	-0.0456 (1.27)	-0.0259 (1.83)
<b>State_Opp_Prog</b>	0.0339 (1.37)	-0.0273 (0.32)	0.0221 (0.34)	0.0308 (0.54)	-0.0435 (0.82)
<b>private</b>	-0.0402 (2.66)**	-0.0289 (1.47)	-0.0314 (0.41)	-0.0018 (0.03)	-0.0151 (0.36)
<b>hsSIZE</b>	0.0142 (0.81)	-0.0125 (0.52)	-0.0317 (0.24)	0.1169 (1.37)	0.0143 (0.49)
<b>hsEXPEND</b>	0.0023 (1.59)	0.0027 (1.57)	-0.0039 (0.34)	0.0090 (1.12)	0.0016 (0.50)
<b>pov_rate</b>	-0.0008 (1.21)	-0.0015 (1.84)	0.0032 (0.77)	-0.0025 (0.80)	0.0017 (0.95)
<b>priv_medHHinc</b>	0.0048 (1.85)	0.0058 (1.82)	-0.0279 (1.76)	-0.0089 (0.68)	0.0041 (0.68)
<b>Constant</b>	0.6022 (7.41)**	0.6784 (6.67)**	0.0934 (0.22)	0.4766 (1.45)	0.8515 (3.71)**
<b>Observations</b>	9577	5592	439	557	1614
<b>R-squared</b>	0.04	0.03	0.10	0.07	0.05

Absolute value of t statistics in parentheses

\* significant at 5%; \*\* significant at 1%

**TABLE 6: OLS REGRESSION RESULTS – MODEL 6**

(Includes own-group race interactions)

Dependent Variable: Gradin6

	All Students	White	Black	Hispanic	Asian
<b>nonuscitizen</b>	-0.0616 (4.02)**				
<b>black</b>	-0.1061 (4.59)**				
<b>hisp</b>	-0.0014 (0.07)				
<b>asian</b>	0.0004 (0.03)				
<b>natam</b>	-0.1110 (2.77)**				
<b>female</b>	0.0376 (6.21)**	0.0322 (4.40)**	0.1035 (2.62)**	0.0510 (1.66)	0.0268 (1.85)
<b>legacy</b>	0.0103 (1.14)	0.0115 (1.25)	0.1172 (1.15)	-0.0986 (1.35)	-0.0084 (0.23)
<b>recruitedathl</b>	0.0044 (0.39)	0.0059 (0.49)	-0.0782 (0.97)	-0.0640 (0.76)	0.0224 (0.44)
<b>SATV</b>	-0.0027 (0.62)	-0.0063 (1.09)	-0.0317 (1.09)	0.0118 (0.49)	0.0072 (0.76)
<b>SATM</b>	0.0170 (3.19)**	0.0181 (2.75)**	0.0511 (1.60)	-0.0193 (0.74)	0.0010 (0.07)
<b>ACT</b>	0.0063 (2.61)**	0.0046 (1.48)	0.0226 (1.51)	0.0184 (1.84)	-0.0014 (0.21)
<b>hsPERC</b>	-0.0013 (2.80)**	-0.0013 (2.21)*	0.0016 (0.73)	-0.0037 (1.56)	-0.0041 (2.80)**
<b>fa_granted</b>	-0.0267 (4.16)**	-0.0292 (3.97)**	-0.0074 (0.13)	-0.0321 (0.88)	-0.0135 (0.92)
<b>Univ_Opp_Prog</b>	-0.0128 (1.14)	0.0738 (0.83)	0.0860 (1.64)	-0.0468 (1.30)	-0.0258 (1.83)
<b>State_Opp_Prog</b>	0.0228 (0.91)	-0.0273 (0.32)	0.0035 (0.05)	0.0485 (0.85)	-0.0437 (0.82)
<b>private</b>	-0.0369 (2.41)*	-0.0289 (1.47)	0.0131 (0.14)	-0.0448 (0.66)	-0.0202 (0.46)
<b>hsSIZE</b>	0.0152 (0.87)	-0.0125 (0.52)	-0.0312 (0.23)	0.1499 (1.69)	0.0159 (0.54)
<b>hsEXPEND</b>	0.0024 (1.62)	0.0027 (1.57)	-0.0041 (0.35)	0.0098 (1.21)	0.0016 (0.48)
<b>pov_rate</b>	-0.0011 (1.52)	-0.0015 (1.84)	0.0026 (0.60)	-0.0043 (1.09)	0.0017 (0.95)
<b>priv_medHHinc</b>	0.0045 (1.71)	0.0058 (1.82)	-0.0275 (1.73)	-0.0088 (0.68)	0.0041 (0.68)
<b>blackXhsblack</b>	0.0006 (1.16)		0.0005 (0.54)		
<b>hispXhshisp</b>	0.0004 (0.68)			0.0007 (0.73)	
<b>asianXhsasian</b>	-0.0001 (0.18)				-0.0000 (0.05)
<b>Constant</b>	0.6128 (6.37)**	0.6784 (6.67)**	0.0646 (0.15)	0.3979 (1.20)	0.8489 (3.69)**
<b>Observations</b>	9577	5592	439	557	1614
<b>R-squared</b>	0.04	0.03	0.10	0.08	0.05

Absolute value of t statistics in parentheses

\* significant at 5%; \*\* significant at 1%

**TABLE 7: OLS REGRESSION RESULTS – MODEL 5**  
**(Includes all variables except own-group race interactions)**  
**Dependent Variable: Cumulative GPA**

	<b>All Students</b>	<b>White</b>	<b>Black</b>	<b>Hispanic</b>	<b>Asian</b>
<b>nonuscitizen</b>	0.0941 (4.19)**				
<b>black</b>	-0.2555 (9.95)**				
<b>hisp</b>	-0.1481 (6.89)**				
<b>asian</b>	-0.0859 (6.34)**				
<b>natam</b>	-0.2794 (4.44)**				
<b>female</b>	0.1019 (11.55)**	0.1187 (10.84)**	0.1556 (3.71)**	0.0335 (0.89)	0.0767 (3.44)**
<b>legacy</b>	-0.0073 (0.56)	-0.0143 (1.04)	0.1235 (1.19)	0.0253 (0.27)	-0.0159 (0.29)
<b>recruitedathl</b>	-0.1148 (7.01)**	-0.1297 (7.15)**	-0.0424 (0.49)	0.0961 (0.90)	0.1248 (1.59)
<b>SATV</b>	0.0990 (15.53)**	0.0967 (11.04)**	0.0530 (1.76)	0.1047 (3.61)**	0.0790 (5.44)**
<b>SATM</b>	0.0959 (12.25)**	0.0924 (9.39)**	0.0299 (0.85)	0.1128 (3.50)**	0.0573 (2.66)**
<b>ACT</b>	0.0106 (2.94)**	0.0107 (2.29)*	0.0240 (1.51)	0.0282 (2.31)*	0.0066 (0.62)
<b>hsPERC</b>	-0.0109 (15.51)**	-0.0113 (13.05)**	-0.0029 (1.32)	-0.0144 (4.88)**	-0.0146 (6.22)**
<b>fa_granted</b>	-0.0589 (6.35)**	-0.0470 (4.27)**	-0.0657 (1.11)	-0.0354 (0.81)	-0.0881 (3.96)**
<b>Univ_Opp_Prog</b>	0.0222 (1.35)	-0.0156 (0.12)	0.1508 (2.64)**	-0.0013 (0.03)	0.0412 (1.91)
<b>State_Opp_Prog</b>	-0.0693 (1.90)	-0.3662 (2.83)**	-0.0588 (0.90)	-0.0116 (0.17)	-0.1325 (1.61)
<b>private</b>	-0.0922 (4.13)**	-0.0801 (2.70)**	-0.1508 (1.86)	0.0192 (0.24)	-0.1310 (2.08)*
<b>hsSIZE</b>	-0.0314 (1.26)	-0.0106 (0.29)	0.1367 (1.04)	0.0160 (0.15)	-0.0899 (2.08)*
<b>hsEXPEND</b>	0.0013 (0.61)	0.0010 (0.41)	0.0070 (0.58)	0.0163 (1.64)	-0.0042 (0.84)
<b>pov_rate</b>	-0.0012 (1.15)	-0.0005 (0.45)	-0.0029 (0.68)	-0.0001 (0.03)	-0.0035 (1.32)
<b>priv_medHHinc</b>	-0.0077 (2.03)*	-0.0039 (0.82)	-0.0038 (0.22)	-0.0018 (0.11)	-0.0236 (2.50)*
<b>Constant</b>	1.8734 (15.45)**	1.8586 (12.05)**	1.7712 (3.85)**	0.9951 (2.42)*	2.5500 (7.15)**
<b>Observations</b>	8484	5208	363	487	1493
<b>R-squared</b>	0.24	0.22	0.23	0.23	0.15

Absolute value of t statistics in parentheses

\* significant at 5%; \*\* significant at 1%

**TABLE 8: OLS REGRESSION RESULTS – MODEL 6 (Includes own-group race interactions)**  
**Dependent Variable: Cumulative GPA**

	<b>All Students</b>	<b>White</b>	<b>Black</b>	<b>Hispanic</b>	<b>Asian</b>
<b>nonuscitizen</b>	0.0968 (4.27)**				
<b>black</b>	-0.2864 (7.90)**				
<b>hisp</b>	-0.1548 (5.19)**				
<b>asian</b>	-0.0542 (2.46)*				
<b>natam</b>	-0.2828 (4.49)**				
<b>female</b>	0.1017 (11.51)**	0.1187 (10.84)**	0.1543 (3.67)**	0.0317 (0.84)	0.0732 (3.27)**
<b>legacy</b>	-0.0072 (0.55)	-0.0143 (1.04)	0.1258 (1.20)	0.0213 (0.23)	-0.0180 (0.32)
<b>recruitedathl</b>	-0.1150 (7.02)**	-0.1297 (7.15)**	-0.0405 (0.47)	0.1027 (0.95)	0.1197 (1.53)
<b>SATV</b>	0.0989 (15.48)**	0.0967 (11.04)**	0.0546 (1.78)	0.1004 (3.42)**	0.0760 (5.22)**
<b>SATM</b>	0.0957 (12.19)**	0.0924 (9.39)**	0.0278 (0.79)	0.1101 (3.39)**	0.0533 (2.46)*
<b>ACT</b>	0.0108 (3.00)**	0.0107 (2.29)*	0.0238 (1.49)	0.0286 (2.33)*	0.0074 (0.69)
<b>hsPERC</b>	-0.0108 (15.45)**	-0.0113 (13.05)**	-0.0027 (1.19)	-0.0149 (4.97)**	-0.0150 (6.36)**
<b>fa_granted</b>	-0.0579 (6.23)**	-0.0470 (4.27)**	-0.0634 (1.06)	-0.0349 (0.79)	-0.0838 (3.74)**
<b>Univ_Opp_Prog</b>	0.0264 (1.60)	-0.0156 (0.12)	0.1508 (2.64)**	0.0027 (0.06)	0.0417 (1.93)
<b>State_Opp_Prog</b>	-0.0719 (1.96)	-0.3662 (2.83)**	-0.0702 (1.03)	-0.0131 (0.19)	-0.1341 (1.63)
<b>private</b>	-0.0908 (4.02)**	-0.0801 (2.70)**	-0.1142 (1.15)	0.0236 (0.28)	-0.1746 (2.63)**
<b>hsSIZE</b>	-0.0280 (1.12)	-0.0106 (0.29)	0.1286 (0.95)	0.0216 (0.20)	-0.0772 (1.77)
<b>hsEXPEND</b>	0.0012 (0.56)	0.0010 (0.41)	0.0073 (0.60)	0.0154 (1.54)	-0.0030 (0.60)
<b>pov_rate</b>	-0.0012 (1.14)	-0.0005 (0.45)	-0.0029 (0.66)	0.0030 (0.60)	-0.0035 (1.34)
<b>priv_medHHinc</b>	-0.0082 (2.15)*	-0.0039 (0.82)	-0.0035 (0.20)	-0.0015 (0.09)	-0.0237 (2.50)*
<b>blackXhsblack</b>	0.0002 (0.24)		0.0000 (0.05)		
<b>hispXhshisp</b>	-0.0007 (0.81)			-0.0013 (1.03)	
<b>asianXhsasian</b>	-0.0001 (0.19)				0.0011 (1.16)
<b>Constant</b>	1.8895 (13.14)**	1.8586 (12.05)**	1.7720 (3.83)**	1.0338 (2.49)*	2.5485 (7.15)**
<b>Observations</b>	8484	5208	363	487	1493
<b>R-squared</b>	0.24	0.22	0.23	0.24	0.15

Absolute value of t statistics in parentheses

\* significant at 5%; \*\* significant at 1%

Tables 7 and 8 present the results of the GPA regressions using Models 5 and 6 respectively. For the most part, these results confirm our earlier findings. Black students who participate in the institution's opportunity program have significantly higher GPAs than those who do not. Recruited athletes tend to have lower GPAs overall, and this effect is most significant for whites. It is interesting to note that both the SAT Verbal and Math scores predict cumulative GPA for all groups except for blacks. The same is true for rank in class, which has similar effects for all groups except blacks. Our model is able to explain 39 percent of the GPA gap among Hispanics and 37 percent of the GPA gap among blacks.

## **5. Discussion**

Our best model was able to explain 43 percent of the black-white graduation rate gap attributed to race. This suggests, as was previously alluded to, that high school characteristics may not be the end of the story (see, for example, Bowen and Bok, 1998; Nelson et. al, 2006; Massey et.al, 2003). Other, less quantifiable issues could be responsible for the remaining gap. These may include cultural factors such as differences in child rearing, levels of disorder and violence experienced during childhood, and the peer environment both within and outside of school (Massey et. al, 2003). Students' self perception may also play a modest role, as well as their motivation for pursuing a degree in the first place (Nelson et. al, 2006).

We also wonder why SAT scores and high school rank are significant predictors of cumulative GPA for all groups except for blacks. Is it true, as some suggest, that the test is culturally biased (Freedle, 2002)? If this the case, however, then why do the tests predict Hispanic performance? Why do blacks at highly selective institutions such as this one underperform based on what their SAT scores would predict (Bowen and Bok, 1998)? These



findings lead to a complex question: why is it that admissions characteristics, generally, predict college level performance for all groups except blacks?

The opportunity program implemented at this institution lead to an increase in GPA and an increase in graduation probability among black students (which was not significant at the five percent level, but close to significance at the ten percent level), but not for Hispanics and actually seemed to lead to lower performance of Asians (again, at the ten percent level). Since we have controlled for college-level effects, this could be due to the fact that the students who participate in the school's opportunity program may be more likely to choose a major in the humanities or in ethnic studies. Parekh (2002) finds that departments such as these are more likely to give out higher grades. Further research on this question is warranted.

With regard to the Hispanic students in our sample, our model was able to explain away the majority of the racial gap in both graduation rate and GPA. This is evidence that while cultural factors probably play a key role in explaining their graduation rate gap as well, these factors have less significance for that group. Does this mean opportunity programs should focus on all minority groups, be restricted to underrepresented minorities, or focus solely on blacks?

## **6. Conclusion**

This paper set out to explain the black-white and Hispanic-white graduation rates at a large Ivy League university. We attempted to explain the gap by estimating a model with high-school and neighborhood level characteristics. It turns out that after all controls were included, a modest proportion of the gap was explained away for both groups, more for Hispanics than for blacks. We conclude that though this institution is doing much to increase the graduation rates of both populations, particularly of black students, more needs to be done at both the pre-college

and college level in general to ensure that all students graduate at reasonably high rates from college.

Further research that considers the cultural and sociological effects of experiences in earlier years on academic progress in the college years would be helpful. Also, it is important for colleges to remain committed to their diversity programs in order to ensure that progress will continue to be made. Although many of these programs are under attack, this paper has shown that when properly implemented, they play a key role in guaranteeing that students from underrepresented minority groups will complete their college studies in a timely manner. Now is not the time to discontinue such policies, as all students will stand to lose. As the competition for spaces in highly selective institutions such as this leads to a stronger and more academically-prepared student pool, one can only hope that the convergence in graduation rates continues and that even more students of all racial groups will graduate from college and reap the economic benefits that a college degree will bring.

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## Appendix A: List of Selected Variables and Their Definitions

<b>Variable</b>	<b>Definition</b>
<b>Nonuscitizen</b>	Indicator for non-US citizen
<b>Female</b>	Indicator for female
<b>Legacy</b>	Indicates whether student was a legacy
<b>Recruitedathl</b>	Indicates whether student was a recruited athlete
<b>SATV</b>	SAT verbal score, in 100-point increments
<b>SATM</b>	SAT math score, in 100-point increments
<b>ACT</b>	ACT score, one-point increments
<b>hsPERC</b>	High school rank, in increments of one percent
<b>Fa_granted</b>	Indicates whether student receives financial aid or not
<b>Univ_opp_prog</b>	Indicates participation in the University Opportunity Program
<b>State_opp_prog</b>	Indicates participation in the State Opportunity Program
<b>Hssize</b>	High school size, in thousands of students
<b>blackXhsblack, hispXhshisp, etc.</b>	Interaction of student's race with proportion of same race students in his/her high school, in increments of one percent
<b>Pov_rate</b>	High school poverty rate, in increments of one percent
<b>hsEXPEND</b>	Per-pupil expenditure for students in public schools, in increments of one thousand dollars
<b>Priv_medHHinc</b>	Median Household Income for private school students in increments of ten thousand dollars

## Appendix B: Logistic Regression Models

### Model 5 – Odds Ratios Dependent Variable: Graduation in six years

	All Students	White	Black	Hispanic	Asian
<b>nonuscitizen</b>	0.4648 (4.09)**				
<b>black</b>	0.6344 (2.31)*				
<b>hispanic</b>	0.7585 (1.53)				
<b>asian</b>	0.9518 (0.37)				
<b>natam</b>	0.4333 (2.21)*				
<b>female</b>	1.6979 (6.23)**	1.6876 (4.37)**	2.1797 (2.71)**	1.6608 (1.70)	1.5501 (1.98)*
<b>legacy</b>	1.1355 (0.94)	1.1805 (1.07)	2.3694 (1.05)	0.4213 (1.38)	0.8499 (0.30)
<b>recruitedathl</b>	1.0318 (0.20)	1.0941 (0.47)	0.5826 (1.00)	0.5307 (0.90)	1.2301 (0.26)
<b>SATV</b>	0.9560 (0.77)	0.9116 (1.00)	0.7621 (1.29)	1.0615 (0.26)	1.1066 (0.76)
<b>SATM</b>	1.2417 (3.05)**	1.3155 (2.72)**	1.4769 (1.64)	0.7435 (1.17)	1.0175 (0.08)
<b>ACT</b>	1.0812 (2.54)*	1.0684 (1.43)	1.1752 (1.53)	1.2534 (2.04)*	0.9960 (0.04)
<b>hsPERC</b>	0.9826 (3.18)**	0.9825 (2.29)*	1.0109 (0.55)	0.9694 (1.59)	0.9594 (2.42)*
<b>fa_granted</b>	0.6751 (4.33)**	0.6340 (3.93)**	0.8677 (0.34)	0.6540 (1.12)	0.8100 (0.95)
<b>Univ_Opp_Prog</b>	0.8784 (0.89)		1.7514 (1.56)	0.5678 (1.48)	0.6721 (1.87)
<b>State_Opp_Prog</b>	1.3508 (0.97)	0.7046 (0.32)	1.2608 (0.44)	1.3603 (0.50)	0.5039 (0.98)
<b>private</b>	0.6316 (2.47)*	0.6934 (1.29)	0.7484 (0.52)	0.9801 (0.03)	0.8177 (0.31)
<b>hsSIZE</b>	1.3086 (0.97)	0.8216 (0.50)	0.8662 (0.13)	4.8800 (1.62)	1.3026 (0.44)
<b>hsEXPEND</b>	1.0424 (1.85)	1.0569 (1.82)	0.9673 (0.36)	1.1079 (1.15)	1.0277 (0.55)
<b>pov_rate</b>	0.9885 (1.23)	0.9777 (1.82)	1.0324 (0.88)	0.9789 (0.76)	1.0280 (0.94)
<b>priv_medHHinc</b>	1.0539 (1.53)	1.0852 (1.61)	0.8293 (1.80)	0.9003 (0.83)	1.0504 (0.57)
<b>Observations</b>	9577	5584	438	526	1612

Absolute value of z statistics in parentheses

\* significant at 5%; \*\* significant at 1%

**Model 6 – Odds Ratios**  
**Dependent Variable: Graduation in six years**

	<b>All Students</b>	<b>White</b>	<b>Black</b>	<b>Hispanic</b>	<b>Asian</b>
<b>Nonuscitizen</b>	0.4744 (3.94)**				
<b>Black</b>	0.5105 (2.82)**				
<b>Hisp</b>	1.0023 (0.01)				
<b>Asian</b>	0.9924 (0.04)				
<b>Natam</b>	0.4439 (2.14)*				
<b>Female</b>	1.6959 (6.20)**	1.6876 (4.37)**	2.1725 (2.68)**	1.6437 (1.66)	1.5496 (1.98)*
<b>Legacy</b>	1.1441 (1.00)	1.1805 (1.07)	2.4327 (1.09)	0.3875 (1.49)	0.8463 (0.30)
<b>Recruitedathl</b>	1.0395 (0.25)	1.0941 (0.47)	0.5958 (0.95)	0.5610 (0.82)	1.2365 (0.27)
<b>SATV</b>	0.9660 (0.59)	0.9116 (1.00)	0.7929 (1.08)	1.0962 (0.40)	1.1058 (0.75)
<b>SATM</b>	1.2480 (3.11)**	1.3155 (2.72)**	1.4842 (1.65)	0.7819 (0.97)	1.0228 (0.11)
<b>ACT</b>	1.0819 (2.55)*	1.0684 (1.43)	1.1741 (1.51)	1.2572 (2.05)*	0.9957 (0.04)
<b>hsPERC</b>	0.9834 (3.02)**	0.9825 (2.29)*	1.0146 (0.71)	0.9705 (1.50)	0.9598 (2.36)*
<b>fa_granted</b>	0.6783 (4.26)**	0.6340 (3.93)**	0.8602 (0.36)	0.6886 (0.98)	0.8181 (0.90)
<b>Univ_Opp_Prog</b>	0.8697 (0.96)		1.7762 (1.60)	0.5670 (1.47)	0.6729 (1.87)
<b>State_Opp_Prog</b>	1.2309 (0.67)	0.7046 (0.32)	1.0807 (0.14)	1.6176 (0.77)	0.5026 (0.98)
<b>Private</b>	0.6458 (2.30)*	0.6934 (1.29)	1.0150 (0.02)	0.6400 (0.67)	0.7457 (0.42)
<b>hsSIZE</b>	1.3402 (1.04)	0.8216 (0.50)	0.8998 (0.10)	6.0861 (1.79)	1.3478 (0.48)
<b>hsEXPEND</b>	1.0429 (1.87)	1.0569 (1.82)	0.9646 (0.39)	1.1145 (1.20)	1.0268 (0.53)
<b>pov_rate</b>	0.9852 (1.54)	0.9777 (1.82)	1.0248 (0.66)	0.9689 (0.93)	1.0283 (0.95)
<b>priv_medHHinc</b>	1.0509 (1.44)	1.0852 (1.61)	0.8315 (1.77)	0.9030 (0.80)	1.0499 (0.57)
<b>blackXhsblack</b>	1.0073 (1.11)		1.0059 (0.80)		
<b>hispXhshisp</b>	1.0057 (0.94)			1.0047 (0.52)	
<b>asianXhsasian</b>	0.9991 (0.12)				0.9989 (0.11)
<b>Observations</b>	9577	5584	438	526	1612

Absolute value of z statistics in parentheses  
\* significant at 5%; \*\* significant at 1%