

Abstract

Title of Thesis: THE IMPACT OF PERSONAL RESOURCES ON COLLEGE
PERSISTENCE AND EDUCATIONAL ATTAINMENT

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This study examines the influence of personal resources on educational attainment. Using data from the National Education Longitudinal Study of 1988, this study analyzes the educational outcomes of 1992 graduates who enrolled in a 4-year college or university immediately after high school. Using logistic regression, this study attempts to answer the following questions: (1) Do personal resources influence educational outcomes, net of important background characteristics?; (2) Do these resources affect men and women differently?; and (3) Do these resources affect minority students differently? Results indicate that, net of other important background characteristics, personal resources as measured by *respondent's aspirations, advanced math taking, and SAT/ACT preparation efforts*, significantly influence educational outcomes. However, they have stronger effects on degree completion than persistence. The effects of advanced math courses on degree attainment are significantly stronger for women. SAT/ACT preparation and seeking help with college admissions yields significantly different results for some racial/ethnic groups.

THE IMPACT OF PERSONAL RESOURCES ON COLLEGE PERSISTENCE AND
EDUCATIONAL ATTAINMENT

by

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Chapter I.

Introduction

Racial disparities in academic achievement and educational attainment remain a serious problem in this country. Despite academic progress made in the 1970s and 1980s, recent education data show stagnant or declining academic performance by minority students since the 1990's. Minority students continue to perform well below their White and Asian counterparts on national standardized tests and continue to enroll and graduate from college at lower rates (Garibaldi 1997; Slavin and Madden 2002 as cited in Chubb and Loveless 2002).

There has been significant progress in closing the black/white gap in high school graduation rates, but Hispanic students still lag far behind with a graduation rate of 59.6 percent for 18- to 24-year olds (American Council on Education 2002). Minority students have increased their enrollment in postsecondary institutions, but college graduation rates still remain low. In 1999, the six-year graduation rate for African-Americans at Division I institutions was 39 percent compared to 59 percent for Caucasian students and 66 percent for Asian students (American Council on Education 2002; Current Population Survey 2001; Journal of Blacks in Higher Education 1999).

These differences in academic performance and educational attainment mean that Black and Hispanic Americans are much less likely than White and Asian Americans to complete high school, earn a college degree, and make a living considered to be middle class. Consequently, African-Americans and Hispanics are also disproportionately

affected by social problems (i.e., poor health, higher crime and unemployment rates, etc.) that are closely correlated with low-income (Chubb and Loveless 2002).

These profound differences in lifestyle contribute to attitudes of resentment and inter-group hostility. If minority students can raise their overall academic achievement, the social and economic impact on racial inequalities would help ease racial tensions and raise the status of minorities in this country (Slavin and Madden 2002).

Most studies of educational attainment draw from the Status Attainment model and focus on the impact of background characteristics such as parental education and income on educational attainment. Other research focuses on barriers to access and enrollment in higher education institutions (Dougherty 1992; Lang 1992). This paper seeks to identify determinants of college success and examine additional factors that may help to explain racial differences in higher education using the 1988 National Education Longitudinal Survey. Specifically, my focus is on the personal and academic resources that students bring to college and the impact these resources have on college persistence and degree completion.

Background

The proportion of individuals earning college degrees has significantly increased over the last several decades. In 2000, 26 percent of individuals 25 years and older had completed 4 or more years of college compared to 21 percent in 1990 (U.S. Census Bureau 2003). From 1985 to 2000, the proportion of workers aged 25 to 34 years old that were college-educated increased from 26 percent to 33 percent. In addition, 6 percent of

individuals 25-years and older now hold a master's degree or higher (U.S. Census Bureau 2003; Digest of Education Statistics 2001).

According to the U.S. Census Bureau, individuals with a Bachelor's degree or higher earn on average \$1,000,000 more than those without a degree over the course of their working lifetime. For example, workers aged 25 to 64 with a bachelor's degree earned a median weekly income of \$834, compared to \$507 for workers whose highest level of education was a high school diploma or equivalent (U.S. Bureau of Labor Statistics 2002). Earnings also increase significantly with more advanced degrees. In addition to the economic incentives to pursue higher education, there are other reasons individuals go to college. Some students are motivated by self-improvement, personal goals or family expectations (U.S. Bureau of Labor Statistics 2002).

Enrollment & Completion

College enrollment and completion rates have increased significantly over the last several decades. According to the Department of Education, enrollment rates of high school graduates have increased from 53.4 percent in 1971 to 63.3 percent in 2000. Much of the gain in enrollment is attributable to an increase in female enrollment. For example, from 1989 to 1999, the number of women in college rose by 13 percent, compared to an increase of only 5 percent for men (Digest of Education Statistics 2001). Furthermore, 56 percent of undergraduates enrolled in U.S. colleges and universities in 2000 were women (U.S. Bureau of the Census 2002; National Center for Education Statistics 2001). Women are also more likely to attain a bachelor's degree than men (U.S. Bureau of the Census 2002; National Center for Education Statistics 2001).

Minority enrollment in postsecondary institutions has also increased significantly over the last several decades. In 1999, minority students made up 28 percent of overall student enrollment, compared to 16 percent in 1976 (Digest of Education Statistics 2001). In 1976, the rate of enrollment¹ for 18- to 24-year old African-American and Hispanic high school graduates was 33.4 percent and 35.9 percent, respectively, compared to 33.1 percent nationally (Current Population Statistics unpublished data; Education Digest 2001). By 2000, the college enrollment rate of African-Americans had increased to 39.3 percent, while the national average increased to 43.2 percent. Hispanic enrollment stagnated at 36.2 percent (Digest of Education Statistics 2001).

Despite the increase in minority enrollment, African-American and Hispanic participation in higher education still lag behind their White counterparts. For example, 18- to 24-years old African-American and Hispanic students represented an average of only 10 percent of the total enrollment in 4-year colleges in 2000, although they represented 14 and 15 percent of the population, respectively.

In addition to enrolling in postsecondary institutions at lower rates than Caucasian students, African-American and Latino students are much more likely to be enrolled in 2-year institutions (American Council on Education 2002; Garibaldi 1997). Previous research has shown that students who enter two-year institutions are less likely to eventually complete a baccalaureate degree than students who initially enroll in a four-year institution (American Council on Education 2002). For example, an analysis of the High School & Beyond data reveals that 57 percent of students who entered a four-year institution in the 1989-90 school year completed a baccalaureate degree by 1994,

¹ Applies to student enrollment in degree-granting institutions.

compared to only 8 percent of students who started at a two-year institution during the same school year (Choy 2002). However, Dougherty (1992) points out that community college students are much less likely to want a baccalaureate degree than students who initially enroll at four-year institutions. Furthermore, he explains that community college students typically have weaker academic skills, fewer financial resources, less certain plans for the future, less self-confidence and are more likely to attend part-time. All of the aforementioned characteristics are associated with slower progress in college and also lower rates of educational attainment.

One would hope that overall increases in minority college enrollment would translate into higher college completion rates. However, minority graduation rates still fall well below the national average. Moreover, postsecondary degree attainment among minorities has not experienced a steady increase. For example, African-Americans received approximately 6.5 percent of the total bachelor's degrees awarded in 1981, but they received only 5.9 percent of the total in 1985 (Carter & Wilson 1989 as cited in Garibaldi 1997).

Despite these low completion rates, prior research has shown that minorities with equivalent socioeconomic circumstances and academic preparation are more likely than White students to attend and complete college (Bauman 1996; Light and Strayer 2000; Teachman 1987; Velez 1985). This increased likelihood, also referred to as "black net advantage", raises questions about the factors associated with persistence and degree attainment. Controlling for other factors, are Black students more motivated to complete their postsecondary education than others?

Literature Review

Racial differences in academic performance and educational attainment are both severe and persistent. Differences in scores on standardized examinations such as the National Assessment of Educational Progress (NAEP), Scholastic Aptitude Test, and American College Test (ACT) have narrowed in recent decades, but nonetheless, continue to exist. While minority college attendance has increased over the last four decades, completion rates have fluctuated and are still substantially below their non-minority counterparts. What explanations have been suggested for continued racial differences in attainment? A comprehensive review of the literature will establish theoretical guidelines for understanding educational attainment and identify relevant control variables based on past theoretical contributions and empirical research.

Explanations foremost posited by social researchers include: 1) socioeconomic factors such as parental education and income; 2) single-parent family structure; 3) characteristics of the school (school quality); 4) external influences such as institutional barriers; 5) cultural and peer influences; 6) academic expectations; 7) academic preparation; and 8) the availability of social capital (Chubb and Loveless 2002; Lang 1992; Light and Strayer 2000; Rivkin 1995; Roscigno 1998). For example, Chen and Kaufman (as cited in Horn 2002) identified background characteristics which put students at risk for academic failure, including: 1) coming from a single-parent family, 2) changing schools two or more times, 3) having an older sibling who dropped out of high school, and 4) receiving low grades. In addition, Susan Choy (2002) found that starting at a community college, working full-time, and/or having parents who did not attend

college were all risk factors for not completing college. Examining the effects of college selectivity on student ability, Light and Strayer (2000) found that low-ability students significantly increased their likelihood of completing college if they attended schools that were less academically demanding. Likewise, high ability students were more likely to graduate if they attended top-tier schools.

The first section of this literature review identifies factors found to be significant predictors of educational outcomes in previous research. The second section discusses two theoretical frameworks used to understand college attrition and degree attainment as well as my theoretical model.

Previous Research

Previous empirical research indicates that many factors are correlated with educational outcomes. To effectively analyze the influence of my variables of interest on persistence and degree attainment, it is important to identify and control for other characteristics correlated with educational outcomes. Characteristics found to have significant effects on educational attainment are discussed in this section.

Family Socioeconomic Background

While there are competing paradigms put forth to explain the achievement gap, research has shown that **family background** is strongly correlated with educational outcomes. There is overwhelming empirical evidence that suggests a student's likelihood of attending and completing college increases significantly with **parental education** (American Council on Education 2002; National Center for Education Statistics 2002). For example, in a study using the NELS data, Horn and Nunez (2000) found that 93

percent of 1992 high school graduates whose parents had a bachelor's degree or higher had enrolled in some form of postsecondary education two years after high school, compared to only 59 percent of students whose parents did not go beyond high school. College-educated parents tend to have higher expectations of educational attainment for their children than parents who did not attend college. Furthermore, college-educated parents are presumably, better able to provide adequate educational resources and foster an environment conducive to learning (American Council on Education 2002; Teachman 1987). Even without a degree, students whose parents have some postsecondary training tend to enroll in college at higher rates than students whose parents hold only a high school diploma (American Council on Education 2002).

Another family background characteristic, **parental income**, is highly correlated with educational attainment. Parents with higher incomes and greater financial resources (i.e. savings, investments, ability to obtain second mortgage, etc.) are better equipped to finance the cost of a college education. Analyzing the Parent Survey of the High School and Beyond data set, Steelman and Powell (1991) found that parents with more financial resources were more willing to go into financial debt to fund their child's college education compared to parents with little or no financial resources. With regard to the black-white inequality in educational attainment, minority students are more likely to come from low-income households; therefore, they are more likely to lack the financial resources necessary to enroll in college and persist to degree completion. Compounding the problem of low parental income is the issue of financial assets. As Cross and Slater (1997) point out:

Even middle-class black families with strong incomes have not been able to generate sufficient wealth to cover the costs of the best quality of higher education.... white families with incomes between \$25,000 and \$50,000, whose head of household had a college degree, had an average net worth of \$74, 922. On the other hand, black families with similar incomes and educational levels had an average net worth of only \$17,437. (P.82)

Because the cost of higher education has increased significantly in recent decades and federal aid has decreased, parental financial resources continue to be a very important factor in student persistence to degree attainment.

Family Structure

Another important element in determining academic attainment is family structure. Family disruptions, such as divorce or remarriage, can create stress that leads to ineffective parenting and behavioral changes in the child (Sandefur 1997). Research has shown that students in **divorced, single parent or stepparent** households tend to perform less well than students in natural, two-parent households. Possible explanations for this phenomenon include the fact that single parents may have less time to instruct and supervise their children. Also, stepparents frequently have responsibilities to former households, including financial obligations. Furthermore, the nature of a stepparent/child relationship may not be as conducive to parental investment as the natural parent/child relationship. In an analysis of the 1986 cohort of the High School and Beyond data, Astone and McLanahan (1991) found that

Children who live with single parents or stepparents during adolescence receive less encouragement and less help with school work than children who live with both natural parents. (P.309)

These findings are echoed by Downey's (1995) research, which found that children in step-households are unable to secure the same level of economic, interpersonal, and social resources as children in two, natural-parent households.

Another important aspect of family structure is the **number of siblings** in the household. As sibship increases, the amount of financial resources available for each child decreases. The ability of parents to impart financial resources on one child is diminished when the resources must be shared among siblings. Therefore, parents are better able to support the cost of their child's education when they have fewer children (Downey 1995; Steelman and Powell 1991). In addition to financial resources, parents must also invest time and energy into children. In a review of studies that examined the impact of sibling number (and birth-timing) on intelligence and educational attainment, Heer (1985) concluded that the number of siblings had a negative, statistically significant effect on educational attainment.

Geographic Location & Quality of Schooling

Numerous studies have shown that there is tremendous variation between schools, school districts, and states in the quality of schooling. There are also regional differences. On average, individuals in the North complete more years of schooling than individuals in the South. Because neighborhoods in the U.S. are still highly segregated, high- and low-performing schools tend to be concentrated in different geographic locations. To illustrate how achievement gaps vary geographically, Flanagan and Grissmer (2002) disaggregated NAEP scores by region, race, and locality. Rural and suburban students in the Midwest and Northeast were found to have scores rivaling the

highest achieving students in the world. However, students residing in the central cities of these same regions had some of the lowest test scores in the country. The demographic composition of students residing in the central cities were mainly African-American and low-income.

What is it about the geographic location of schools that would make them more or less conducive to educational attainment and contribute to the black/white achievement gap? High performing schools tend to be concentrated in better off neighborhoods, which also happen to consist of mostly non-minority residents. Because local school districts are partially financed using funds from local taxes, schools located in more affluent neighborhoods have more financial resources. Schools with substantial financial resources generally have smaller class sizes, are better able to attract and retain better qualified teachers by providing competitive salaries, and are also better able to provide students with quality textbooks and information technology instruction (Chubb and Loveless 2002). Minority students are more likely to live in segregated neighborhoods and attend racially segregated, high-poverty, low performing elementary and secondary schools (Chubb and Loveless 2002; Garibaldi 1997). The majority of these schools have out-dated textbooks, inadequate resources, and do not offer a rigorous curriculum. Differences in the quality of education received at the secondary level have vast implications for academic preparedness (and thus, postsecondary enrollment rates) of minority students relative to White students. Therefore, some of the variation in educational attainment is likely due to differences in school quality.

Institutional Effects

Some researchers have suggested that the peculiar characteristics of higher education institutions create barriers to access and enrollment in higher education (Dougherty 1992; Lang 1992). Nettles et. al. (1986) argues that there are non-cognitive and environmental variables that affect student learning and overall performance. These factors include student attitudes and behaviors, faculty attitudes and behaviors, and the environment of the institution. Furthering the view that institutional barriers contribute to lower rates of enrollment and persistence, past research efforts have focused on the validity of college entrance exams. A comprehensive review of population validity studies involving college entrance exams found that identical regression equations over predicted black student performance (Breland 1978 as cited in Nettles et. al. 1986). This suggests that the college experiences of blacks and whites are not equivalent and that perhaps characteristics or experiences in postsecondary institution have a negative effect on the performance of Black students.

Peer Influence

Past research has also shown that **peers** can have a significant influence on educational plans for the future. Students who have friends with plans to attend a four-year college are more likely to enroll in a four-year college than students whose friends do not plan on attending a four-year institution (American Council on Education 2002). Empirical evidence from the High School & Beyond data supports the idea that students are influenced by the behavior of their friends and behave similarly. For example, students who take academically demanding courses, take the SAT, and plan to go to college, have friends who are also engaged in these positive activities. Other studies have

also found a significant relationship between peer influence and college persistence (Bank et. al. 1990; Bean 1980). Despite these findings, there has also been empirical evidence that suggests that peer influence is not as strong during the college years (Reitzes and Mutran 1980 as cited in Bank et. al. 1990).

Cultural Capital

Cultural capital is also highly correlated with positive life outcomes, including high educational attainment. Cultural capital refers to activities involving museums, operas, and the arts. Bourdieu (1977) defines cultural capital as “the general cultural background, knowledge, deposition, and skills that are passed form one generation to the next” (as cited in Hallinan 2001:p.56). He argues that participation in prestigious cultural activities allows individuals to gain access to certain privileges in society. Accordingly, information, privilege, and opportunity allow individuals to secure societal advantages. Likewise, DiMaggio (1982) states:

Weber noted that elite status groups...generate or appropriate as their own specific distinctive cultural traits, tastes, and styles. This shared status culture aids group efforts to monopolize for the group as a whole scarce social, economic, and cultural resources by providing coherence to existing social networks and facilitating the development of co-membership, respect, and affection out of which new networks are constructed. (P.189)

In “Cultural Capital, Educational Attainment and Marital Selection,” DiMaggio and Mohr (1985) distinguish between class (an individual’s economic market position) and Weber’s concept of status (conceptualized as *participation* in prestigious status culture). The authors argue that class, as measured by income, education level and occupational prestige, does not fully capture the effects of cultural capital. Their study of approximately 2,906 11th graders who were surveyed in 1960 sought to measure levels of

participation in high status culture and determine the extent to which cultural capital influenced educational attainment and marital selection. Cultural capital was operationalized as self-reported participation in activities such as attending a museum, art exhibit, or symphony orchestra, etc. The study found statistically significant effects of cultural capital on educational attainment. Despite these findings, the study had several limitations, including a sample that is not generalizable to the population, self-reported participation rates, and a definition of cultural capital that excludes prestigious cultural activities in minority communities. Cultural capital, institutional characteristics, and peer influence, are all likely contributors to both student persistence and degree attainment. However, they are not the focus of this discussion.

The next section will discuss findings from previous research that lead me to believe that my measures of personal resources are most influential on positive educational outcomes. These measures of personal resources are of primary interest and the focus of this paper.

Educational Aspirations

Aspiring to go to college is an important first step in the postsecondary process. Numerous studies have documented the link between parental and student aspirations and educational attainment. In fact, data from the National Center for Education Statistics support the assertion that student and parent educational aspirations are highly correlated with total number of years of schooling. Prior research has also shown that these expectations are particularly high among students from high SES families (NCES 2002; Teachman and Paasch 1998). For example, NCES's (2003) analysis of NELS:2000 data

show that students were more likely to report completing a Bachelor's degree or higher if their mother's educational expectations of them were high. Additionally, the report also found that 89 percent of high SES 8th grade students aspired to a bachelor's degree, compared to only 42 percent of low SES students (Horn et al. 1997; NCES 2002).

According to Teachman and Paasch (1998), although parental educational expectations and family socioeconomic status are highly correlated, SES (as measured by parental income and level of education) fails to capture "the full range of social and psychological processes likely to be related to the development of educational aspirations in children". In their article, "The Family and Educational Aspirations", the authors discuss several reasons why family background is associated with educational aspirations. First, families act as role models and provide academic encouragement. Second, families may provide educationally enriching material in the home and intellectually stimulating activities that emphasize academic values (DiMaggio 1982; Teachman 1987; Teachman and Paash 1998). Third, children whose parents possess greater financial resources are more likely to view college as a feasible option after high school. Therefore, the strong relationship between parental expectations and educational attainment are at best, proximate indicators of more complex interactions that foster a high expectation of educational attainment. Social processes other than family influence also affect student aspirations, which tend to be slightly lower than parental aspirations. Other factors that contribute to the social processes that shape student aspirations include teacher expectations/encouragement and occupational expectations.

Academic Preparation

In addition to high aspirations, **academic preparation** is certainly a precursor to postsecondary success. Numerous studies have documented the link between strong academic preparation and postsecondary success (American Council on Education 2002; Chubb and Loveless 2002; NCES 2001; Rivkin 1995). In fact, strong academic performance in middle and high school can mitigate other characteristics associated with poor academic outcomes (American Council on Education 2001; NCES 2002). For example, an analysis of degree attainment using the High School & Beyond cohort found that the quality and intensity of academic preparation was a better predictor of postsecondary completion than demographic and other characteristics (Adelman 1999 as cited in NCES 2002). Prior research has also found that minority students with equivalent academic preparation as Caucasian students are more likely to attend and graduate from college (Bauman 1996; Hauser 1992; Light and Strayer 2000; NCES 1997; Rivkin 1995; Teachman 1987). Additional research has shown that mathematical achievement, particularly in advanced math classes, is strongly correlated with academic success (American Council on Education 2002; Horn and Nunez 2000; Pelavin and Kane 1990). Therefore, some of the difference in college persistence and completion is attributable to differences in academic preparedness.

Social Capital

According to Social Capital theory, individuals have access to information and resources that are important in the facilitation of action via membership in social networks (Coleman 1988; Portes 1998). These social networks are formed by individuals

with common interests: parents whose children attend the same school; neighbors; students who must study for the same test; co-workers engaged in similar work activities, etc. Individuals use their membership in social networks as a resource to facilitate actions that are otherwise unobtainable.

Researchers have often studied the relationship between social capital and life outcomes. Of particular interest are the studies that have found a positive relationship between social capital and educational attainment (Coleman 1988; DiMaggio 1982; DiMaggio and Mohr 1985; Kalmijn and Kraaykamp 1996). For example, Hoffer (1986) and Coleman and Hoffer (1987) tested the notion that social capital, provided to children by their parents, diminishes with increasing numbers of children. Their analysis of the *High School and Beyond* data set, which used the ratio of adults to children as a proxy for social capital, found that children who possessed less family social capital (i.e. children who had more siblings or fewer parents) were significantly more likely to drop out of high school than children who possessed more social capital.

Using NELS:88-1992 data, Teachman et. al.(1997) tested Coleman's theory that social capital facilitates the acquisition of human capital. The authors tested the belief that structurally deficient households (i.e., families with one parent or two stepparents) possess less social capital than two biological-parent households. According to this perspective, parents in structurally deficient households should have less time for parent-child interactions, which is an important influence on the decision-making process. With the exception of "divorced mother", the authors found that all family types other than "two, biological-parent" were associated with an increased risk of dropping out of high

school. In general, they found that *more* social capital was associated with a *decrease* the odds of dropping out of school.

In addition to social capital, personal and family resources play a vital role in educational attainment. Although family background characteristics represent one of the most commonly cited explanations of educational attainment, some studies have examined the role of specific types of resources on educational attainment (Clausen 1991; Teachman 1987). In “Family Background, Educational Resources, and Educational Attainment,” Teachman (1987) argues that parents use resources to create a home environment conducive to educational attainment. Using the National Longitudinal Study of the High School Class of 1972, he seeks to better define the educational resources used to encourage educational attainment. He creates a new composite explanatory variable indicating the presence of the following resources:

- A specific place of study;
- Reference books;
- Daily newspaper; and
- Dictionary/encyclopedia.

The presence of these resources indicates parents attempt to provide educational resources for their children. The results indicate that educational resources play a positive and statistically significant role in educational attainment. However, the study was limited to White students who completed high school and responded to all four follow-up surveys.

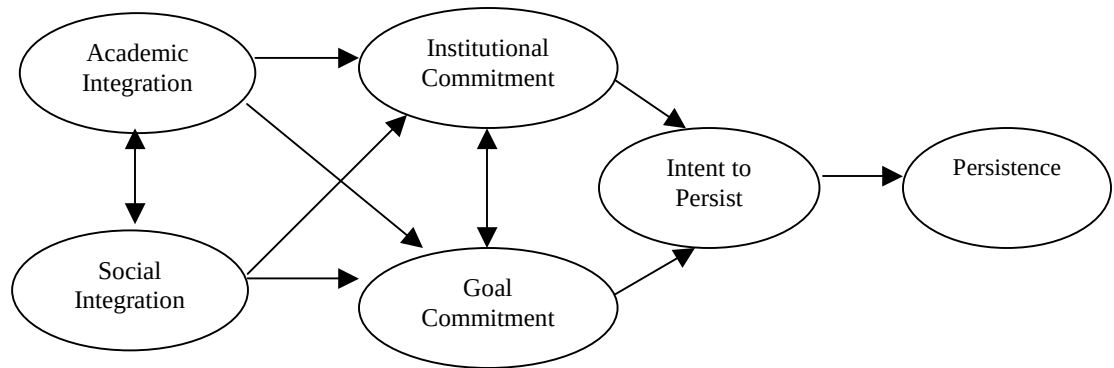
Besides physical resources, researchers have examined the relationship between attributes and behaviors of the individual and educational attainment. Clausen (1991) develops the concept of “planful competence” and argues that adolescents who engage in

realistic goal setting activities and whose personal attributes include being dependable, productive, and intelligent are more likely to have positive life outcomes, including higher levels of education. The results of Clausen's study suggest that adolescents who make responsible decisions, have self-confidence and engage in planning for the future have more positive life outcomes, including more years of education, than their counterparts who are not as actively engaged in planning for the future.

Theoretical Background

The two guiding theoretical frameworks used in the literature to explain college attrition vs. degree attainment are the *Student Integration Model* and the *Student Attrition Model*. Tinto's *Student Integration Model* (see Figure 1) attributes attrition to the lack of congruency between the individual and the institution (as cited in Cabrera, et. al. 1992). This model asserts that persistence depends on the match between an individual's characteristics such as motivation and academic ability and the institution's academic and social characteristics. As illustrated in Figure 1, the degree of congruity between characteristics of both the individual and the school (academic and social integration) influence the individual's commitment to complete college (goal commitment) as well as the commitment to the institution (institutional commitment). Using this model, prior research that focused on the fit between individuals and the institution has found that students who live on campus, are able to meet the academic requirements of the institution, and are integrated into campus life tend to persist to degree attainment (Light and Strayer 2000). An important criticism of this model is that it does not give adequate attention to the influence of external factors on persistence.

Figure 1. Student Integration Model



Source: Cabrera et. al. 1992

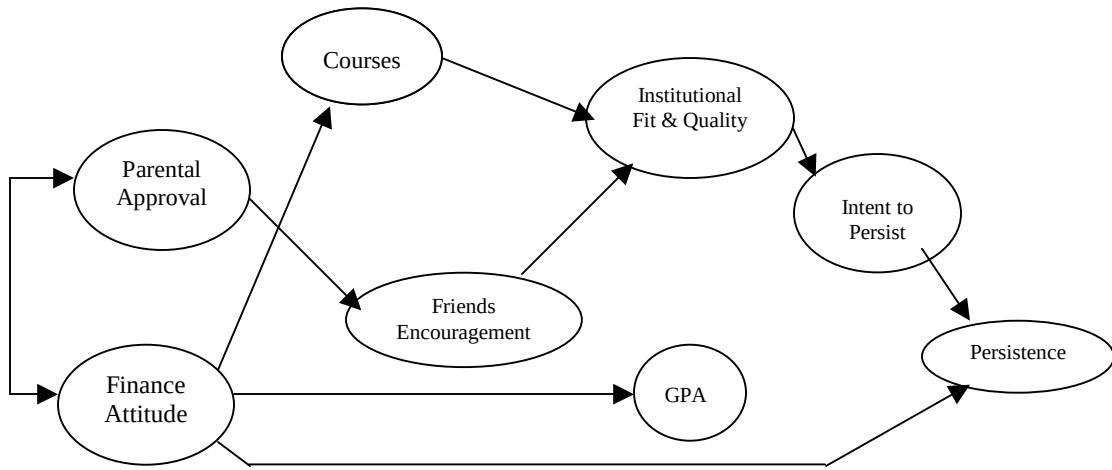
Another well accepted theoretical explanation for education outcomes is Bean's *Student Attrition Model* (see Figure 2). This theory attributes student attrition to beliefs that shape attitudes and influence behavior. The strength of this model is the inclusion of external factors as a driving force behind persistence. As you can see from Figure 2, this model recognizes that external factors such as: 1) parental approval; 2) financial attitudes (satisfaction with financial support); and 3) peer encouragement play a major role in students' attitudes and decisions. In addition to the external factors, Figure 2 also illustrates the importance of academic performance and institutional fit and quality on persistence.

Using this model, Nora and Cabrera (1996) examined the role of perceived discrimination at a public, predominately white, commuter institution. The authors found that minorities were more likely than non-minority students to feel discriminated against while on campus and that these perceptions were found to affect minority students' adjustments to college and college-related outcomes. Despite minority students' increased likelihood of feeling alienated or discriminated against, this cannot adequately explain minority students' lower college completion rates. Historically Black Colleges and Universities, where presumably minority students would not feel as alienated or discriminated against, are designed to integrate minority students and provide additional support; yet, many of these institutions post minority student graduation rates as low as or lower than many predominantly white institutions (Journal of Blacks In Higher Education 1999). In fact, black graduation rates are highest among the nation's most selective universities such as Harvard (95 percent) and Princeton (92 percent).

As noted by Cabrera et. al. (1992), both models share similarities. Both models acknowledge that persistence is the result of complex, multi-dimensional interactions. Both models assert that the successful match between the student and the institution largely affects persistence. However, the models differ with regard to the emphasis placed on the strongest indicators of college persistence. The *Student Integration Model* suggests that academic and social integration along with institutional and goal commitment exert the highest affects on retention. On the other hand, the *Student Attrition Model* believes that persistence is most affected by institutional fit as well as beliefs and attitudes concerning external factors such as family approval, satisfaction with financial support, and encouragement by friends. Given the strong empirical support for both models, it is important to note that a better understanding of persistence can be derived by combining the 2 models (Cabrera et. al. 1993).

A major criticism of the 2 models is that they fail to adequately recognize the importance of pre-college characteristics in influencing educational outcomes. Earlier educational experiences, such as academic preparation, guidance, and encouragement, shape students overall ability to adjust to college. Therefore, these pre-college experiences are an important piece of the puzzle when examining persistence.

Figure 2. Student Attrition Model



Source: Cabrera et. al. 1992

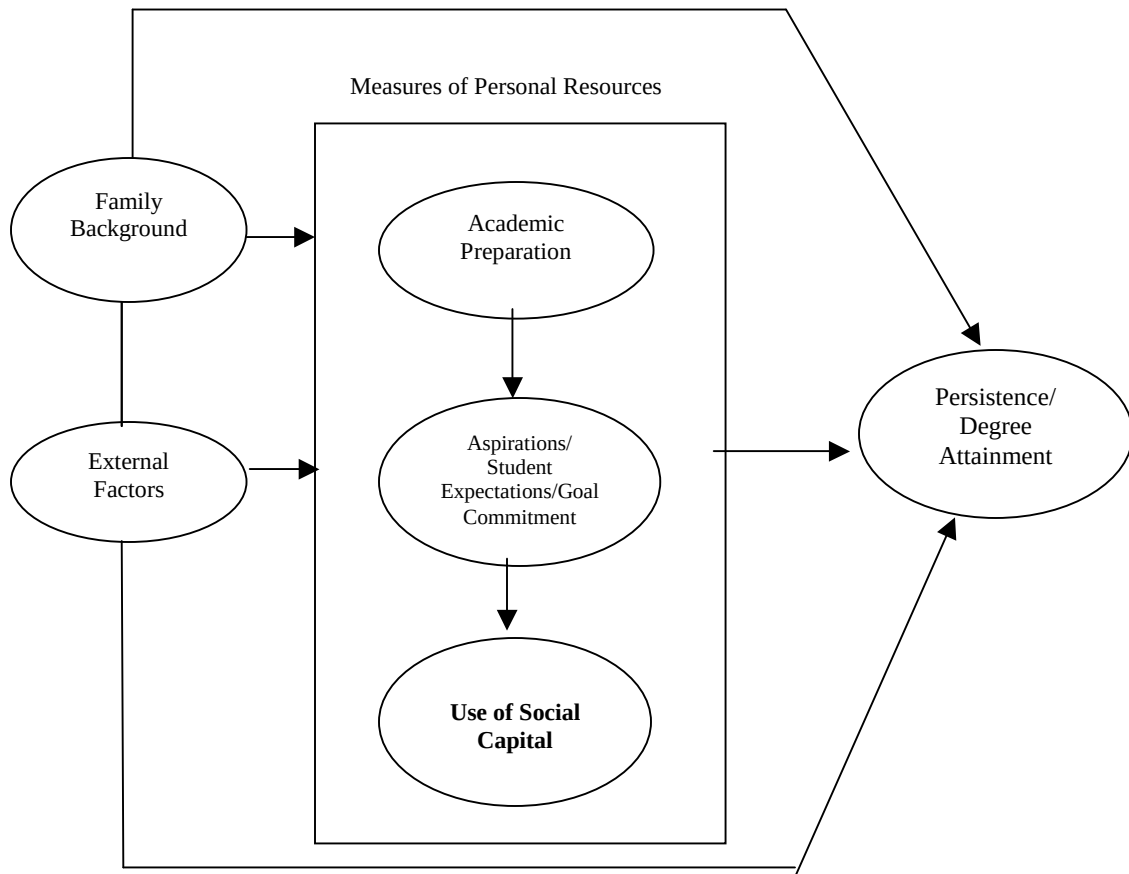
Conceptual Model

Although the model I propose incorporates ideas from both models, it is shaped by a broader literature concerning educational outcomes. My conceptual model (see Figure 3) attributes persistence to measures of personal resources. The conceptual model I propose adds to the *Integration* and *Attrition* models because it considers pre-collegiate factors as a major influence on educational outcomes. Furthermore, this model jointly examines the impact of academic preparation, high aspirations, and the use of social capital on educational attainment. As Figure 3 illustrates, this approach regards all 3 factors as essential to both persistence and degree attainment.

I also contribute to the existing literature by examining whether these measures of personal resources mediate the affects of gender or race/ethnicity. There is strong evidence in the literature to suggest that these personal resources positively impact educational outcomes for all students. However, existing literature does not jointly consider the differential impact of these resources on race and gender/ethnicity. If minority students are generally disadvantaged by less academic preparation and social capital, then sufficient academic preparation and social capital should increase their odds of both persisting for two years and degree completion (relative to non-minority students). Likewise, if female students have traditionally been encouraged to take less rigorous math courses (academic preparation) and have less social capital, then sufficient academic preparation and social capital should positively influence their academic outcomes as well.

There are mixed findings concerning the relative importance of high aspirations for Black students relative to White students. Some studies have found that high aspirations are more important or equally important for minority students relative to their non-minority counterparts (Bauman 1996; Portes and Wilson 1976 as cited in Gottfredson 1981), while other studies have found no effect of aspirations on attainment for Black students (Hauser and Anderson 1991 as cited in Bauman 1996; Keckhoff and Campbell 1977 as cited in Gottfredson 1981; Mickelson 1990 as cited in Bauman 1996). Given the inconclusive findings in the literature, the interaction between higher aspirations and race should be further examined.

Figure 3. Conceptual Model



Research Questions

Previous research has found a relationship between educational aspirations and postsecondary success (American Council on Education 2002; NCES 2002 Teachman and Paasch 1998). However, the significance of aspirations on educational outcomes varies between groups of students. Some students who aspire to high levels of education may have realistic goals based on past academic experiences, while others may have unrealistic expectations or external barriers that prevent them from pursuing college. The literature continues to find a disjuncture between Black students' educational aspirations and subsequent attainment (Epps 1995; Solorzano 1992). Therefore, this study will investigate the overall significance of aspirations as well as its effects on different groups of students.

Unlike the conflicting research on student aspirations, there is a positive relationship between student preparation and educational outcomes. Students who have prepared for college by taking advanced math classes demonstrate positive educational outcomes. Likewise, students who have prepared for the college entrance exam may have better educational outcomes than students who do not prepare for the exam.

To prepare for college, students must pull together internal and external resources. These resources inhere in social relationships that are familial, communal, organizational, or institutional. The wherewithal to fully utilize the available resources that exist within these relationships during the college application process is used as a proxy for a student's ability to extract social capital. Although the students in this sample come from different environments, there are personal resources that students possess

which may enable them to succeed academically. Personal resources that students possess may include educational aspirations and goals, superior study habits, a specific plan for the future, the ability to adjust to a new environment, and/or the ability to navigate the system of higher education (i.e., seek appropriate guidance as needed). This study will examine the aforementioned factors, collectively known as “personal resources”.

This study seeks, in part, to examine the effect of fully utilizing available resources on persisting for 2 years and college completion. Using the 1988-2000 National Education Longitudinal Study, I will examine factors that exert a positive influence on the likelihood of persisting for 2 years after enrollment as well as the likelihood of completing college within eight years. I will attempt to answer the following questions:

- (1) Do personal resources influence educational outcomes, net of family resources?
- (2) Do these resources have different effects on females compared to males?
- (3) Do these resources have different effects on students of different races?

Hypotheses

I hypothesize that 1) high aspirations, 2) academic preparedness, and 3) the ability to utilize existing resources influence educational outcomes in the following ways:

- (1) Individuals who **aspire to high levels of education** may be more likely to plan their future and less likely to make decisions that are incompatible with their goals. Therefore, high aspirations should increase the likelihood of persistence

and degree attainment. Controlling for important characteristics found to be significant in past research, I hypothesize that high student expectations will increase the likelihood of persisting two years as well as completing college.

- (2) A vital aspect of academic success is the extent to which an individual can meet the expectations of college. The better prepared a student is academically, the higher the odds of persistence and degree completion. I hypothesize that students who have demonstrated sufficient **academic preparation** will be more likely to persist two years later and complete college.
- (3) Building on research conducted by John Clausen (1991) and James Coleman (1988), I hypothesize that students who demonstrate an ability to use their social capital will be more likely to remain in school and persist to degree attainment. Students who actively plan for their educational goals, seek guidance, and engage in activities conducive to educational achievement will be more likely to succeed in college. The **ability to use social capital** includes: talking to adults about college, receiving assistance during the college application process, and participating in SAT/ACT preparatory classes or other activities related to preparing for college.

Chapter II.

Analytic Strategy

This study will use longitudinal data to trace the success of students in college. Specifically, this study seeks to examine the relationship between the aforementioned personal resources and educational outcomes. NELS data is well suited for this research because it provides rich information about students' high school experiences, including academic ability, course-taking patterns, and college preparation efforts. Beginning in the 8th grade (in 1988), this information is collected every two years until 12th grade. Additionally, information is collected two years after high school (1994) and again in 2000. This study will 1) examine the "personal resources" of 1992 graduates who enrolled in a 4-year college immediately after high school, 2) predict the odds of remaining in college two years after initial enrollment, and 3) predict the odds of completing a Bachelor's degree or higher within eight years of initial enrollment. Personal resources will be operationalized as having 1) high aspirations, 2) sufficient academic preparedness, and 3) demonstrated involvement in planning for college/demonstrated ability to utilize existing resources.

By examining educational outcomes 2 years after enrollment as well as 8 years later, this study seeks to identify determinants of persistence *and* degree completion and establish an approximate timeframe when students are vulnerable to dropping out.

Data and Methods

This study will use data from the NELS 1988 data set. The study – designed to support longitudinal as well as cross-cohort analyses – follows over 25,000 8th graders for

12 years. Base year (1988) data collection efforts consisted of a survey and cognitive tests for students, and separate surveys administered to parents, administrators and teachers. The base year (1988) study design consisted of a stratified, clustered, two-stage probability sample of 1,052 public and private 8th grade schools. Schools constituted the primary sampling unit and students within schools served as the second-stage unit. To ensure that underrepresented populations were sufficiently represented in the sample, Hispanics, Asian and Pacific Islanders, schools with predominantly African-American students, and private schools were over sampled. 26,432 students were randomly selected from participating schools. 24,599 spring term 1988 students representing over 3 million 8th graders participated in the first wave of NELS. Students excluded from the survey include those with severe disabilities and those who lacked sufficient English skills to complete the survey.

The first three waves (1988, 1990, 1992) of data collection included the pencil-and-paper administration of selected achievement tests (developed by ETS) to students as well as separate surveys of parents, teachers, and principals. The last two waves (1994, 2000) utilized computer-assisted telephone interviewing (CATI) for the primary mode of data collection. Fourth follow-up data collection efforts began in January 2000. The fourth follow-up study sample included 15,237 individuals who were sub-sampled from the 1994 third follow-up sampling frame of 15,964 individuals.

This analysis is based on data from all collection waves (1988, 1990, 1992, 1994, and 2000). During the spring of the 1987-88 school year (base year), most respondents were 8th graders approximately 14 years old. During the 1994 administration, most

respondents had been out of high school for two years. During the year 2000 survey (fourth follow-up), most respondents were 26 years old.

Descriptive statistics are used to describe the sample of students attending college and also to compare postsecondary achievement by selected characteristics. Logistic regression analysis is used to model the probability of remaining in school for at least two years; and completing a Bachelor's degree or higher within eight years. All analyses are weighted to compensate for unequal probabilities of selection, adjust for the effects of non-response, and make the results generalizable to the larger population of spring 1988 8th graders who enrolled in a postsecondary institution between June and December of 1992. IVEware² imputation and variance estimation software is used to take into account the study's complex sample design³ (weighting, clustering and stratification).

Defining the Sample of Interest

The NELS Fourth Follow-up study (in 2000) consists of 12,144 members of NELS:88 sample cohorts two years after the base-year data collection. Most respondents were 26 years old and had been out of high school for eight years. Because the NELS data were designed to accommodate longitudinal and cross-sectional research, flags were included in the data set to identify specific populations. The flag, F4PNLFL, was used to identify sample members who responded to all five waves of NELS data collection (n = 10,827). To limit the percentage of missing cases for each independent variable, the initial population of interest was selected using this flag. Among respondents who

² IVEware uses the jackknife repeated replication approach to estimate the sampling variances.

³ Crosstabs of the NELS stratum variable produced incoherent results. Therefore, I created 1 stratum and assigned all PSUs to that stratum. This will capture the dominant design effect of clustering but will ignore any true stratification gains that the NELS designers may have built into the primary stage of their sample.

participated in all five waves, the population of interest was further defined as “Class of 1992” graduates⁴ (n=9,028). “Class of 1992” graduates were identified using the flag F3SEQ. This variable contains information about whether the sample member graduated from high school in sequence (1 = graduated class 1992). The population of interest was further limited to 1992 graduates who reported enrolling in a 4-year postsecondary institution between June 1992 and December 1992 (n = 4,061). Statistics run on students who graduated early, graduated late, or did not graduate reveal significant differences in characteristics and thus, were excluded from this analysis. Therefore, the analytic sample consists of high school graduates who immediately went on to a 4-year college or university in the summer or fall following their senior year.

Variables

Dependent Variables

My analyses seek to examine the impact of student resourcefulness on degree attainment. I start, however, by first looking at retention during the second year of college. The dichotomous variable, **STILL2YR**, indicates if the respondent was still enrolled in a postsecondary institution at the time of the 1994 interview (1 = still enrolled, 0 = not still enrolled). A respondent was considered “still enrolled” if s/he was enrolled in a postsecondary institution at least one month between January 1994 and May 1994.

Looking at retention during the second year of college is useful since many students who drop out of college do so within the first two years. Moreover, the key variables for this study (e.g., student aspirations, preparedness and resourcefulness) are

⁴ NELS defines “Spring 1992 graduate” as those who graduated between April 1, 1992 and June 30, 1992.

measured during high school and are likely to have a greater impact earlier in college than later. Also, by looking at retention both early and later during the college years, we may gain more insight into when and why some students drop out of college.

In the second stage of my analysis, I also look at the determinants of college completion. The dependent variable is based on the respondent's highest postsecondary degree attained as of 2000, when the respondents were approximately 26 years old. This allows for students who took time off from school or decided to continue part-time.

DEGREE is coded "1" for respondents who reported attaining a Bachelor's degree or higher (i.e., M.A., Ph.D., M.B.A., etc.) by 2000 and "0" for respondents who reported that they had not completed at least a Bachelor's degree. Respondents who were unable to provide degree types for any of their reported degrees were excluded from these analyses and coded as missing.

Independent Variables

Gender: The respondent's sex, **FEMALE**, is coded "1" for women and "0" for men.

Race: Race and ethnicity is captured by asking "Which of these best categorizes your background?" and "What is your race?". The categories of the original variable **F4RACE2** have been recoded as follows: **AA** is coded "1" for African-American, non-Hispanic and "0" otherwise; **ASIAN** is coded "1" for Asian or Pacific Islander and "0" otherwise; **HISPANICs** coded "1" for Hispanic or Latino and "0" otherwise; **NATIVE AMERICAN** is coded "1" for Native American/Alaska Native and "0" otherwise. The reference category, **WHITE**, is coded "1" for White, non-Hispanic and "0" otherwise.

Socioeconomic Status: NELS 10th grade socioeconomic status variable is derived using the following information: father's educational level, mother's educational level, father's occupation, mother's occupation, and family income. The variable, **F1SESQ**, is derived by recoding socioeconomic status information (F1SES) into quartiles based on the weighted marginal distribution. The categories for **F1SESQ** are: 1 = Quartile 1 Low; 2 = Quartile 2; 3 = Quartile 3; and 4 = Quartile 4 High.

Parental Marital Status: **BYPARMAR** reflects the respondent's parents' marital status during the base year interview. **BYPARMAR** has been recoded and assigned indicator variables as follows: **DIVORCED** is coded "1" for divorced, widowed, or separated and "0" otherwise; **MARRIED** is coded "1" for married and married-like relationship and "0" otherwise; **NEVER** is coded "1" for never married and "0" otherwise. I realize that parental marital status may change after 1988, but this measure is designed to provide a basic measure of family structure while growing up.

Number of Siblings: The number of siblings a respondent had in 1988 is represented by the numeric variable, **BYS32**, coded as follows: 0 = no siblings, 1 = one sibling, 2 = two siblings, 3 = three siblings, 4 = four siblings, 5 = five siblings, 6 = six or more siblings.

Academic Ability: This analysis uses respondent's 10th grade composite reading and math achievement score to control for academic ability. **F12XCOMP** represents the respondent's 10th grade combined reading and math achievement score. It is derived from respondents' original reading and mathematics standardized scores, F12XMSTD and F12XRSTD.

Region: **G10REGION** is used to control for regional differences in educational attainment. **G10REGION** indicates the region where the student's first follow-up school was located. It was created by recoding the state of the 10th grade school into the four Census Bureau regions: Northeast (New England and Middle Atlantic states); North Central (East North Central and West North Central states); and South (South Atlantic, East South Central and West South Central states). It is recoded into a series of dummy variables as follows: **NORTHEAS** is coded “1” for the Northeast and “0” otherwise; **NORTHCE** is coded “1” for North Central and “0” otherwise; and **WEST** is coded “1” for the West and “0” otherwise. The reference group, **SOUTH**, is coded “1” for the South and “0” otherwise.

Type of School District: The variable **G10URBAN** classifies respondent's 10th grade school as urban, suburban, or rural/outside the metropolitan statistical area. The variable is recoded into a series of dummy variables as follows: the reference group, **URBAN**, is coded “1” for schools located in an urban school district, “0” otherwise; **SUBURBAN** is coded “1” for schools located in a suburban school district, “0” otherwise; and **RURAL** is coded “1” for schools located in a rural school district, and “0” otherwise.

Institution Type of First PSE Enrollment: The variable **PSEFIRTY** reflects the type of postsecondary institution the respondent attended according to their earliest date of enrollment. The original variable, **PSEFIRTY**, is recoded into two indicator variables: **PRIV4YR** is coded “1” for Private not-for-profit 4-year, “0” otherwise; and **PUB4YR** is coded “1” for Public 4-year, “0” otherwise.

Aspirations: Having a specific goal or aspiration, such as the completion of a bachelor's degree, is an important step in educational attainment. I will measure **students' 10th grade educational aspirations** using information from the question, "As things stand now, how far in school do you think you will get". The response categories were collapsed and recoded (**RASPIRE**) as follows:

2 = High School graduate or less

4 = trade school

6 = some college

7 = finish college

8 = Master's Degree

9 = Ph.D., M.D.

While parental and student aspirations are highly correlated, analyses of descriptive data showed that parental educational aspirations tended to be slightly higher than their child's aspirations. It is assumed that 10th graders have relatively realistic expectations about post-high school plans based on their past academic performance and experiences. Therefore, educational aspirations will be measured using students' aspirations as opposed to parental aspirations.

Academic Preparation: Academic preparation is measured by the type of math courses taken by the respondent by the 10th grade. Respondents answered the following question, "From the beginning of ninth grade to the end of this school year, how much coursework will you have taken in each of the following subjects?" The response categories for each math course are: 0 = None, 1 = ½ year, 2 = 1 year, 3 = 1 ½ years, 4 = two years. All response categories were collapsed so that responses ranging from 1 to 4 (½ to two years of coursework) were recoded as "1" to indicate that the respondent had

taken the math course, “0” otherwise. An indicator variable was created for each of 5 math courses: Geometry, Algebra II, Trigonometry, Pre-calculus, and Calculus. A composite variable, **ADVMATH** was created to identify students who have taken any of these 5 math courses by the 10th grade. **ADVMATH** was coded “1” for students who reported taking Geometry or Algebra II or Trigonometry or Pre-Calculus or Calculus and “0” otherwise.

Resourcefulness: Using information about students’ use of available resources, I will develop a composite variable to measure resourcefulness. Resourcefulness is conceptualized as the ability to utilize existing resources during the years or months preceding college enrollment. Students who are considered resourceful 1) seek or accept help completing college applications, 2) speak with adults about financial aide, and/or 3) take SAT/ACT preparatory courses or use other study aide materials. Using information about students’ efforts to prepare themselves for college, I will be able to determine the significance of resourcefulness. **HELP** is an ordinal variable created to quantify the amount of help respondents received during the college admissions process in 12th grade. Respondents were asked the following questions:

- 1) At your high school, have you received help with filling out voc/tech school or college applications?
- 2) At your high school, have you received help with filling out financial aid forms?
- 3) At your high school, have you received assistance in writing essays for voc/tech school or college applications?
- 4) 4) At your high school, have you received days off from school to visit vocational/technical schools or colleges?

The response categories are coded “1” for Yes and “0” for No. Respondents whose school did not offer help were coded as missing. **HELP** is created by adding the four dichotomous variables. **HELP** has a minimum range of “0” and a maximum range of “4”.

SATPREP – 12th Grade respondents answered the following question: “To prepare for the SAT and/or ACT, did you do any of the following...”

- 1) take a special course at your high school?
- 2) take a course offered by a commercial test preparation service?
- 3) receive private one-to-one tutoring?
- 4) study from test preparation books?
- 5) use a test preparation videotape?
- 6) use a test preparation computer program?

The response categories are coded “1” for Yes and “0” for No. Next, **SATPREP** is created by adding the six dichotomous variables. **SATPREP** has a minimum range of “0” and a maximum range of “6”. A list of variables and their definitions can be found in Appendix B.

Descriptive Statistics

Table 1 shows descriptive characteristics for the sample. The NELS data are consistent with enrollment statistics obtained from other sources (Garibaldi 1997; Slavin and Madden 2002). Among students who enrolled in college immediately after high school: more than half were women; over three-quarters were white, non-Hispanic; more than three-fourths were from the top two socioeconomic quartiles; 82 percent had parents

who were married (as of the 1988 interview); and 75 percent had two siblings or fewer. With regard to academic preparation and ability, 85 percent of the students completed Geometry or higher and 80 percent had composite math and reading test scores in the top two quartiles (see Table 1). 42 percent of students who enrolled immediately attended high school in a suburban school district, and two-thirds attended a public, 4-year college or university. An overwhelming majority of students (98 percent) enrolled full-time. Most students (81 percent) had received help with at least one task related to the college admissions process. 70 percent of the students in the sample utilized one or more study aids to prepare for the SAT/ACT.

Among 4,061 students who enrolled in a 4-year postsecondary institution immediately after high school, 90 percent were still enrolled⁵ two years later. Although women enrolled at slightly higher rates than men, both sexes were still enrolled two years later at similar rates (see Table 2). White and African-American students were also still enrolled at similar rates (90 percent and 92 percent, respectively). Asian Americans were much more likely to still be enrolled than any other race (98 percent). Among Hispanic students, only 85 percent were still enrolled two years later. There were also noticeable differences in the percentage of students still enrolled by socioeconomic status. Among students in the highest socioeconomic quartile, 94 percent were still enrolled in college two years later compared to 84 percent of students in the lowest socioeconomic status quartile. Parental marital status was also associated with persistence. Among students whose parents were married at the baseline interview, 91percent were still enrolled two

⁵ “Still enrolled” is defined as being enrolled for at least one month between January and May 1994, which would have been their second year of college.

years later, compared to only 78 percent of students whose parents were never married (see Table 2). Academic ability and preparation were also associated with persistence. 92 percent of students in the highest combined mathematics and reading quartile were still enrolled in college after two years, compared to 87 percent of students in the lowest combined mathematics and reading quartile. With regard to academic preparation, 91 percent of students who completed Geometry or higher were still enrolled, compared to 85 percent of students who did not take Geometry or higher (see Table 2).

Students from urban and suburban school districts were still enrolled at similar rates (91 percent); however, students from rural school districts were slightly less likely to still be enrolled (88 percent). There were no strong regional differences in persistence. Among students who enrolled in a private 4-year institution, 93 percent were still enrolled, compared to 89 percent of students who enrolled in a public 4-year college. Among the 2 percent of the sample who enrolled half time or less, 75 percent were still enrolled in college two years later. Among students in the 10th grade who had aspired to complete college or earn a Master's or doctoral degree, persistence rates were almost identical (91 percent). However, persistence rates were considerably lower for students whose plans did not include a postsecondary degree. Among students who aspired to some college, 86 percent were still enrolled, compared to 83 percent of students who aspired to trade school and only 63 percent of students who expected to complete high school or less.

With regard to utilizing resources during the college application process, there were no substantial differences in persistence between students who received assistance

and students who did not receive help. There was a noticeable difference between students who prepared for the college entrance examination and those who did not prepare for the test. Among students who reported no preparation efforts, 86 percent were still enrolled two years later. In contrast, more than 90 percent of students who prepared for the SAT or ACT were still enrolled two years later.

Besides examining students who were still enrolled two years later, this study also examines whether students completed a Bachelor's degree or higher⁶ by 2000.

The second column of Table 2 shows greater variability in degree completion than in persistence after two years. Among students who immediately enrolled in a public or private 4-year institution, 71 percent earned a Bachelor's degree or higher by 2000.

Women were more likely to earn a degree than men (73 percent and 68 percent, respectively). Consistent with recently published data (U.S. Bureau of the Census 2002; National Center for Education Statistics 2001), degree completion varied widely by race and ethnicity. Asian students had the highest rate of degree completion (80 percent) followed by White students (74 percent), Hispanic students (60 percent), and Black students (56 percent). In addition, degree completion varied by family background characteristics. Among students in the highest socioeconomic quartile, 80 percent completed a Bachelor's degree or higher. In contrast, only 49 percent of students in the lowest socioeconomic quartile completed a degree. Among students whose parents were married (at the baseline interview), 74 percent earned a degree, compared to 60 percent of students whose parents were divorced, widowed, or separated (as of the 1988 interview). Among students with no siblings (as of 1988), 76 percent earned a degree, compared to

⁶ "Bachelor's degree or higher" is used interchangeably with "degree".

69 percent among students who had 2 siblings and 55 percent of those with 5 or more siblings. Degree completion also varied by level of academic ability. 79 percent of students in the highest combined mathematics and reading quartile completed a degree, compared to only 67 percent of students in the third quartile and 39 percent of students in the lowest quartile.

There was also regional variation in degree completion. 75 percent of students from the Northeast earned a degree by 2000, compared to only 68 percent of students from the South. Students who attended urban or suburban schools completed a Bachelor's degree or higher at similar rates, 71 percent and 73 percent, respectively. Students from rural schools had somewhat lower completion rates (68 percent).

Institution type also played a role in the odds of completing a degree. Among students who enrolled in a private, 4-year institution, 79 percent completed a degree. In contrast, 66 percent of students who attended a public, 4-year institution completed college. Among students who enrolled full-time, 71 percent earned a degree, compared to 42 percent of students who attended part-time or less (see Table 2).

Degree completion also varied by level of aspiration. Among students who expected to complete "some" college, 52 percent earned a degree, compared to 71 percent of students who expected to finish college. Among students who expected to earn a Master's or Ph.D., over three-quarters earned a degree.

Degree completion also varied by academic preparation. 74 percent of students who took Geometry or higher in high school completed a degree, compared to only 50 percent of students who did not take high level math courses in high school (see Table 2).

With regard to utilizing resources during the college application process, student resourcefulness did not seem to have a large impact on the likelihood of degree attainment. Compared to students who did not receive assistance, students who received assistance with the application process earned degrees at similar rates (70 percent). However, students who received substantially more assistance (3 or more types of help) were somewhat more likely to report earning a degree (73 percent). There were also noticeable differences in college completion rates between students who prepared for a college entrance exam and those who did not prepare for the exam. Among students who reported no preparation efforts, 66 percent earned a degree, compared to 69 percent of students who used one method to prepare and 77 percent of students who used two methods to prepare for the SAT or ACT (see Table 2).

Because Table 2 shows gender, race, and ethnic differences in persistence and degree completion, a closer examination is warranted. Therefore, **Table 3** presents educational attainment outcomes by gender and race. This information serves to illuminate the relationship between race and gender when discussing educational outcomes.

White female students were somewhat more likely than White males to persist for two years (91 percent vs. 89 percent). On the other hand, African-American females were much more likely than African-American males to persist for two years (95 percent vs. 86 percent). Hispanic female students had similar persistence rates relative to their Hispanic male counterparts (85 percent). Among Asian students, males were somewhat more likely to persist for two years than females (99 percent vs. 97 percent).

The chi-square tests and significance levels less than 0.0001 in columns 1 and 2 clearly demonstrate a significant relationship between race/ethnicity, gender, and persistence. Given the large differences in persistence between African-American and Asian students, it is worth noting that African-American females have a persistence rate that is higher than that for white females and very similar to that for Asian females.

The large chi-square statistic and significance levels less than 0.0001 in columns 3 and 4 clearly demonstrate a significant relationship between race/ethnicity, gender, and degree attainment. For all racial/ethnic categories, women were much more likely than men to complete a Bachelor's degree or higher within eight years. Among White students, females were more likely than males to earn a degree (76 percent vs. 71 percent). For Black students, the gender difference in degree attainment is particularly pronounced. As with persistence, African-American students had the largest gender gap in degree completion. Black female students had a degree completion rate of 62 percent - a rate approximately 25 percent higher than Black male students' completion rate of 47 percent. Among Hispanic students, 64 percent of females earned a degree within eight years, compared to only 56 percent of male students. Asian students demonstrated the highest degree completion rate for both sexes. 84 percent of Asian female students completed a degree within eight years, compared to 76 percent of Asian male students. The issue of gender and racial/ethnic inequalities in educational outcomes will be discussed further in the final section.

Table 1. Characteristics of Students Who Enrolled in College Immediately after High School⁷

	Percent Distribution
Eligible Population n = 4,061	
<u>Gender</u>	
Female	53.44
Male	46.56
<u>Race and Ethnicity</u>	
White, not Hispanic	78.26
Black, not Hispanic	9.34
Hispanic	6.59
Asian	3.59
Native American ^a	0.44
{Race missing}	1.79
<u>10th Grade Socioeconomic Status</u>	
Highest Quartile	49.05
3 rd Quartile	27.67
2 nd Quartile	15.13
Lowest Quartile	8.15
<u>Parent Marital Status in 1988</u>	
Married	81.76
Marriage-Like Relationship	0.92
Divorced, Widowed, Separated	10.77
Never married	1.38
{Missing}	5.17
<u>Number of Siblings</u>	
0	7.60
1	38.98
2	28.44
3	12.63
4	5.47
5	2.66
6 or more	4.04
Missing/Multiple Response	0.19
<u>Combined Math and Reading Quartile (10th Grade)</u>	
Highest Quartile	52.04
3 rd Quartile	28.36
2 nd Quartile	12.25
Lowest Quartile	4.63
{Test not complete}	2.70
{Missing Quartile}	0.02

Source: U.S. Department of Education, National Center for Education Statistics, NELS Data 88:2000.

⁷ Students who enrolled in a 4-year institution between June 1992 and December 1992. Weighted Distribution.

^a Small sample size, n = 16

Table 1. Characteristics of Students Who Enrolled in College Immediately after High School continued...

4-Year Institutions Only	Percent Distribution
<u>Region (10th Grade)</u>	
Northeast	26.13
North Central	27.86
South	30.78
West	14.94
{Missing}	0.29
<u>Type of School District (10th Grade)</u>	
Urban	30.51
Suburban	41.97
Rural/Outside MSA	27.07
{Missing}	0.45
<u>Type of Institution</u>	
Private ^b , 4-year	33.76
Public, 4-year	66.24
<u>Enrollment Status</u>	
Full-time	97.65
Half-time or less	2.33
{Missing}	0.03
<u>Respondent's 10th Grade Aspirations</u>	
Ph.D.	21.25
Master' Degree	24.75
Finish College	42.82
Some College	7.87
Trade School	2.40
High School or Less	0.37
{Refusal/ Missing }	0.53
<u>Academic Preparation (by 10th Grade)</u>	
Geometry or higher	85.38
No Geometry or higher	11.21
{Missing}	3.41

Source: U.S. Department of Education, National Center for Education Statistics, NELS Data 88:2000.

^b Not for profit.

Table 1. Characteristics of Students Who Enrolled in College Immediately after High School continued...

4-Year Institutions Only	Percent Distribution
<u>Resourcefulness</u>	
<u>Number of types of help sought (filling out applications, writing essays, etc.)</u>	
0	16.79
1	22.57
2	23.98
3 or more	34.46
{Missing}	2.20
<u>Resourcefulness</u>	
<u>Number of SAT/ACT preparation efforts (taking prep course, studying from a prep book, etc.)</u>	
0	26.74
1	35.63
2	21.82
3 or more	12.96
{Missing}	2.86

Source: U.S. Department of Education, National Center for Education Statistics, NELS Data 88:2000.

Table 2. Percentage of Students Who Were Still Enrolled 2 years Later Compared to Percentage of Students Who Attained a Bachelor's Degree or Higher by 2000

	Still Enrolled 2 years Later	DEGREE
	Percent	Percent
	90.11	70.76
<u>Gender</u>		
Female	91.45	73.37
Male	88.57	67.77
<u>Race and Ethnicity</u>		
White, not Hispanic	90.15	73.69
Black, not Hispanic	91.85	56.18
Hispanic	84.85	60.06
Asian	97.52	80.38
Native American ^a	79.47	38.80
<u>10th Grade Socioeconomic Status</u>		
Highest Quartile	93.38	79.92
3 rd Quartile	88.52	68.76
2 nd Quartile	85.77	56.60
Lowest Quartile	83.93	48.60
<u>Parent Marital Status in 1988</u>		
Married	90.98	73.50
Married-Like	81.21	54.04
Divorced, Widowed, Separated	86.71	59.97
Never Married	78.45	47.83
<u>Number of Siblings</u>		
None (0)	88.70	75.70
1	93.31	74.65
2	88.62	68.95
3	89.49	67.82
4	85.96	71.93
5	87.07	54.45
6 or more	81.98	55.06

Source: U.S. Department of Education, National Center for Education Statistics, NELS Data 88:2000.

^a Small sample size, n = 16

Table 2. Percentage of Students Who Were Still Enrolled 2 years Later Compared to Percentage of Students Who Attained a Bachelor's Degree or Higher by 2000 continued...

	Still Enrolled 2 years Later	DEGREE
	Percent	Percent
<u>Combined Math and Reading Quartile (10th Grade)</u>		
Highest Quartile	91.84	78.97
3 rd Quartile	89.68	66.97
2 nd Quartile	84.93	55.23
Lowest Quartile	86.83	39.45
<u>Region (10th Grade)</u>		
Northeast	91.94	74.64
North Central	89.78	69.15
South	89.45	67.94
West	89.70	74.14
<u>Type of School District(10th Grade)</u>		
Urban	90.78	70.81
Suburban	91.26	72.89
Rural/Outside MSA	87.96	68.10
<u>Type of Institution</u>		
Private ^b , 4-year	92.57	79.25
Public, 4-year	88.86	66.45
<u>Enrollment Status</u>		
Full-time	90.35	71.42
Half-time or less	75.13	42.06
<u>Respondent's 10th Grade Aspirations</u>		
Ph.D.	91.58	79.08
Master' Degree	90.92	75.55
Finish College	90.44	70.88
Some College	85.50	51.67
Trade School	82.73	14.08
High School or Less	63.10	39.84

Source: U.S. Department of Education, National Center for Education Statistics, NELS Data 88:2000.

^b NFP = Not for profit.

Table 2. Percentage of Students Who Were Still Enrolled 2 years Later Compared to Percentage of Students Who Attained a Bachelor's Degree or Higher by 2000 continued...

	Still Enrolled 2 years Later	DEGREE
	Percent	Percent
<u>Academic Preparation (by 10th Grade)</u>		
Geometry or higher	91.01	73.80
No Geometry or higher	85.41	49.56
<u>Resourcefulness</u>		
<u>Number of types of help sought (filling out applications, writing essays, etc.)</u>		
0	89.29	70.35
1	88.59	69.69
2	90.49	70.43
3 or more	91.54	72.78
<u>Resourcefulness</u>		
<u>Number of SAT/ACT preparation efforts (taking prep course, studying from a prep book, etc.)</u>		
0	85.88	65.87
1	90.80	68.75
2	93.90	76.61
3 or more	91.93	79.40

Source: U.S. Department of Education, National Center for Education Statistics, NELS Data 88:2000.

Table 3. Persistence and Degree Attainment by Gender and Race

	Still Enrolled 2 years Later		Bachelor's Degree or Higher	
	Male	Female	Male	Female
All	88.57	91.45	67.77	73.37
White	88.81	91.37	71.26	75.90
African-American	86.10	95.09	46.65	61.58
Hispanic	84.59	85.11	56.15	63.90
Asian	98.59	96.59	75.65	84.43
Native American	74.64	83.77	12.46	62.25
Missing Race	86.50	86.34	37.96	50.58
Chi-Square	2,709	3,750	16,664	10,445
Probability	<0.0001	<0.0001	<0.0001	<0.0001

Source: U.S. Department of Education, National Center for Education Statistics, NELS Data 88:2000.

Logistic Regression Models

To test my hypotheses, I will run separate logistic regression models that predict the log odds of 1) persisting in college for two years; and 2) degree attainment within eight years. Logistic regression analysis is used because the dependent variables (persistence and degree completion) are dichotomous as opposed to continuous. My hypotheses will be tested using measures of personal resources: *Respondent's Aspirations, Advanced Math, Help Received During the College Application Process* and *SAT/ACT Preparation Efforts*. The logistic regression models are as follows:

$$\begin{aligned} \text{STILL2YR} = & B_0 + B_1 \text{Female} + B_2 \text{African-American} + B_3 \text{Hispanic} + B_4 \text{Asian} + \\ & B_5 \text{Native American} + B_6 \text{Missing Race} + B_7 \text{SES4} + B_8 \text{SES3} + B_9 \text{SES2} + B_{10} \\ & \text{Divorced} + B_{11} \text{Never Married} + B_{12} \text{Unknown parental marital status} + B_{13} \\ & \text{Number of Siblings} + B_{14} \text{Ability} + B_{15} \text{Northeast} + B_{16} \text{North Central} + B_{17} \text{West} \\ & + B_{18} \text{Suburban} + B_{19} \text{Rural} + B_{20} \text{Private 4 yr} + B_{21} \text{Full time} + B_{22} \text{Student} \\ & \text{aspirations} + B_{23} \text{Advance math} + B_{24} \text{SAT Preparation} + B_{25} \text{Help with} \\ & \text{admissions} \end{aligned}$$

$$\begin{aligned} \text{DEGREE} = & B_0 + B_1 \text{Female} + B_2 \text{African-American} + B_3 \text{Hispanic} + B_4 \text{Asian} + \\ & B_5 \text{Native American} + B_6 \text{Missing Race} + B_7 \text{SES4} + B_8 \text{SES3} + B_9 \text{SES2} + B_{10} \\ & \text{Divorced} + B_{11} \text{Never Married} + B_{12} \text{Unknown parental marital status} + B_{13} \\ & \text{Number of Siblings} + B_{14} \text{Ability} + B_{15} \text{Northeast} + B_{16} \text{North Central} + B_{17} \text{West} \\ & + B_{18} \text{Suburban} + B_{19} \text{Rural} + B_{20} \text{Private 4 yr} + B_{21} \text{Full time} + B_{22} \text{Student} \end{aligned}$$

aspirations + B₂₃ Advanced math + B₂₄ SAT Preparation + B₂₅ Help with admissions

In preliminary analyses, I ran 6 stepwise regression models separately on each dependent variable. First, I ran a basic model examining the relationship between gender, race/ethnicity, and persistence. As expected, the model showed significant differences in persistence by gender and race/ethnicity. Next, I added control variables to the basic model. The nature of race differences changed (i.e. being Hispanic was no longer significant, being African-American had positive effects on persistence) but gender differences remained. Next, I ran 4 more models (each model included all covariates) to test the effect of each “personal resource” variable on persistence. Advanced math taking and SAT/ACT preparation efforts yielded significant results. Even when the “personal resources” variables were jointly considered in the same model, the aforementioned variables continued to yield significant results. The same models were run using degree completion as the dependent variable. The first model yielded significant differences in degree attainment by gender and race/ethnicity. These differences disappeared once I controlled for other important background characteristics. With the exception of HELP, each personal resource variable was significant with regard to degree completion. Because each personal resource variable remained significant in the presence of the other “personal resources” variables and for the sake of clarity, only the final model for each dependent variable is shown (see Tables 4 and 5).

In an effort to gain a better understanding of the relationship between gender and race and ethnicity on educational outcomes, I also tested for gender and race interactions with my 4 resource variables. Among the 8 models that test for these interactions, 3 models yielded significant results: gender x advance math courses; race x SAT preparation; and race x help received during the college admissions process. The results of the interactions are presented in Table 6.

Chapter III.

Results

Tables 4 and 5 present logistic regression coefficients and odds ratios, respectively, for the model. Table 6 presents results from significant interaction models.

Since the purpose of this study is to determine the effects of personal resources on educational attainment, let's first turn to the effects of personal resources as measured by *Respondent's Aspirations, Advanced Math, Help Received During the College Application Process* and *SAT/ACT Preparation Efforts* (see bottom of Tables 4 & 5).

Hypotheses 1, 2, and 3 predict that high aspirations, sufficient academic preparation, and use of social capital will positively influence both measures of educational attainment. While in general, the results support these hypotheses, they are clearly stronger for degree completion than for persistence for the first two years of college. The results demonstrate mixed results for **Hypothesis 1**, which predicts that high aspirations would positively influence persistence as well as degree attainment. High academic aspirations do not significantly increase the likelihood of remaining in college for two years. In fact, the odds ratio of 0.99 indicates that students with high expectations have almost the same likelihood (99%) of remaining in college for two years as students who do not have high educational expectations. Although they do not significantly influence persistence the first two years, the log odds ratio of 1.24 indicates that students with high academic aspirations are 24 percent more likely than students with lower aspirations to earn a Bachelor's degree or higher within eight years ($p < 0.001$).

Results of this analysis support **Hypothesis 2**, which predicts that academic preparation will positively influence both persistence and degree attainment. Compared to students who do not take at least one advanced math course by 10th grade, students who took at least one advanced math course (Geometry or higher) by 10th grade are 39 percent more likely to persist two years later ($p < 0.100$). Furthermore, it significantly increased the likelihood of degree attainment. Students who take Geometry or higher by the 10th grade are 58 percent more likely to earn a degree than students who do not take higher level math courses by the 10th grade ($p < 0.001$).

Results of this analysis provide mixed support for **Hypothesis 3**. Students who make more efforts to prepare for the SAT/ACT are more likely to persist for two years and also to earn a degree. Compared to students who make little or no SAT/ACT preparation efforts, students who make more SAT/ACT preparation efforts are 31 percent more likely to persist two years ($p < 0.010$) and 27 percent more likely to earn a Bachelor's degree or higher ($p < 0.001$). However, receiving help during the college admissions process does not significantly increase the likelihood of persistence or degree attainment. Relative to students who receive little or no assistance, students who receive assistance 1) filling out college applications; 2) completing financial aid forms; 3) writing essays; and/or 4) visiting potential schools do not significantly increase their chances of staying in college for two years or completing a degree.

Table 3 shows differences in persistence and degree attainment by gender and race. To examine some of the possible explanations for these differences, I ran intermediate multivariate regression models. Most bivariate racial and ethnic differences in persistence and degree attainment disappear in the multivariate model. In results not

shown, it appears that racial and ethnic differences in educational outcomes are primarily explained away after controlling for background factors that include SES and academic ability. Personal resources, the focus of this study, do not appear to account for persistent race differences in educational outcomes.

In contrast, strong gender differences in educational attainment remain. Even after controlling for important background characteristics such as socioeconomic status and academic ability, women are still significantly more likely than men to persist in college for 2 years and earn a degree. Net of all other variables in the model, women are 45 percent more likely to persist for two years and 38 percent more likely to complete a degree within eight years of enrolling in college. Both findings are significant at $p < 0.01$.

With regard to race, African-American and Asian students are both significantly more likely than White students to persist in college for two years. In fact, controlling for important background characteristics, African-American students are 87 percent more likely than White students to persist for two years ($p < 0.100$). Asian students are over 3.5 times more likely than White students to persist ($p < 0.05$). Hispanic and “missing race” students showed no significant difference in the likelihood of persisting two years, relative to White students. When examining degree attainment, the advantages for Asian and Black students disappear. Although Hispanic students are still less likely than White students to complete a degree, the results are not significant. Controlling for important background factors, “missing race” students are significantly less likely than White students to complete a degree within eight years ($p < 0.05$).

Among the control variables, the following characteristics increased the likelihood of positive educational outcomes: 1) belonging to the highest or 3rd socioeconomic quartile; 2) higher academic ability; 3) attending a private institution; and 4) enrolling full-time. Compared to students in the lowest socioeconomic quartile, students in the highest socioeconomic quartile are almost twice as likely to remain enrolled two years later (log odds=1.81, $p<0.00$) and more than twice as likely to complete a degree within eight years (log odds=2.02, $p<0.001$). Compared to students in the lowest socioeconomic quartile, students in the 3rd socioeconomic quartile are equally as likely to persist two years later, but more likely to earn a degree within eight years (log odds=1.46, $p<0.100$). Higher academic ability is not associated with persistence after two years. However, there is a positive and significant relationship between higher academic ability and degree attainment ($p < 0.001$).

With regard to enrollment status, students enrolled full-time are much more likely than part-time students to persist in college and complete a degree within eight years. Students who enroll full-time are over 2 ½ times more likely to both persist for two years ($p<0.010$) and also to earn a Bachelor's degree or higher within eight years ($p<0.001$). With regard to type of school, attending a private institution has no significant influence on the probability of persisting for two years. However, compared to students who attend public institutions, students who attend private institutions are 1 ½ times more likely to complete a degree (log odds=1.54, $p<0.001$).

Among the control variables, having many siblings is negatively associated with educational attainment. Students with many siblings are significantly less likely than

students with fewer siblings to remain enrolled in college and complete a degree ($p < 0.050$).

Among the control variables, the following characteristics were found to be insignificant: 1) parental marital status in 1988; 2) region of high school; and 3) urbanicity of high school. We will discuss these findings further in the discussion.

Table 6 presents the results for the 3 models with significant interactions. By testing for the interaction between gender and advanced math courses, I examine the question: *Is the effect of higher-level math courses on educational attainment the same for male and female students?* The results from model 1 demonstrate that the effects of higher-level math courses on persistence are not significantly different for females compared to males, though they are significant for degree attainment. The results indicate that, for women, the advantage of taking advanced math courses show up further in the educational process. Historically, female students have been discouraged from taking advanced mathematics courses and socialized to aspire to “gender specific” fields such as education and nursing (Wilson and Boldizar 1990). With regard to mathematics achievement, this socialization process has resulted in a cumulative disadvantage for females relative to males. Consequently, taking advanced math courses mitigates the effects of otherwise less mathematically prepared female students.

In an effort to determine if my measures of “personal resources” mediate the effects of race and ethnicity on educational outcomes, I also tested for the interaction between race/ethnicity and my resource variables. By testing this interaction, I examine the question: *Do these resources have different effects for students of different races?*

Among the 4 models⁸ that tested for a race interaction, 2 models (race x SAT/ACT preparation; and race x HELP) yielded significant results. Examining persistence in **model 2** of table 6 shows that the returns to SAT/ACT preparation efforts are significantly smaller for Hispanic students, relative to White students. Also, SAT/ACT preparation efforts provide a significantly smaller effect on college completion for Black students, relative to White students ($p < 0.100$). With regard to help received during the college admissions process, model 3 of table 6 illustrates significantly smaller returns on persistence for African-American and Hispanic students, relative to White students. Model 3 also shows a significantly smaller effect on college completion for Asian students, relative to White students.

⁸ Models run: 1) African-American*aspirations, Hispanic*aspirations, Asian*aspirations; 2) African-American *advanced math, Hispanic*advanced math, Asian*advanced math; 3) African-American *SAT/ACT prep, Hispanic*SAT/ACT prep, Asian*SAT/ACT prep; and 4) African-American *amount of help received, Hispanic*amount of help received, Asian*amount of help received. Models include control variables.

Table 4. Parameter Estimates for Full Logistic Regression Model Predicting Persistence and Degree Attainment

	STILL2YR	DEGREE
Intercept	-0.3198	-4.8396
Gender		
Female	0.3806 **	0.3212 **
Race and Ethnicity		
African-American	0.6135 †	-0.2742
Hispanic	-0.1707	-0.3413
Asian	1.3455 *	0.1511
Native American	-0.6071	-0.8032
Missing Race	-0.1657	-1.2248 *
Socioeconomic Status		
Highest Quartile	0.5929 *	0.7048 ***
3 rd Quartile	0.0205	0.3794 †
2 nd Quartile	-0.1853	-0.0075
Parental Marital Status in 1988		
Divorced	-0.3095	-0.2561
Never Married	-0.7741	-0.1542
Unknown Marital Status	-0.2011	-0.4147
Family Structure		
Number of Siblings	-0.1141 *	-0.0772 *
Ability		
Academic Ability	0.0138	0.0342 ***
Region of High School		
Northeast	0.2088	0.2102
North Central	0.1680	0.0269
West	-0.0166	0.2071
Urbanicity of High School		
Suburban	0.0436	-0.0413
Rural	-0.1177	-0.0373
Enrollment Status		
Full-time Enrollment Status	0.9316 **	1.0237 ***
Type of Institution		
Private, 4-Year Institution	0.2367	0.4292 ***
Measures of Personal Resources		
Student Aspirations	-0.0119	0.2114 ***
Advanced Math Courses	0.3287 †	0.4543 **
Amt. of SAT/ACT preparation efforts	0.2619 **	0.2390 ***
Amt. of help rec'd. for college admissions	0.0528	0.0302
Sample Size	3,769	3,747

Source: U.S. Department of Education, National Center for Education Statistics, NELS Data 88:2000.

Note: † .05 ≤ p < .10 * .01 ≤ p < .05 ** .001 ≤ p < .01 *** p < .001

Reference groups: Male, White, Lowest SES Quartile, Married, South, Urban, Part-time, Public School

Table 5. Log Odds Ratio for Full Logistic Regression Model Predicting Persistence and Degree Attainment

	STILL2YR		DEGREE	
Gender				
Female	1.46	**	1.38	**
Race and Ethnicity				
African-American	1.85	†	0.76	
Hispanic	0.84		0.71	
Asian	3.84	*	1.16	
Native American	0.54		0.45	
Missing Race	0.85		0.29	*
Socioeconomic Status				
Highest Quartile	1.81	*	2.02	***
3 rd Quartile	1.02		1.46	†
2 nd Quartile	0.83		0.99	
Parental Marital Status in 1988				
Divorced	0.73		0.77	
Never Married	0.46		0.86	
Unknown Marital Status	0.82		0.66	
Family Structure				
Number of Siblings	0.89	*	0.93	*
Ability				
Academic Ability	1.01		1.03	***
Region of High School				
Northeast	1.23		1.23	
North Central	1.18		1.03	
West	0.98		1.23	
Urbanicity of High School				
Suburban	1.04		0.96	
Rural	0.89		0.96	
Enrollment Status				
Full-time Enrollment Status	2.54	**	2.78	***
Type of Institution				
Private, 4-Year Institution	1.27		1.54	***
Measures of Personal Resources				
Student Aspirations	0.99		1.24	***
Advanced Math Courses	1.39	†	1.58	**
Amt. of SAT/ACT Preparation Efforts	1.30	**	1.27	***
Amt. of help rec'd. for college admissions	1.05		1.03	
Sample Size	3,769		3,749	

Source: U.S. Department of Education, National Center for Education Statistics, NELS Data 88:2000.

Note: † .05 ≤ p < .10 * .01 ≤ p < .05 ** .001 ≤ p < .01 ***p < .001

Reference groups: Male, White, Lowest SES Quartile, Married, South, Urban, Part-time, Public School

Table 6. Coefficients from Logistic Regression Models Predicting Persistence and Degree Attainment – Interaction between Gender and Personal Resources, and Race and Personal Resources

	Model 1 Gender*Advanced Math Interaction		Model 2 Race*SAT/ACT Preparation Interaction		Model 3 Race*Help Interaction	
	STILL2YR	DEGREE	STILL2YR	DEGREE	STILL2YR	DEGREE
GENDER*ADVMATH						
Female	0.0902	-0.1908	--	--	--	--
Advanced Math Courses	0.1184	0.1140	--	--	--	--
Female*Advanced Math Courses	0.3429	0.5988 **	--	--	--	--
RACE*SATPREP						
African-American	--	--	0.5059	0.3436	--	--
Hispanic	--	--	0.8606*	-0.0446	--	--
Asian	--	--	2.2045*	0.3571	--	--
SAT Preparation	--	--	0.3592***	0.3098***	--	--
AA* SAT Preparation	--	--	0.1020	-0.4027**	--	--
Hispanic* SAT Preparation	--	--	-0.7855***	-0.2365	--	--
Asian* SAT Preparation	--	--	-0.6417	-0.1591	--	--
RACE*HELP						
African-American	--	--	--	--	1.9762**	-0.1758
Hispanic	--	--	--	--	1.0257*	-0.1022
Asian	--	--	--	--	0.6919	1.0657
Help	--	--	--	--	0.1202*	0.0578
AA* Help	--	--	--	--	-0.6112*	-0.0538
Hispanic* Help	--	--	--	--	-0.5614**	-0.1280
Asian* Help	--	--	--	--	0.4505	-0.4691*
Sample Size	3,769	3,749	3,769	3,749	3,769	3,749

Source: U.S. Department of Education, National Center for Education Statistics, NELS Data 88:2000.

Note: Models for table 6 run using SAS 8.02. The results of this analysis control for the effects of all other variables in tables 4 and 5.

† .05 <= p < .10 * .01 <= p < .05 ** .001 <= p < .01 *** p < .001

Discussion

The discussion will begin with a review of the sample's characteristics as well as findings from cross-tabulations and the logistic regression models. Explanations are offered for some of the findings in this study. The discussion concludes with a dialogue on policy implications based on these findings and suggestions for future research.

Table 1 shows that the sample of students who enrolled in college immediately after high school have many background characteristics conducive to positive educational outcomes. More than 75 percent of the students in the sample are from the top two socioeconomic quartiles; 82 percent had parents who were married (as of the 1988 interview); and over 50 percent scored in the top quartile for academic ability. Considering these strong background characteristics, one would expect similar levels of educational achievement among sample members. However, table 2 shows differences in both persistence and degree completion for some groups of students. Therefore, large variations in educational outcomes between subgroups are of particular interest and warrant further investigation. But first, we will revisit determinants of educational attainment for all groups.

The results from this study indicate that some background characteristics do not significantly influence persistence after two years of college, but are significant with regard to degree completion. These factors include: 1) higher academic ability; 2) attending a private institution; and 3) having high educational aspirations. Belonging to the 3rd socioeconomic quartile is marginally significant.

Generally, college coursework increases in difficulty from one year to the next. Therefore, students with higher levels of academic ability may be better prepared to deal

with the demands of increasingly difficult coursework and thus, are able to complete college at higher rates than students with less academic ability. In addition, the advantage of attending private school is not surprising, given that students who attend private school usually come from higher-income families and have stronger academic credentials. Alternatively, private schools may provide more support to students (i.e. smaller classes, academic counseling, faculty guidance, academically stimulating environment, positive peer support, etc.) than public schools (Light and Strayer 2000). These additional resources may provide students with the tools they need to graduate from college. Lastly, high educational aspirations significantly increase the chances of completing a Bachelor's degree or higher within eight years. There is general consensus in the literature concerning the high correlation between educational aspirations and educational attainment (Teachman and Paasch 1998; Jere Cohen 1987; Horn 1997; Velez 1985). Students with high educational aspirations probably possess other positive traits (or have other positive influences) such as high self-esteem, a positive experience with school (i.e., good grades, teacher approval, etc.), and/or parents who have established high educational expectations.

The results of this analysis also identify background characteristics positively associated with both persistence and degree completion. These factors include: 1) being female; 2) belonging to the highest socioeconomic quartile; 3) attending college full-time; 4) taking at least one advanced math course by 10th grade; and 5) making an effort to prepare for a college entrance exam. Sibship size is the only background characteristic negatively associated with both persistence and degree attainment ($p < 0.050$). The increased likelihood of persistence and degree attainment for women relative to men and

high SES students relative to low SES students have been well documented (American Council on Education 2002; Horn and Nunez 2000; National Center for Education Statistics 2001; U.S. Bureau of the Census 2002). The results of this analysis support these findings.

Likewise, the results of this study corroborate recent findings that full-time enrollment increases the probability of both persistence and degree completion (American Council on Education 2002; Susan Choy 2002). Presumably, full-time students are less distracted from schoolwork and have fewer non-academic time commitments compared to part-time students. Therefore, students who attend college full-time should have a better chance at social and academic integration than their part-time peers.

My results support past empirical research that finds a positive relationship between taking advanced math classes and positive educational outcomes (American Council on Education 2002; Horn and Nunez 2000; Pelavin and Kane 1990). Compared to students who do not take advanced math courses by 10th grade, students who take at least one advanced math course by 10th grade are 39 percent more likely to persist and 58 percent more likely to earn a degree within eight years. One possible explanation is that the analytic skills acquired in advanced mathematics courses prepare students for the demands of increasingly difficult college coursework. Alternatively, taking advanced math courses may also be a function of other unmeasured external characteristics such as school quality.

The last characteristic positively associated with both persistence and degree completion is SAT/ACT preparation efforts. The number of resources used to prepare for

the college entrance exam serves as a proxy for social capital and is used to test Coleman's (1988) belief that social capital is used in the creation of human capital⁹. The results of this analysis are consistent with other research findings (Coleman 1988; Coleman and Hoffer 1987; DiMaggio 1982; DiMaggio and Mohr 1985; Kalmijn and Kraaykamp 1996) -- there is a positive relationship between social capital and educational attainment. Students who are able to prepare for the SAT/ACT by using multiple methods (i.e., taking a special course in high school, taking a course offered by a commercial test preparation service, receiving private one-on-one tutoring, studying from test preparation books, using a test preparation video tape, and/or using a test preparation computer program) are 30 percent more likely to persist for two years and 27 percent more likely to earn a degree within eight years. This is not surprising, considering that students who make an effort to prepare for the SAT/ACT may also have other characteristics positively associated with high educational outcomes, such as high educational aspirations, higher levels of academic ability, and/or good study habits. They may also have parents or teachers encouraging them to prepare for the exam. On the other hand, my additional measure of social capital -- receiving help to apply for college - - does not find evidence to support this theory. There is no statistically significant difference in educational outcomes between students who receive help during the college application process and students who receive little or no help. Possibly, SAT/ACT preparation efforts may be a better measure of social capital than the amount of help received during the college admissions process. Students who seek help filling out

⁹ It is important to note that Portes (1998) distinguishes between the resources themselves and the ability to obtain them via membership in different social structures. SAT/ACT preparation efforts are intended to measure the effects of sample members' ability to utilize resources during the college admissions process.

college applications or assistance with writing essays may have other characteristics that are associated with poorer educational outcomes. These students may be behind academically or they may be less well organized.

As discussed earlier, past empirical research has consistently demonstrated a significant, negative relationship between the number of siblings and educational attainment (Coleman and Hoffer 1987; Downey 1995; Heer 1985; Hoffer 1986; Steelman and Powell 1991). The results of this study confirm the expected negative relationship between sibship size and educational outcomes. Even after controlling for important background factors, students with many siblings are less likely to persist and earn a degree than students with fewer or no siblings. This is most likely due to parents' diminished ability to provide sufficient financial resources for college when the resources must be shared among siblings.

Previous research has consistently found a significant relationship between parental marital status and educational outcomes (Astone and McLanahan 1991; Downey 1995). Contrary to these findings, this study finds parental marital status (in 1988) to be insignificant. However, this study only measures parental marital status during the 1988 interview. Therefore, subsequent interruptions to parental marital status as well as the proximity of the interruption to students' college experience are not captured. The impact of change in parental marital status on educational outcomes may be more effectively measured closer to the student's college experience.

Past research has also found urban and regional variations in educational attainment. Table 2 shows similar persistence rates for all regions, but higher degree completion rates for students from the Northeast and West. However, in table 4,

differences in degree completion disappear when other important characteristics are taken into consideration. With regard to urbanicity, table 2 shows only small differences in educational outcomes. Furthermore, the differences are less pronounced between urban and rural areas and more pronounced between rural areas and urban/suburban areas. Nonetheless, these small differences in educational outcomes are not statistically significant.

Review of Theories

Bean's *Attrition* model and Tinto's *Integration* model both attempt to explain persistence by focusing on influences *during* the college experience. However, this study's focus emphasizes *pre-collegiate* factors that influence persistence. Because this study is shaped by a broader literature and is not meant to be directly comparable to Bean or Tinto's paradigm, the findings of this study should serve to complement the 2 models. In other words, the positive and significant effects of advanced math-taking, aspirations, and SAT/ACT preparation efforts on educational outcomes lend support to the idea that *pre-collegiate factors* also influence persistence and degree attainment.

Review of Hypotheses

Results from tables 4 and 5 do not support the hypothesis that high educational aspirations will significantly increase the likelihood of remaining in college for two years, but aspirations are highly related to degree completion. The lack of significance between aspirations and 2-year persistence may indicate that a broader cross-section of students tend to stay in college for the first two years, but only the highly motivated complete college.

Results of this analysis provide stronger support for **Hypothesis 2**, which predicts that academic preparation will positively influence both persistence and degree attainment. These findings are consistent with other research, (American Council on Education 2002; Pelavin and Kane 1990) which found that students who take higher-level math courses are significantly more likely to persist and complete a degree compared to students who do not take higher-level math courses. One possible explanation is that students who take challenging math courses are doing so to prepare themselves academically for college. Therefore, taking advanced math courses may provide students with important analytic skills that are helpful in meeting the academic demands of college. Taking advanced math classes may also reflect the quality of the school curriculum. If secondary schools seek to prepare their students for college, they should continue to offer higher-level math courses and advise their students to take these classes throughout high school.

This study finds mixed results concerning **Hypothesis 3**. The results support the hypothesis that students who make more SAT/ACT preparation efforts increase their chances of both persisting for two years and earning a degree, relative to students who make little or no preparation efforts. On the other hand, receiving help with the college admissions process during high school does not significantly increase the likelihood of persistence or degree attainment. Obtaining the appropriate resources to prepare for the SAT or ACT may be a better measure of social capital than obtaining help with the college admissions process. Receiving extensive help writing essays or filling out forms may be a better indicator of weakness rather than strength. Possibly, students who receive assistance completing applications and writing essays may be weak academically

or less organized than their peers who do not seek as much assistance with the college admissions process.

Examining racial/ethnic and gender differences

Considering the sample's strong background characteristics, which favor positive educational outcomes, one would expect similar levels of educational achievement among sample members. However, the results in tables 2 and 3 clearly show differences in both persistence and degree attainment by gender as well as race and ethnicity.

Among most racial and ethnic groups, women exhibited a significant educational advantage compared to men. This trend is consistent with recent statistics that show higher enrollment and graduation rates for women relative to men (NCES 2000). This trend is in contrast to the gender differences in attainment seen in earlier years. Since 1970, an increasing proportion of the undergraduate population has been female. In 1970, 42 percent of all undergraduates were women, compared to 56 percent in 1996 (NCES 2000). Despite the higher baccalaureate degree completion rates for women relative to men, gender inequality remains an important issue in higher education.

Women continue to be disproportionately represented in fields of study that require few mathematic skills and yield lower economic returns such as education, nursing, English, fine arts, and history (Jacobs 1996). Men continue to dominate mathematics-intensive fields that yield higher economic rewards including science, mathematics, and engineering (Wilson and Boldizar 1990). Furthermore, 30% of women would have to change their major to have the same distribution of majors as men (Jacobs 1996).

Therefore, increasing women's participation in higher education is a necessary but not sufficient condition to achieve gender equality in society. More attention must be paid to

the socialization process that leads women to pursue less technical, lower-income fields of study.

Another interesting finding in this study deals with the contrast between group persistence rates vs. degree attainment rates. Although the 2-year persistence rate for most minority students is high, it does not seem to be a good indicator of college completion. For example, despite the fact that Black female students have persistence rates higher than all other racial/ethnic groups except Asians, their degree attainment rate of 62 percent is among the lowest of all groups (see Table 3). Likewise, Black males demonstrate persistence rates similar to White males; however, their 47 percent degree attainment rate, compared to 68 percent for all males and 71 percent for White males, is extraordinarily low. Hispanic students have lower persistence rates than African-American students; nonetheless, Hispanic students have higher degree attainment rates.

This study duplicates previous research findings -- African-American students with similar background characteristics as White students, are more likely to remain enrolled in college for two years (Bauman 1996; Light and Strayer 2000; Rivkin 1995; Teachman 1987; Velez 1985). Asian students are also more likely than White students to remain enrolled in college for two years. However, with the exception of “missing race” students, there are no significant racial or ethnic differences in the odds of degree attainment after controlling for other important background characteristics. However, the results also show that, even after controlling for important background characteristics, gender is still a significant predictor of both persistence and degree attainment.

Generally, African-American and Hispanic students tend to come from less privileged backgrounds that include lower levels of family income and parental

education, lower quality schools and fewer overall economic and social resources. These environmental characteristics influence motivation and academic preparation, which in turn, impact educational outcomes. Considering the fact that minority students often have fewer economic and social resources, I ask the question: ***Do these resources have different effects for students of different races?*** The results show that SAT/ACT preparation and seeking help with the college admissions process yield significantly different results for some racial/ethnic groups.

For Hispanic students, efforts to prepare for the SAT/ACT have a significantly smaller effect on the likelihood of persisting in college for two years, compared to other students. For African-American students, preparation efforts have a significantly smaller effect on degree attainment, compared to other students. Given that a disproportionate percentage of minority students come from lower quality schools, perhaps the quality of SAT/ACT preparation is an issue. Perhaps minority students rely on relatively inexpensive test preparation resources such as books, while other students may have the benefit of classroom preparation and/or a private tutor. On the other hand, the qualitative nature of SAT/ACT preparation efforts may have little to do with the smaller returns to educational outcomes for minority students. Although SAT/ACT preparation efforts potentially benefit all students, the smaller returns to African-American and Hispanic students point to other unmeasured processes. Previous research has found that SAT scores tend to overpredict African-American students' academic performance (Nettles et. al. 1986). Furthermore, findings in the literature discuss negative expectations of African-American students relative to White students (Epps 1995). Claude Steele's (1997) work on stereotype threat attributes poorer minority performance on tests (relative

to White students) to a perceived affront to one's intellectual capacity via group membership. He argues that this self-conscious distraction serves as a self-fulfilling prophecy. In addition to the distraction of "stereotype threat", Nettles et. al.'s finding that African-American students are more likely to 1) have "interfering" problems and 2) feel that their school is discriminatory, alludes to unmeasured processes affecting educational outcomes that should be examined further in future research.

In addition to preparing for the college entrance exam, receiving help with the admission process yields significantly different results for students of different races/ethnicities. Among White students, receiving help with the admissions process yields no significant advantage or disadvantage with regard to persistence. Among African-American and Hispanic students, receiving help with the admissions process significantly decreases their odds of persistence. For Asian students, receiving help significantly decreases their odds of degree attainment. Originally, I viewed assistance with the college admissions process as a beneficial use of social capital that benefits all students. However, the results seem to indicate that seeking help, or at least multiple forms of help, is a weakness for minorities. Students who receive a great deal of help with the college admissions process may have other characteristics that negatively influence educational attainment.

Conclusion

The sample of students in this study exhibited behaviors consistent with a desire to complete college. They completed high school on time and enrolled in a 4-year college or University immediately after graduation. Therefore, by design, this study

controls for unmeasured characteristics that affect a student's ability and decision to go to college and allows for a conservative test of my hypotheses.

One of the most interesting findings of this study is that large gender and racial/ethnic differences in degree completion exist, despite the conservative nature of the sample. One would expect smaller differences in educational outcomes for a sample of students that are on a timely path to degree completion. Further, some of my measures of personal resources have significantly different effects on different groups of students. Advanced math courses help women significantly more than men, while SAT/ACT preparation efforts and receiving help with college admissions hurt African-American and Hispanic students. It is important to note that minority students cannot equally increase their chances of persistence or degree completion by preparing for SAT/ACT. This finding challenges critics who claim that racial differences in educational attainment are due primarily to [lack of] individual effort.

Another issue worth addressing is the disconnect between African-American and Hispanic students' modest persistence rates but extraordinarily low degree completion rates. Because 2-year persistence rates do not seem to be a good indicator of college completion, I must revisit the issue of factors that influence persistence *during* college. *What happens after the second year of college that facilitates dropping out of school? Are minority students finding it difficult to finance their remaining time in college, or is there a lack of fit between minority students and the institution?*

Although school administrators and admissions counselors cannot control student background characteristics such as family structure and home environment, the results of this analysis suggests that there are other areas in students' lives that are susceptible to

positive influence. Encouraging and preparing all students to take advanced math courses in high school will significantly increase their chances of both persistence and graduation. Policy interventions that enhance these resources will go a long way in increasing positive educational outcomes for all students. Future research should also examine more explicitly structural characteristics of postsecondary institutions and their affects on different groups of students. Policymakers and administrators should focus on retention efforts that will positively impact educational attainment for all students, especially those least likely to graduate from college.

Appendix A. Parameter Estimates and (Standard Errors) of Logistic Regression

Dependent Variable: STILL2YR

	Model 1 Race & Gender			Model 2 Explanatory Variables			Model 3 Full Model	
Intercept	2.0835	(0.1058)		-0.1024	(0.6995)		-0.4510	(0.8364)
FEMALE	0.3433 **	(0.1314)		0.4072 **	(0.1386)		0.3726 **	(0.1411)
AA	0.2015	(0.3061)		0.7521 *	(0.3443)		0.6269 +	(0.3491)
HISPANIC	-0.5043 *	(0.2528)		-0.1212	(0.3147)		-0.1632	(0.3186)
ASIAN	1.3355 *	(0.5231)		1.4474 *	(0.5856)		1.3471 *	(0.5825)
NATIVE	-1.1614	(0.7618)		-0.6795	(0.8473)		-0.5976	(0.8735)
MISSRACE	-0.3660	(0.5039)		-0.2783	(0.5399)		-0.3119	(0.5364)
SES4	–	–	–	0.6498 *	(0.2860)		0.5860 *	(0.2887)
SES3	–	–	–	0.0627	(0.2520)		0.0304	(0.2584)
SES2	–	–	–	-0.1380	(0.2586)		-0.1600	(0.2607)
DIVORCED	–	–	–	-0.3021	(0.2080)		-0.3042	(0.2109)
NEVER	–	–	–	-0.8019	(0.9154)		-0.7685	(0.9128)
UNKPARMA	–	–	–	-0.2187	(0.3459)		-0.2090	(0.3575)
SIBS	–	–	–	-0.1089 *	(0.0475)		-0.1141 *	(0.0477)
ABILITY	–	–	–	0.0171 +	(0.0100)		0.0146	(0.0108)
NORTHEAS	–	–	–	0.2492	(0.2187)		0.2452	(0.2208)
NORTHCEN	–	–	–	0.1222	(0.2099)		0.1766	(0.2108)
WEST	–	–	–	-0.0258	(0.2272)		-0.0006	(0.2322)
SUBURBAN	–	–	–	0.0433	(0.2081)		0.0583	(0.2076)
RURAL	–	–	–	-0.1267	(0.2076)		-0.1164	(0.2032)
PRIV4YR	–	–	–	0.2674	(0.1732)		0.2280	(0.1740)
PSEFIRST	–	–	–	1.0068 **	(0.3124)		0.9782 **	(0.3114)
RASPIRE	–	–	–	–	–	–	-0.0091	(0.0709)
ADVMATH	–	–	–	–	–	–	0.3299 +	(0.1929)
SATPREP	–	–	–	–	–	–	0.2702 ***	(0.0879)
HELP	–	–	–	–	–	–	0.0451	(0.0572)
Sample Size	3,747			3,747			3,747	

Source: U.S. Department of Education, National Center for Education Statistics, NELS Data 88:2000.

Note: + .05 <= p < .10 * .01 <= p < .05 ** .001 <= p < .01 *** p < .001

Appendix A. continued...

Dependent Variable: DEGREE

	Model 1 Race & Gender			Model 2 Explanatory Variables			Model 3 Full Model		
	Parameter Est.	Sig.	Std. Error	Parameter Estimate	Sig.	Std. Error	Parameter Est.	Sig.	Std. Error
Intercept	0.8852		(0.0742)	-3.4164		(0.4904)	-4.8396		(0.5977)
FEMALE	0.3210 ***		(0.0950)	0.3888 ***		(0.1014)	0.3212 **		(0.1032)
AA	-0.8272 ***		(0.2408)	-0.1506		(0.2458)	-0.2742		(0.2559)
HISPANIC	-0.6087 ***		(0.1835)	-0.1806		(0.2224)	-0.3413		(0.2207)
ASIAN	0.2887		(0.4206)	0.2820		(0.3758)	0.1511		(0.3359)
NATIVE	-1.2434		(0.9456)	-0.9707		(0.8305)	-0.8032		(0.9357)
MISSRACE	-1.1910 **		(0.4288)	-1.2047 *		(0.5673)	-1.2248 *		(0.5257)
SES4	—			0.8998 ***		(0.2036)	0.7048 ***		(0.1931)
SES3	—			0.4972 *		(0.2097)	0.3794 +		(0.1986)
SES2	—			0.0681		(0.1987)	-0.0075		(0.1816)
DIVORCED	—			-0.2247		(0.1582)	-0.2561		(0.1593)
NEVER	—			-0.0882		(0.5400)	-0.1542		(0.5707)
UNKPARMA	—			-0.4255		(0.3053)	-0.4147		(0.2914)
SIBS	—			-0.0819 *		(0.0362)	-0.0772 *		(0.0356)
ABILITY	—			0.0463 ***		(0.0070)	0.0342 ***		(0.0075)
NORTHEAS	—			0.1824		(0.1530)	0.2102		(0.1480)
NORTHCEN	—			-0.0745		(0.1371)	0.0269		(0.1414)
WEST	—			0.1446		(0.1713)	0.2071		(0.1693)
SUBURBAN	—			-0.0498		(0.1438)	-0.0413		(0.1422)
RURAL	—			-0.0435		(0.1518)	-0.0373		(0.1515)
PRIV4YR	—			0.4682 ***		(0.1224)	0.4292 ***		(0.1237)
PSEFIRST	—			1.0503 ***		(0.2664)	1.0237 ***		(0.2605)
RASPIRE	—			—			0.2114 ***		(0.0565)
ADVMATH	—			—			0.4543 **		(0.1497)
SATPREP	—			—			0.2390 ***		(0.0496)
HELP	—			—			0.0302		(0.0482)
n=	3,749			3,749			3,749		

Source: U.S. Department of Education, National Center for Education Statistics, NELS Data 88:2000.

Note:

+ .05 <= p < .10 * .01 <= p < .05 ** .001 <= p < .01 *** p < .001

Appendix B. Description of Variables Used in Analysis

BYPARMAR	BYPARMAR characterizes the parent's marital status. It was taken directly from BYP7. The values for BYPARMAR are: Divorced, Widowed Separated, Never married, Not married but living in a marriage-like relationship, Married.
BYS32	Number of siblings respondent had in 1988. Question: How many brothers and sisters do you have? Please include any stepbrothers and/or stepsisters if they live or have lived in your home. (none, one, two, three, four, five, six or more)
ENRL0194 – ENRL0594	These variables contain the month-by-month enrollment status of the respondent. Enrollment status is defined here as a concatenation of the full/part-time status with the type of institution attended. These variables were used to calculate the population of students “still enrolled”. These students reported being enrolled in a postsecondary institution at least one month between January 1994 and May 1994. (ENRL0194, ENRL0294, ENRL0394, ENRL0494, ENRL0594)
ENRL0692 – ENRL1292	These variables contain the month-by-month enrollment status of the respondent. Enrollment status is defined here as a concatenation of the full/part-time status with the type of institution attended. These variables were used to calculate the population of students who reported being enrolled in a postsecondary institution at least one month between June 1992 and December 1992. (ENRL0692, ENRL0792, ENRL0892, ENRL0992, ENRL1092, ENRL1192, ENRL1292)
F12XCOMP	Standardized Test Composite (Reading, Math) 10 th Grade.
F1S22D- F1S22H	From the beginning of ninth grade to the end of this school year, how much coursework will you have taken in each of the following subjects?” Count only courses that meet at least three times (or three periods) a week for at least one half year. Also include summer school classes taken in 1988 or 1989 that counted for one half year or more.
F1S22D	Geometry
F1S22E	Algebra II
F1S22F	Trigonometry
F1S22G	Pre-Calculus
F1S22H	Calculus

F1S49	Respondent's 10 th Grade Aspirations Categories: 1 = Less than H.S. graduate, 2 = H.S graduate only, 3 = less than two years Trade School, 4 = 2 or more years trade school, 5 = less than two years of college, 6 = 2 or more yrs of college, 7 = finish college, 8 = Master's Degree, 9 = Ph.D., M.D.
F1SESQ	Ordinal measure of parent's socioeconomic status. F1SESQ is the quartile into which F1SES falls. It was constructed by recoding F1SES into quartiles based on the weighted, F1QWT, marginal distribution.
F2S45A - F2S45F	Captures respondents' efforts to prepare for the SAT and/or ACT by asking: To prepare for the SAT and/or ACT, did you do any of the following? 1 = Yes, 2 = No.
F2S45A	Take a special course at your high school
F2S45B	Take a course offered by a commercial test prep service
F2S45C	Receive private one-to-one tutoring
F2S45D	Study from test preparation books
F2S45E	Use a test preparation video tape
F2S45F	Use a test preparation computer program
F2S57A- F2S57D	Respondents were asked, "At your high school, have you received...." 1 = Yes, 2 = No.
F2S57A	Help with filling out voc/tech school or college applications?
F2S57B	Help with filling out financial aid forms?
F2S57C	Assistance in writing essays for voc/tech school or college applications?
F2S57D	Days off from school to visit vocational/technical schools or colleges?
F3SEQ	Identifies whether the sample member graduated from high school in sequence. If this information was collected in 1994, it was used. Otherwise, 1992 data were used. 1 = Graduated with class of 1992
F4HHDG	Respondent's highest PSE degree attained as of 2000. Some PSE, no degree attained, certificate/license, Associate's degree, Bachelor's degree, Master's degree/equivalent, Ph.D. or a professional degree
F4PNLFL	This panel flag identifies respondents who participated in all five NELS:88 data collection points: 1988 (BY), 1990 (F1), 1992 (F2),

1994 (F3), and 2000 (F4). Members of this panel responded to all five NELS:88 waves in

F4PNLWT	This is the fourth follow-up complete panel weight, for respondents at all five NELS:88 data collection points. The weight applies to fourth follow-up respondents who were also respondents in each of the previous rounds (i.e., 1988, 1990, 1992, 1994). It is used to estimate longitudinal parameters that describe the population of spring 1988 8th-graders.
F4RACE2	This composite variable captures respondents' self-reported race. Categories: race -White, Black or African-American, American Indian or Alaska Native, Asian, or Native Hawaiian or other Pacific Islander. Ethnicity - Are you Hispanic or Latino? Are you of Spanish origin? 1 = Yes, 2 = No. This item reflects new federal standards for collecting race and ethnicity data. If a respondent indicated that he/she was of Hispanic Origin, their value on this variable was coded as 5 (Hispanic or Latino). If they responded that they were not of Hispanic origin, their self-reported race was taken as their primary choice of race/ethnicity.
F4SEX	Derived from F2SEX. 1 = Male, 2 = Female. This variable is based on F2SEX and augmented by second follow-up New Student Supplement Information. If the information was still missing, it was imputed from student first names.
G10REGON	G10REGON indicates in which of the four U.S. Census regions the first follow-up school is located. It was created by recoding the state of the tenth grade school into the four Census Bureau regions: Northeast – New England and Middle Atlantic states North Central – East North Central and West North Central states South – South Atlantic, East South Central and West South Central states West – Mountain and Pacific states.
G10URBAN	Trichotomizes the urbanicity of the area in which the sample member's first follow-up school is located. This metropolitan status is defined by QED for public school districts, for Catholic dioceses, or in some cases for the county in which the school is located. QED bases the classifications on the Federal Information Processing Standards as used by the U.S. Census.
PSEFIRST	Contains the enrollment status from the valid postsecondary institution with the earliest enrollment date. Categories: full-time, at least half, less than full time, less than half

PSEFIRTY time.
Contains the type of postsecondary institution (recoded from IPEDS 93/94) with the earliest enrollment date. Categories: Private for profit, Private not for profit < 4-year, Public < 2-year, Public 2-year, Private not for profit 4-year, Public 4 year.

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