Gender and Race Differences in American College Enrollment: Evidence from the Education Longitudinal Study of 2002

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Abstract This article examines college enrollment of male and female students from different racial-ethnic groups. Utilizing nationally representative data from the Education Longitudinal Study of 2002 (ELS:2002), the present study investigates the following research question: Among those who have completed high school or received a General Educational Development certificate (GED), to what extent are gender and racial/ethnic differences in enrollment explained by students' pre-college academic achievement, educational and parental expectations net of socio-economic background, family structure and high school characteristics? The study finds that females have a great advantage over males in overall college enrollment, and the female advantage also exists within each racial/ethnic group. For racial/ethnic differences in college enrollment, the study finds that black and Hispanic students are less likely to go to any college compared to their white peers. However, when black, Hispanic, and white students have completed high school and have similar socioeconomic background and precollege achievement, black and Hispanic students are more likely than are white students to go to any colleges.

Keywords: *gender, race, college enrollment, the female postsecondary advantage, the net black/Hispanic advantage*

1. Introduction

Studies have documented inequalities in higher education when it comes to gender and race/ethnicity [2,8,11,16,17,37,39]. In terms of gender inequality in higher education, we know that females are underrepresented in traditionally male-dominated college majors such as math, physics, computer science and engineering [16,41,50], however, they are overrepresented in American colleges and universities [57].

The number of females in postsecondary education has outnumbered males since the 1980s [57]. The proportion of both men and women enrolling in college has increased over the years, but the increase for women has been much more substantial. The college enrollment rate for males has increased by 36 percent between 1999 and 2009, while the rate has increased for women by 63 percent especially due to the increased representation of women of color as well as women from lower-SES backgrounds. The gender gap in college attendance will also likely continue through 2020, when women are expected to make up 59% of undergraduate enrollment [57].

Current descriptive statistics also estimate that not only the gender gap but also the racial/ethnic gap in college attendance will continue through 2020. Although racial/ethnic minorities are projected to have increasing

enrollment rate, the gap between white and those groups will remain the same [57]. The size of the gender gap also varies among racial/ethnic groups [17] and recent research indicates that we have a black gender gap in educational attainment, which means that black males still lag behind their co-racial females [44]. The gender gap existing among all racial/ethnic groups is larger for blacks, and the gender gap among whites is a more recent trend. Research finds that black men's lack of access to education as well as high status occupations explains why they lag behind black women [44]. Also, growing up in a segregated neighborhood in which there is high rate of violence, social disorder, crime and other negative conditions damages young children in terms of their cognitive skills [12,43]. Given that, research finds that black males are exposed to higher levels of violence and disorder in comparison to black females throughout childhood, and this exposure rises as levels of segregation increase [22,23,43,44]. As a result, black males' academic achievements are highly affected by ecological disadvantage [22,23], and this would also explain why black males have the lowest educational attainment among all racial/ethnic groups [44]. In addition to the structural factors, socialization along with other cultural elements would also play an important role in explaining role the lowest educational achievement of black males as well as Hispanic males, who might have more anti-school attitudes

and disruptive behaviors, and pretend not to care about school work [29,68].

Although college enrollment has significantly increased for the previously excluded racial/ethnic groups over time and especially since Brown vs. Board of Education, these groups have extensively been in low-tier, non-selective schools in the American higher education system [34,40]. Among the 2004 high school graduating class, the percentages of Black and Hispanic students who attended moderately or highly selective 4-year institutions are 23% and 18% respectively whereas the percentages of whites and Asians were 45% and 53%, respectively [47].

Many studies have examined gender and race differences in college enrollment for the purposes of identifying factors explaining these differences [3,4,5,11,13,17,27,39,44,51,56,67], and suggested that main factors contributing to gender and race differences in college enrollment include students' precollege achievement [10,19,28,45], parental expectations [15,35,49,51,58,64], and students' educational aspirations [9,26,49,53,55].

2. Precollege Achievement

Academic preparation during high school significantly affects gender and racial/ethnic differences in college enrollment. Gender and race differences at the pre-college stage, to some extent, explain the gender and race differences observed after high school graduation. It means that precollege achievement (e.g., students' high school grade point average (GPA), Scholastic Assessment Test (SAT)/American College Testing (ACT) scores) is an important predictor for their prospective college enrollment. Males (in comparison to females) and students of color (in comparison to whites) are less academically prepared during high school to go on to higher education. Research argues that males do not have similar expectations as females when it comes to how to behave and perform well during high school, perhaps because males and females have different sets of values, attitudes and behaviors throughout their life-long socialization. Those different values, attitudes and behaviors are reflected in the educational system in which males tend to have more anti-school attitudes and disruptive behaviors, and pretend not to care about school work [30,31,62,63]. As a result, males hinder their GPAs, which are dominantly based on grades, in-school performance, student-teacher relationships as well as other non-cognitive skills. Once females outperform males during high school, it seems that their advantaged position continues through their paths to and in college.

In addition to gender differences, racial/ethnic groups are also different from each other in precollege achievement. In 2009, while white students had an average of 3.09 high school GPA, black and Latino students had an average of 2.47 and 2.60 respectively [46]. SAT mean scores of college-bound seniors also demonstrate that white students have historically had higher scores in all subjects compared to black and Latino students [54]. Research indicates that African American and Latino students internalize and externalize stereotypes about their race and cultures, which works to threaten and decrease their academic performance [12]. Also, those students may not develop school-related skills and habits

due to their isolated social conditions [20]. Compared to white students, African American and Latino students are more likely to live in poor socioeconomic neighborhoods and go to low quality public high schools. This would make them have low high school achievement for accessing higher education [43].

3. Parental Expectations

Parents who have high expectations for their children set high standards and make high demands, which would in turn result in high academic achievement [6,25,33]. More specifically, parental expectations have significant impacts on students' college entry outcomes. Students who have higher parental expectations are more likely to enroll in college [15,51]. Parental impacts on students' educational pathways, however, is also related to and informed by gender and race.

Several studies find that females receive more encouragement and support from their parents to go to college [10,21,55]. Using gender roletheory [62], we could argue that parents have higher expectations for their daughters because they might believe that their sons, as males, have every advantage to successfully make their way through life, while their daughters need more education in order to secure their life financially. Also, increasing opportunities for women in the labor market and relatively decreasing prejudice and discrimination against women in society would eventually increase the expectations of parents for their daughters.

Overall, according to the U.S. Department of Education, a higher percentage of girls (69 percent) than boys (62 percent) have parents who expect them to finish college. (http://nces.ed.gov/nhes). The gendered effect is also evidenced across all racial/ethnic backgrounds, but to varying degrees [55]. White and Latino parents have significantly higher educational expectations for their daughters, and there are no significant parental expectations for African American students in general [55]. Also, African American mothers hold less favorable expectations for sons and perceive sons to be less academically competent than daughters [65,66]. In relation to this, African American females tend to perceive that their mothers have higher educational expectations for them [60].

The lower parental expectations of black and Hispanic students can also be related to parents' socio-economic status. Parents who have low socio-economic status as well as parents who have less education expect their children to complete less education compared to those who have a higher socio-economic status (SES) and higher educational levels. Parents who are highly educated and who have a high SES tend to have more information regarding educational opportunities through their social capital, can pass necessary information to their children, and may have higher educational expectations for them [7,14,35]. Black and Latino parents experience more challenges to become actively involved in their children's education especially due to their limited resources and lower socio-economic conditions [59,60]. Perna and Titus [51] indicate that relative to whites and Asians, black and Latino students have lower levels of family income and parental education, and they also attend schools with limited resources to promote college enrollment. Importantly,

not only do black males have lower expectations for their future educational career compared to their female peers, but their parents and teachers also have lower expectations for them [64], which eventually decreases their college enrollment.

4. Educational Expectations

Students' expectations for further education and career are related to their college enrollment. Students who have more educational and career expectations are more likely to go to college. Parental expectations discussed above positively impact students' own educational expectations [14,55], and this is interconnected with other factors that influence college enrollment and works as a sort of cycle. Females not only have higher parental expectations but also have higher educational expectations for themselves.

Young women's rising expectations for future employment also encourage them to attend and complete higher education [32]. Overall, females in comparison to males have higher educational expectations during high school, which to some extent explains their greater success in their paths to college for further education [26,55]. In addition to gender differences, research has also observed racial/ethnic differences in educational aspirations; for instance, racial/ethnic minorities have greater educational expectations than whites [39,52]. African Americans have especially high educational aspirations reflecting their high pro-school values, but there is also a discrepancy between their high educational aspirations and low academic performance due to the lack of material conditions [1,20].

Gender differences in educational expectations are consistent across racial/ethnic groups. For example, black males than their female peers have lower expectations for their future educational career [64]. On average, for each racial–ethnic group, female students have significantly higher educational aspirations than do their male counterparts [42]. According to a study titled, "Monitoring the Future," 66 percent of females have definite plans to graduate from a 4-year college, while only 53 percent of males do so. Also, percentages of 12th grade students who indicated that they "definitely will" graduate from a 4-year college are 61, 59, and 50 for whites, blacks, and Hispanics, respectively [38].

This research aims to shed light on understanding the pattern of the gender gap in college entry across racial/ethnic groups utilizing nationally representative data. Given the increasing importance of attending college and the growing female advantage in college attendance, the present research aims to contribute to the higher education literature by exploring the factors leading to the female postsecondary advantage and its variation by race/ethnicity. Riegle-Crumbs's [56] recent research emphasizes the need for further research that examines racial/ethnic variations in gender differences in college enrollment. The present research fills this gap by investigating the combined effects of gender and race on college enrollment.

5. Data and Method

The present research utilizesthe Education Longitudinal Study of 2002 (ELS: 2002) that follows a nationally representative cohort of students from 2002, when they were high school sophomores, through their postsecondary education. The researchers collected information from the same students in 2004 when they were high school seniors and 2006 when the majority of the students were in college. Of 17,591 eligible sampled students from752 schools, 15,362 10th grade students participated, which represent 3.4 million students as of 2002 in the United States.

Since college enrollment assumes either completion of high school or a GED, the analytic sample of this research includes high school graduates (including the ones who reported completing a GED), who remained in the study from 2002-2006 and indicated "highest level of education attempted." Therefore, results presented in this research are conditional on graduation from high school or at least having a GED. Students who do not provide information about their postsecondary enrollment are excluded from analysis. As of 2006, students who did not earn a GED or high school diploma are considered "dropouts" in this research and about 6 percent of all ELS respondents in the tenth grade in 2002 fall into the high school dropout category by the spring of 2006.

Since students' high school GPA is an important variable in this research, only students who have complete transcript data for all 4 years in high school are included. When identifying the type of college a student attended, only students who attended college within twelve-months of their high school graduation are included. For students who attended more than one school in this time, the school they attended first is included in the analysis. Overall, the analytic sample includes 9,910 respondents.

The choice of data is important for this study since ELS:2002 is the most recent longitudinal dataset spanning high school to postsecondary enrollment. Also, ELS monitored the critical transitions made by cohort of 2002 high school sophomores through college into their adult careers, with a special emphasis on college access and choice. Also, it obtained information about factors that influence these transitions, student's educational motivations, experiences, and achievement, as well as school and family characteristics. The restricted version of ELS:2002 is used because it includes more detailed information such as students' high school GPAs that are not available in the public use data. To secure the generalizability of the research findings, the panel weight [1] adjusting for sample member nonresponses to maintain representativeness of the analytic sample is used.

6. Dependent Variable

College Enrollment: To measure postsecondary enrollment, a composite variable in ELS is used, which indicates whether the respondent has ever attended a postsecondary institution since high school completion/exit. This is early college enrollment that includes students following the traditional educational pipeline from high school to

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1F2F1WT panel weight provided by ELS was used. This weight applies to all sample members who responded in the first follow-up and the second follow-up. It was used with the appropriate sample flags (G10COHRT=1) to make projections to the population (Spring 2002 tenth graders). For additional information, see the ELS:2002 Data File Documentation.

college. Early enrollment would make a difference in relation to the gender differences because "females who make an on-time transition into a four-year college experience the greatest advantages over males, and females who delay entering the college pipeline actually do slightly worse than males in attaining a bachelor's degree" ([11]: 1).

ELS students were high school sophomores in 2002, and the information about their college enrollment was gathered in 2006, when most of them were college sophomores. Considering this, the research has immediate college enrollment of students that indicates the enrollment right after high school graduation.

7. Primary Independent and Intervening Variables

Gender and Race: Primary independent variables of interest are gender and race, as well as combined gender/race groups. Gender is defined by males and females. Race is defined by non-Hispanic white, non-Hispanic black, Hispanic, and Asian. Gender/race variable is measured by creating a new variable which includes the following categories; non-Hispanic white men, non-Hispanic white women, non-Hispanic black men, non-Hispanic black women, Hispanic men, Hispanic women, Asian men, and Asian women.

Parental expectation: Both the mother's and father's expectations for children are used. Parental expectation data were collected as composite variable from parent questionnaire. Parents were asked how far in school they want 10th grader to go. Parental expectation is measured as a dummy variable to indicate whether parents have any expectations on their children to earn a bachelor's degree or higher (BA degree=1, else=0).

Students' Educational Expectations: Students' educational expectation is measured as a dummy variable to indicate whether students have any expectations to earn a bachelor's degree or higher (BA and/or higher=1, else=0).

8. Control Variables

The study has family and high school characteristics as controls. Socio-economic status, family structure, and number of siblings are family background variables. High school controls include high school type and urbanicity. Socio-economic status is measured as a composite in ELS based on five equally weighted, standardized components: father's/guardian's education, mother's/guardian's education, family income, father's/guardian's occupation, and mother's/guardian's occupation. This composite measure of SES2 provided by NCES is used in the analysis. It is a continuous range of variables between -2.10 and 1.80.

2Socio-economic status composite variable was constructed from parent questionnaire data when available and student substitutions when not. SES is based on five equally weighted, standardized components: father's/guardian's education, mother's/guardian's education, family income, father's/guardian's occupation, and mother's/guardian's occupation. Each of these five composite variables were imputed if missing. The 1961 Duncan index was used for determining the occupation prestige values for the SES variable. The parent questionnaire included parent occupation codes determined by the respondents themselves. Missing occupations were imputed.

Family structure is measured as a dichotomous variable indicating students lived in families with two biological or adoptive parents during 2002 when they were eight graders (Students live in families with two parents =1, not live in families with two parents = 0).Number of siblings refers to the total number of brothers and sisters students have at home. High school control includes dummy variables for public, Catholic and other private schools, with public schools as the reference group. School urbanicity is measured as dummy variables for urban, suburban and rural, with urban as the reference category.

9. Analytic Strategy

Using ELS: 2002 data, the study models the college enrollment of students using a set of logistic regression. It estimates the gross effects of gender, as well as race, along with combined effects of gender and race in college enrollment. Logistic regressions are used to examine the outcomes of the dependent variable: Any college enrollment versus no college enrollment. It includes precollege achievement variables, which are standardized test scores and high school GPAs as intervening variables to examine the extent to which precollege academic achievement explains gender/race differences in college destination. As controls, background variables including socio-economic status of parents (SES), number of siblings, and family structure along with high school urbanicity (urban, suburban or rural) and high school type (public, Catholic or other private) are included in the models. Parental and educational expectations are separately added into the model as other intervening variables.

In the logit model $\ln[p/(1-p)] = a + \beta X$.; p is the probability that the event Y occurs, $p(Y=1)$. $p/(1-p)$ is the "odds ratio". $\ln[p/(1-p)]$ is the log odds ratio, or "logit". The slope coefficient (β) is interpreted as the rate of change in the "log odds" as X changes, but this is not very useful in interpretations especially because logit coefficients (log odds) are usually less intuitive than the odds ratio. In this sense, the odds ratio are reported and interpreted in this research. The logit model as follows; $p/(1-p) = \exp(a + \beta \text{Gender/Race})$. In the model, $\exp(\beta)$ is the effect of the independent variable, gender/race, on the "odds ratio" of enrolling in college.

The logit models to predict college enrollment are as follows (controls in the models include SES, high school type, high school urbanicity, number of sibling, family structure);

Model I: Odds of college enrollment $p/(1-p) = \exp(a + \beta_1 \text{gender})$

Model II: Odds of college enrollment $p/(1-p) = \exp(a + \beta_1 \text{gender} + \beta_2 \text{race})$

Model III: Odds of college enrollment $p/(1-p) = \exp(a + \beta_1 \text{gender} + \beta_2 \text{race} + \beta_3 \text{controls}$

Model IV: Odds of college enrollment $p/(1-p) = \exp(a + \beta_1 \text{gender} + \beta_2 \text{race} + \beta_3 \text{controls} + \beta_4 \text{GPA}$

Parent education was based on parent report, or student report if parent data missing, imputed otherwise. Income was based on parent questionnaire information, imputed otherwise. For additional information, see the ELS:2002 Data File Documentation.

Model V: Odds of college enrollment $p/(1-p) =$ exp $(a + \beta_1 \text{gender} + \beta_2 \text{ race } + \beta_3 \text{ controls} + \beta_4 \text{math achievement} + \beta_5 \text{reading achievement}$

Model VI: Odds of college enrollment $p/(1-p) =$ exp $(a + \beta_1 \text{gender} + \beta_2 \text{ race } + \beta_3 \text{ controls} + \beta_4 \text{ parental expectation}$

Model VII: Odds of college enrollment $p/(1-p) =$ exp $(a + \beta_1 \text{gender} + \beta_2 \text{ race } + \beta_3 \text{ controls} + \beta_4 \text{ educational expectation}$

Model VIII: Odds of college enrollment $p/(1-p) =$ exp $(a + \beta_1 \text{gender} + \beta_2 \text{ race } + \beta_3 \text{ controls} + \beta_4 \text{ GPA } +$ $\beta_5 \text{math achievement} + \beta_6 \text{reading achievement} + \beta_7 \text{parental expectation} + \beta_8 \text{educational expectation}$

The analyses are weighted using ELS provided weights. The odds ratios of each covariate in the model are reported and compared. To facilitate the interpretation of the logistic regression coefficients, the delta-p statistic is used to estimate the change in the probability of enrolling in a college associated with a one unit change in each independent variable. The results are tested at 0.001, 0.01, and 0.05 alpha levels. The survey commands are used in STATA to address the ELS complex survey design to have the correct variance and significance tests.

Table 1. Descriptive Statistics for Dependent and Independent Variables

Variable	Variable Description	Mean	SD	Min – Max
Dependent variable				
Enrollment	College enrollment status (1= enroll in any college, 0= not enroll)	.82	.39	0 – 1
Independent variable (n=9,910)				
Female	Gender (1= Female, 0= not)	0.53	0.50	0 – 1
White	Race/ethnicity (1=White, 0= not)	0.64	0.48	0 – 1
Black	Race/ethnicity (1=Black, 0= not)	0.12	0.33	0 – 1
Hispanic	Race/ethnicity (1=Hispanic, 0= not)	0.14	0.34	0 – 1
Asian	Race/ethnicity (1=Asian, 0= not)	0.10	0.30	0 – 1
White male*	Combined gender and race/ethnicity (1=White male, 0= not)	.31	.46	0 – 1
White female	Combined gender and race/ethnicity (1=White female, 0= not)	.33	.47	0 – 1
Black male	Combined gender and race/ethnicity (1=Black male, 0= not)	.05	.23	0 – 1
Black female	Combined gender and race/ethnicity (1=Black female, 0= not)	.07	.25	0 – 1
Hispanic male	Combined gender and race/ethnicity (1=Hispanic male, 0= not)	.06	.25	0 – 1
Hispanic female	Combined gender and race/ethnicity (1=Hispanic female, 0= not)	.07	.26	0 – 1
Asian male	Combined gender and race/ethnicity (1=Asian male, 0= not)	.05	.22	0 – 1
Asian female	Combined gender and race/ethnicity (1=Asian female, 0= not)	.05	.22	0 – 1
High school GPA	Standardized high school GPA for all courses (on a 4-point scale)	2.89	.68	0 – 4
Educational expectation	Higher education expectation of the student (1= if the student aspire to get a bachelor's degree or higher, 0= if not)	.90	.30	0 – 1
Parental expectation	Expected educational level of parent for the student (1= if at least one parent expects the student to attain a bachelor's degree or higher, 0= if not)	.91	.29	0 – 1
SES	Socio-economic status composite of the student's family	.10	.74	-2.10– 1.80
Siblings	The total number of brothers and sisters students have in home	2.17	1.36	0 – 6
Twoparent	Family formation (1= the student is living with two parents, 0= living with single parent)	.79	.41	0 – 1
Urban	School urbanicity (1= if the school is located in urban area, 0= if not)	.32	.47	0 – 1
Suburban*	School urbanicity (1= if the school is located in suburban area, 0= if not)	.49	.50	0 – 1
Rural	School urbanicity (1= if the school is located in rural area, 0= if not)	.19	.39	0 – 1
Public*	School control (1= if the school is public, 0= if not)	.76	.43	0 – 1
Catholic	School control (1= if the school is catholic, 0= if not)	.15	.36	0 – 1
Non-Catholic Private	School control (1= if the school is public, 0= if not)	.09	.29	0 – 1

Note: * indicates a reference group. Source: ELS 2002.

10. Descriptive Results

Table 1 provides descriptive statistics for all variables used in the study. According to the table, there are slightly more females than males (53% vs. 47%) in this research. For race/ethnicity, the majority of students are white (64%). The percentage of blacks, Latinos, and Asians are 12%, 14%, and 10% respectively. 33% of students are white men, and 31% of them are white women. Non-white students from both genders are equally distributed in the sample.

Students have an average high school GPA of 2.89, and 82 % of them enrolled in college. In terms of student expectations for higher education, the majority of students expected to get a bachelor's degree or higher in the future. For parental expectations, 91% of parents expected their children to have at least a B.A. degree.

Most students come from two-parent families (79%). While 49% of students are from suburban areas, 32% of them come from urban settings. Only 19% of students are from rural areas. The majority of students attended public high schools (76%).

Table 2 provides mean distributions of selected independent variables by combined gender/race groups. According to the table, Asian females among all other groups (followed by white females) have the highest high school GPA. Within every racial group, females have higher GPAs than their male counterparts. Black males have the lowest high school GPA followed by Hispanic males. White females have the highest reading scores. For all precollege achievement measurements except reading scores, both Asian males and females have outperformed their counterparts. Males have higher math test scores than females for each racial-ethnic group.

Table 2. Mean Distribution of Selected Independent Variables Explaining Postsecondary Outcomes (by Gender/Race)

	White^ men	White women	Black men	Black women	Hispanic men	Hispanic women	Asian men	Asian women
High school GPA	2.83	3.08*** (172.56)	2.31*** (210.50)	2.49*** (121.67)	2.38*** (11.66)	2.72* (170.55)	2.89 (2.12)	3.22*** (125.23)
Math achievement	54.92	53.34*** (33.30)	45.96*** (390.99)	44.83*** (647.02)	48.20*** (407.04)	46.60*** (213.60)	55.73 (2.44)	54.50 (0.00)
Reading achievement	53.52	54.62*** (15.00)	45.67*** (280.40)	46.94*** (303.32)	47.26*** (194.57)	47.51*** (224.64)	51.15** (11.68)	52.11 (2.47)
Educational expectation	.87	.93*** (58.18)	.88 (2.03)	.93*** (26.51)	.84 (1.07)	.90* (5.60)	.94*** (17.70)	.95*** (57.03)
Parental expectation	.88	.92*** (34.96)	.90* (4.62)	.94*** (18.86)	.90 (0.65)	.91** (7.38)	.97*** (42.07)	.96*** (54.40)
SES	.29	.23* (4.03)	-.16*** (130.02)	-.20*** (228.05)	-.28*** (368.80)	-.38*** (429.53)	.06** (14.25)	.01*** (19.58)

Source: ELS 2002. ^Reference category. F values are given in parentheses. *$p<.05$, **$p<.01$, ***$p<.001$.

In terms of students' own expectations, more females than males have greater educational aspirations for each racial/ethnic group. Hispanic males have the lowest educational expectations followed by white males.

For parental expectations, females from all racial/ethnic groups except Asians have higher parental expectations. All male racial ethnic minorities have higher parental expectations than white males. For all females except Hispanic females, racial/ethnic minorities have higher parental expectations relative to white females. Among all gender/race groups, white males have the lowest parental expectations followed by black and Hispanic males. Also, Asian students have the highest educational expectations as well as the highest parental expectations.

Table 3. Proportions of Students in Postsecondary Outcomes by Gender/Race (%)

	No college	Any college
Whitemen	19.76	80.24
Whitewomen	13.54	86.46
Blackmen	26.83	73.17
Blackwomen	20.77	79.23
Hispanicmen	32.35	67.65
Hispanicwomen	24.10	75.90
Asianmen	11.72	88.28
Asianwomen	9.56	90.44
Total	18.34	81.66
$X^2 = 224.56$, $p<0.001$		

Table 3 presents the proportions of students by postsecondary outcomes, including whether there was any college they enrolled in or no college. Chi-square statistics are used to see whether there is a statistically significant relationship between postsecondary outcomes and combined gender/race groups. According to the results, gender/race groups significantly differ from each other in relation to postsecondary outcomes. Asian women are most likely to go to any college followed by white women, Asian men, and white men, respectively.

Descriptive results further indicate that among all racial-ethnic groups the percentage of women enrolling in college has outnumbered men.

11. Multivariate Results

Table 4 provides logistic regressions that predict any college enrollment of gender and racial/ethnic groups. Females have a greater advantage over males in any college enrollment. The odds of females enrolling in college are 1.56 times higher than that of males. White students have greater advantages over black and Hispanic students in terms of college enrollment. Black and Hispanic students are respectively about .65 and .54 times less likely to enroll in any college relative to their white peers. Their disadvantaged position disappears when including control variables, so that there is no significant difference between whites and blacks and Hispanics. Asian students are the only minority groups who have higher odds of going to college compared to their white counterparts with and without controls. Students from higher socio-economic background and from Catholic high schools are much more likely to go to colleges. This suggests that SES along with private high school graduation significantly matters in college enrollment, and the significance of SES and high school type is also the main reason why black and Hispanic students are no longer different from white students in college enrollment. Given the implications of this result, I re-ran those analyses so that SES and high school type were entered separately. According to these supplementary analyses, SES is more influential than high school type in explaining the race gap.

High school GPA is also found to be a crucial factor in the analysis. GPA is positively and significantly related to pursuing college, and one grade point increase in students' high school GPA on a 4-point scale would increase the odds of enrolling college by 4.39 times. The female advantage in enrollment is still significant net of GPA. When black and Hispanic students have similar grades as white students they are more likely to go on to postsecondary education. This is an important result and indicates that net of high school GPA and background characteristics, the disadvantaged position of black and Hispanic students in college enrollment has disappeared, and they are more likely to enroll in college compared to white students. Relative to the odds of whites enrolling in college, the odds of college enrollment for blacks and Hispanics are about 2 times higher. Also, net of grades, Asians are still more likely to attend college than whites. Grades do not fully explain Asian's outperformance of whites in college entry because the coefficient is highly significant with and without grades in the model.

Multivariate results indicate that parental expectations significantly increase the odds of college enrollment. Students whose parents expect them to be a college graduate are about 3.5 times more likely to go to college compared to those whose parents do not express similar expectations. However, parental expectations do not explain the existing female advantage in college enrollment because females still have greater odds of

college entry. They are still more likely to enroll in college relative to males net of parental expectations. The model further demonstrates that parental expectations do not explain race differences in college enrollment. White students do not significantly differ from black and Hispanic students in college enrollment net of parental expectations. Similarly, net of educational expectations, the existing female postsecondary advantage has been maintained. Educational expectations do not explain the gender gap in college enrollment. For race/ethnicity, no differences are observed between white students and black and Hispanic students. Moreover, Asian students are still significantly more likely to enroll in any college than are white students. Educational expectations do not alter the initial race/ethnicity differences in college enrollment.

The results in Table 4 do not reveal only the gross female advantage, but also the net black-Hispanic advantage in college enrollment. The odds of students of color enrolling in college are about twice the odds of white students enrolling in college net of precollege achievement and background characteristics. This suggests that once we account for background factors students of color are similarly likely to go to college; however, when we include precollege academic achievement, they get a college enrollment boost. It is also important to remember that these results are conditional on completing high school or at least a GED. Those who are high school dropouts or have chosen different paths (i.e. military) might have different racial/ethnic patterns.

Table 4. Logistic Regression Models to Predict College Enrollment of Gender and Racial/Ethnic Groups

Variable (n =9910)	Model I			Model II			Model III			Model IV		
	Odds ratio	sig	SE	Odds ratio	sig	SE	Odds ratio	sig	SE	Odds ratio	sig	SE
Female	1.559	***	0.094	1.587	***	0.097	1.795	***	0.117	1.277	***	0.091
Black				0.643	***	0.056	1.108		0.114	1.958	***	0.221
Hispanic				0.538	***	0.043	1.140		0.115	1.625	***	0.181
Asian				1.838	***	0.228	2.731	***	0.391	2.471	***	0.378
High school GPA										4.385	***	0.255
Math achievement												
Reading achievement												
Parental expectation												
Educational expectation												
SES							2.960	***	0.159	2.522	***	0.152
Siblings							0.878	***	0.019	0.881	***	0.021
Single parent							0.919		0.072	1.070		0.091
Urban							1.077		0.090	1.180		0.109
Rural							0.992		0.080	0.964		0.083
Catholic							3.901	***	0.564	3.835	***	0.580
Non-Catholic private							2.336	***	0.416	1.721	**	0.307
Variable (n =9910)	Model V			Model VI			Model VII			Model VIII		
	Odds ratio	sig	SE	Odds ratio	sig	SE	Odds ratio	sig	SE	Odds ratio	sig	SE
Female	1.910	***	0.132	1.674	***	0.112	1.615	***	0.109	1.266	**	0.095
Black	1.854	***	0.205	0.984		0.103	1.011		0.106	1.911	***	0.226
Hispanic	1.647	***	0.179	1.008		0.103	1.091		0.114	1.606	***	0.186
Asian	2.759	***	0.417	2.306	***	0.328	2.455	***	0.358	2.212	***	0.348
High school GPA										3.322	***	0.213
Math achievement	1.059	***	0.006							1.022	***	0.006
Reading achievement	1.029	***	0.005							1.013	*	0.006
Parental expectation				3.414	***	0.300				1.771	***	0.176
Educational expectation							4.156	***	0.372	2.238	***	0.221
SES	2.255	***	0.131	2.605	***	0.143	2.691	***	0.149	2.082	***	0.133
Siblings	0.897	***	0.021	0.881	***	0.020	0.871	***	0.019	0.886	***	0.022
Single parent	0.959		0.077	0.909		0.072	0.938		0.075	1.069		0.091
Urban	1.163		0.101	1.052		0.089	1.025		0.088	1.143		0.107
Rural	1.001		0.085	1.007		0.084	1.014		0.085	0.994		0.089
Catholic	3.416	***	0.504	3.495	***	0.511	3.584	***	0.526	3.312	***	0.514
Non-Catholic private	2.176	***	0.403	2.272	***	0.425	2.207	***	0.394	1.700	**	0.317

Note: White, men, suburban, public high school, two-parent families are the reference groups.
Source: ELS 2002. Weighted data.
*p<.05, **p<.01, ***p<.001.

Table 5 includes logistic regression models to predict college enrollment of combined gender/race groups. The main effects of combined gender/race groups on overall college enrollment indicate that white and Asian females have a great advantage in college enrollment. Relative to white males, the odds of white and Asian females enrolling in college are 1.57 and 3 times higher, respectively. Importantly, white men are about as likely to

go to college as black and Hispanic women. White males are significantly different from black and Hispanic males. Relative to white males, black and Hispanic males are less likely to enroll in any college. Hispanic men followed by black men are the most disadvantaged groups when it comes to college enrollment. However, Asians students are found to be the most advantaged groups regardless of gender.

Table 5. Logistic Regression Models for College Enrollment of Combined Gender/Race Group

Variable (n =9910)	Model I			Model II			Model III			Model IV		
	Odds ratio	sig	SE	Odds ratio	sig	SE	Odds ratio	sig	SE	Odds ratio	sig	SE
White women	1.569	***	0.121	1.783	***	0.143	1.277	**	0.111	1.889	***	0.160
Black men	0.644	***	0.080	1.123		0.157	1.885	***	0.286	1.893	***	0.285
Black women	1.009		0.121	1.947	***	0.268	2.603	***	0.391	3.432	***	0.497
Hispanic men	0.524	***	0.059	1.114		0.146	1.672	***	0.245	1.584	***	0.222
Hispanic women	0.867		0.097	2.084	***	0.285	2.013	***	0.298	3.245	***	0.476
Asian men	1.783	***	0.302	2.632	***	0.502	2.537	***	0.505	2.640	***	0.530
Asian women	3.017	***	0.534	5.135	***	1.028	3.038	***	0.681	5.545	***	1.182
High school GPA							4.390	***	0.256			
Math achievement										1.059	***	0.006
Reading achievement										1.029	***	0.005
Parental expectation												
Educational expectation												
SES				2.960	***	0.159	2.522	***	0.152	2.256	***	0.131
Siblings				0.877	***	0.019	0.882	***	0.021	0.896	***	0.021
Single parent				0.920		0.072	1.068		0.091	0.961		0.077
Urban				1.076		0.090	1.181		0.109	1.162		0.101
Rural				0.991		0.080	0.965		0.083	1.001		0.084
Catholic				3.907	***	0.565	3.829	***	0.579	3.420	***	0.504
Non-Catholic private				2.336	***	0.416	1.720	**	0.307	2.176	***	0.403

Variable (n =9910)	Model V			Model VI			Model VII		
	Odds ratio	sig	SE	Odds ratio	sig	SE	Odds ratio	sig	SE
White women	1.625	***	0.134	1.567	***	0.130	1.234	*	0.114
Black men	0.973		0.138	0.997		0.142	1.818	***	0.291
Black women	1.622	***	0.229	1.612	***	0.229	2.484	***	0.384
Hispanic men	0.956		0.127	1.036		0.143	1.580	**	0.239
Hispanic women	1.738	***	0.241	1.811	***	0.255	2.019	***	0.310
Asian men	2.163	***	0.410	2.286	***	0.442	2.147	***	0.430
Asian women	4.093	***	0.821	4.246	***	0.878	2.840	***	0.672
High school GPA							3.323	***	0.213
Math achievement							1.021	***	0.006
Reading achievement							1.013	*	0.006
Parental expectation	3.420	***	0.301				1.773	***	0.176
Educational expectation				4.164	***	0.373	2.240	***	0.221
SES	2.605	***	0.143	2.691	***	0.149	2.081	***	0.133
Siblings	0.881	***	0.020	0.871	***	0.019	0.886	***	0.022
Single parent	0.911		0.072	0.940		0.075	1.068		0.092
Urban	1.049		0.089	1.022		0.088	1.142		0.108
Rural	1.006		0.084	1.014		0.085	0.994		0.089
Catholic	3.501	***	0.512	3.591	***	0.526	3.309	***	0.513
Non-Catholic private	2.273	***	0.426	2.207	***	0.395	1.699	**	0.317

Note: White, men, suburban, public high school, two-parent families are the reference groups.
Source: ELS 2002. Weighted data.
*p<.05, **p<.01, ***p<.00

An adjusted Wald test further indicates that the female postsecondary advantage is not only for white students. Rather, black men are significantly different from black women (prob> F = 0.0042); Hispanic men are also significantly different from Hispanic women (prob> F = 0.0004). Similarly, Asian women are about 2 times more likely to go to college relative to Asian men (prob> F = 0.0242).

White women have kept their advantage even after controlling socio-economic and backgroundvariables. More importantly, black and Hispanic women have gained relative advantages over white men net of controls for socioeconomic background characteristics. When black and Hispanic women have the same SES characteristics as white men, they are about 2 times *more* likely to enroll in any college. Furthermore, when socioeconomic characteristics are included in the analysis, black and Hispanic men are no longer significantly different from white men. This means that the disadvantage in college enrollment for

black and Hispanic men is fully explained by differences in socioeconomic background characteristics. This is an important result given the fact that black and Hispanic men are more likely to go to high schools under conditions of segregation and are less prepared academically compared to students from majority-dominant high schools [43, Charles et al. 2009).

High school GPA plays an important role in predicting postsecondary enrollment of males and females of different racial/ethnic groups. Net of high school GPA, the college enrollment advantage appears for black and Hispanic students regardless of gender. This suggests that when black and Hispanic students have similar GPAs to white men, they are significantly more likely to go to college. This net advantage in overall college enrollment also echoes what Espenshade and Randford (2009) found in selective college enrollment: "Underrepresented minority students have an admission advantage compared to white applicants. Black applicants receive a boost

equivalent to 3.8 ACT points at public NSCE institutions and to 310 SAT points at private institutions, on an all-other-things-equal basis" (p.127).

The lower enrollment rates of black and Hispanic students cannot be attributed to their educational expectations or parental expectations. Net of educational or parental expectations, black and Hispanic men do not significantly differ from their white counterparts. Also, net of educational or parental expectations, not only white women but also all women from different racial/ethnic groups are more likely to go to college. This should be interpreted as students' own educational expectations being shaped by their parental expectations. In terms of college enrollment, white, Hispanic and black women as well as Asian men and women have significant advantages over white men net of educational and parental expectations and the vector of socioeconomic controls. As a result, gendered educational and parental expectations hold true for all racial/ethnic groups. There is a female advantage in college enrollment across racial/ethnic groups even after controlling for educational and parental expectations.

Overall, the results in Table 5 indicate that not only white women, but also both men and women from all racial-ethnic groups are significantly more likely to enroll in any college compared to white men. This suggests that students of color have an advantage in college enrollment net of SES, high school type and precollege achievement. This should be interpreted along with the fact that students of color in the United States are more likely to live in a poor neighborhood and to graduate from lower quality public high schools with lower educational achievements. That is why both men and women from racial/ethnic minorities gain their relative advantages after taking precollege achievement and background characteristics into account.

12. Conclusion and Discussion

This study investigates the contributing factors that influence the likelihood of attending any college across males and females in the U.S. from different racial/ethnic groups. It compares any college enrollment with no college enrollment. The evidence shows that there is a female advantage in overall college enrollment, which also holds true for each racial/ethnic group. Females relative to males are almost 2 times more likely to enroll in any college. Although the female advantage persists net of all of the explanatory variables, the main focus in this articleis the effects of SES background characteristics and precollege achievement when it comes to the combined gender/race differences.

The study finds that among those who have completed high school or the equivalent, black and Hispanic students are significantly less likely to go to college compared to their white peers. However, when black and Hispanic males are comparable with white males in terms of their high school achievement and background characteristics, they are more likely to enroll in any college. Similarly, black and Hispanic females are more likely to go to college compared to white males controlling for precollege academic achievement and background characteristics. This overall net black/Hispanic advantage in college enrollment suggests that the main racial/ethnic differences in college enrollment largely occur through precollege achievement and background characteristics regardless of students' gender.

In the present study, the most powerful predictors of college enrollment are students' high school GPA, high school type, and parental socio-economic status. After taking into account these important explanatory variables, the study suggests that black and Hispanic students would be more likely to enroll than similar white students. In actuality, we know significant differences between white students and black and Hispanic students in their precollege academic achievement as well as background characteristics. These differences account for the relative disadvantaged position of black and Hispanic students in any college enrollment. That is why after we hold these differences constant, more black and Hispanic students than white students would be more successful in relation to college enrollment.

Overall, the results presented here echo the importance of socio-economic environment and high school quality. Black and Hispanic students are more likely to live in poor neighborhoods and go to low quality high schools. This trend also results in low academic preparation during high school, which limits access to higher education [43]. Given that individuals' high schools strongly determine whether they go to college, socioeconomically disadvantaged high school students face challenges on the path to college, and have lower rates of college enrollment. As found in the present study, private high school graduation significantly increases the odds of college enrollment; high school students in private schools, especially Catholic schools, are significantly more likely to enter college compared to those in public high schools.

12.1. Implications of the Current Research

The present study finds evidence that structural factors seem to account for the racial/ethnic gap in college enrollment. The lower socio-economic status of black and Latino students coupled with their lower high school achievement mainly explain their disadvantages in college enrollment. It illustrates the continued need to improve academic achievement among black and Latino students as a step toward increasing their college enrollment. Academic preparation and awareness during high school years should be considered first in relation to this finding.

Policy makers and educational leaders also need to know that black and Latino students who have similar socio-economic background and high school achievement as white students will enjoy a net advantage over whites in attending college. However, we also know that black and Latino students are much less likely than whites to enroll in colleges in raw percentages as the present study indicates. What are the implications of these findings for equal access to higher education? There are both positive and negative implications. From a positive side, we can say that the results presented here indicate an educational and social progress. Black and Latino students who successfully navigate high school are more likely than their white peers to go to colleges in the United States despite many challenges and disadvantages they face throughout their educational journey. From a negative side, we might ask ourselves if the net advantage of black and Latino students is really an indicator of social and

educational progress given that the advantage is conditional on controlling for racial disparities in family socio-economic background and precollege academic achievement. Overall, policy makers need to understand that the main barriers that hinder black and Latino students from attending college exist prior to submitting a college application. Improvement of the socio-economic conditions and high school achievement of black and Latino students is highly required to eliminate the racial/ethnic gap in access to higher education. The nation's long history of racial and economic segregation is an important part of racial disadvantage in higher education, and institutions need to reconsider these unequal opportunities to access higher education. Within this sense, affirmative action policies at institutions of higher education are being implemented to recruit disadvantaged minorities, especially black and Latino students who also come from lower socioeconomic background. Findings presented here may also be an indication that affirmative action programs have effectively increased the amount of information about and interest in college among black and Latino students. In addition, affirmative action programs provide larger financial aid awards to blacks than whites so that these programs would increase blacks' enrollment especially in selective colleges and universities Therefore, it would be important to continue including race as a primary factor in the admission process at colleges and universities [8].

The study also has some implications for gender differences in college enrollment. Females have gained a relative advantage over males in terms of college attendance since the 1980's, and the gender gap in enrollment has recently taken more public attention. The female advantage does not necessarily refer to a qualitative advantage (i.e. power relations), but it refers to a numeric advantage of females in colleges and universities. Policy makers need to be aware of the factors leading to this reversed gender gap favoring females in college attendance. Gender differences in postsecondary enrollment are closely tied to gender differences during the early years of education. The gender gap in GPA is one of the most important factors contributing to the existing female advantage in college enrollment. Therefore, educational leaders and policy makers might want to provide a learning environment in our schools, which highly encourages not only female students but also male students to participate in educational activities and schoolwork. In addition, this learning environment should not assume that schooling and learning is just for females.

12.2. Limitations of the Current Research

This study only focuses on a dichotomous indicator of college enrollment. It is important to include multiple possible college enrollment outcomes when examining gender and racial/ethnic inequalities in the college pipeline. Do gender differences in college enrollment vary by institutional type? Are females still more likely than males to enroll in colleges controlling for multiple outcomes including 2-year, 4-year selective, 4-year nonselective colleges? or are females overrepresented in 2-year and nonselective 4-year colleges but underrepresented in selective 4-year colleges? How about racial/ethnic differences in college enrollment by selectivity? Are black

and Latino students also more likely to go to selective colleges compared to their white peers after controlling for socio-economic background and precollege achievement? Future research needs to provide a more complex picture of gender and racial/ethnic differences in post-secondary education by incorporating horizontal stratification of higher education - college selectivity.

Another major limitation is that results presented in this research cannot be generalized to the entire population of high school students. Since the analytic sample of this research only includes those who are high school graduates or have at least completed a GED, we should be aware of the possible implications of this sample selection. According to the 2004 statistics (NCES 2013) when the ELS data was collected, 11.8 % of black and 23.8 % Latino students in the United States dropped out of their high schools, and this rate was only 6.8% for white students. For gender, it is also important to note that the high school dropout rate for males was11.6,whereas the rate was 9 for females. Although dropout rates have significantly declined for each group in recent times, black and Latino students (in comparison to white students) and males (in comparison to females) have still higher dropout rates. Therefore, studying only high school graduates might bias our interpretations, and we might underestimate the effects of being males as well as being black and Latino students.

Findings in this research should be interpreted with caution because they underestimate actual college enrollment within two years of high school graduation. Given that some students might join the military right after high school and later come back for college, the present results need to be tested for late college enrollment as well. For future research, it would be helpful to see if we have differences between early college enrollment and late college enrollment.

Finally, the current study also has some data restrictions. I initially planned to use students' SAT/ACT scores as a strong predictor of their college enrollment []. However, in the ELS, we have a large number of missing cases in these scores. This is likely a combination of all of the factors including inability to match records, poor data quality from transcripts, and lack of SAT/ACT scores. Given that some colleges just do not require these scores, some students in the dataset did not take the tests which were not required by their college. For future research, it is important to see the effects of SAT/ACT scores on college enrollment, and how gender and race groups differ in these standardized tests.

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