LIFE HAPPENS:

HOW NON-COLLEGE LIFE-EVENTS INFLUENCE RACIAL INEQUALITY IN FOUR-YEAR GRADUATION RATES AT SELECTIVE COLLEGES AND UNIVERSITIES

A Dissertation in
Higher Education
by
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Abstract

Racial inequality is a persistent reality in the United States. Racial gaps appear at nearly every stage of the educational pipeline, from pre-school attendance to graduate degree completion (Advisory Committee on Student Financial Assistance, 2002; Cabrera & La Nasa, 2000). Among those students who attend college, sizable racial gaps appear in nearly every measure of student success in college. Black and Hispanic students tend to receive lower grades (GPAs) (Hu & St. John, 2001; Kuh, Kinzie, Cruce, Shoup, & Gonyea, 2007), drop out more frequently (St. John, Hu, & Weber, 2001), and graduate at lower rates (Astin & Oseguera, 2005; Snyder, Dillow, & Hoffman, 2008) than do their White and Asian counterparts.

To develop effective policies and programs aimed at reducing these racial gaps, policymakers and educators must have an understanding of their underlying causes. By addressing the following two questions, this dissertation explores two factors that may currently be contributing to racial inequality in American higher education:

1) Do racial inequalities in four-year graduation rates at competitive-entry colleges and universities remain after accounting for a wide range of race-specific pre-college influences?

2) If so, are such inequalities related to the frequency or effect of certain non-college-life-events that occur while students are attending college?

Using data from 2,590 students who participated in the National Longitudinal Survey of Freshmen, a six-year study of students at selective colleges and universities, this dissertation employs hierarchical generalized linear models to identify the race-conditional effects of students’ pre-college characteristics and non-college life-events on students’ likelihood of graduation within four years. Results suggest two overall conclusions.
1. Racial inequalities in four-year graduation rates at these colleges and universities remain, even amid comprehensive statistical controls for: institutional variation in overall graduation rates; individual variation in students’ demographic, academic, psychological, sociocultural, and financial backgrounds; and race-specific variation in the relative importance of students’ pre-college characteristics.

2. Racial inequalities in four-year graduation rates at selective colleges and universities cannot be explained by racial differences in the frequency or effect of students’ non-college life-events, despite the clearly detrimental effect of certain non-college life-events and significant racial differences in the frequency with which students encounter such events.
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CHAPTER 1: INTRODUCTION

The Problem: Persistent Racial Inequality in American Higher Education

Racial inequality is a persistent reality in the United States. Racial gaps appear at nearly every stage of the educational pipeline, from pre-school attendance to graduate degree completion (Advisory Committee on Student Financial Assistance, 2002; Cabrera & La Nasa, 2000). Evidence also shows that, while students of all races are attending college at higher rates than ever before, racial gaps in college attendance have remained for more than 30 years (Planty, et al., 2008; Snyder, et al., 2008). From 1972 to 2006, the gap in college attendance between Black and White students has increased about 5 percentage points, while the gap between Hispanic and White students has increased approximately 15 percentage points (Baker & Velez, 1996; Ingels, Planty, & Bozick, 2005).

The racial gaps in attendance are particularly pronounced when institutional type or selectivity are considered. Carnevale and Rose (2004) found that, in 1995, Black and Hispanic students made up “only 6 percent each of the freshman classes of the 146 ‘most’ and ‘highly’ selective four-year colleges. [Yet] African Americans and Hispanics were 15 and 13 percent, respectively” of the corresponding national population (Carnevale & Rose, 2004, p. 106). Thus, while institutions of higher education have become considerably more diverse in recent years, and will likely continue that trend for the foreseeable future (Hussar, 2005), such diversity does not appear to have fostered racial equality in college access.

The persistent racial gaps in college attendance represent just one form of racial inequality in higher education. Among those students who do attend college, sizable racial gaps appear in nearly every measure of student success in college. Black and Hispanic students tend to receive lower grades (GPAs) (Hu & St. John, 2001; Kuh, et al., 2007), drop out more frequently
(St. John, et al., 2001), and graduate at lower rates (Astin & Oseguera, 2005; Snyder, et al., 2008) than do their White and Asian counterparts. Black and Hispanic students also tend to take longer to complete their degrees than do White or Asian students (L. Berkner, He, & Forrest Cataldi, 2002; Desjardins, Mccall, Ahlburg, & Moye, 2002). And just like the historical trends in college access, while the percent of 25-29 year olds with bachelor’s degree has increased for all races since 1971, the racial gaps in bachelor’s degree attainment have actually increased by 4-8 percentage points during that time period (Planty, et al., 2008). Thus, while institutions of higher education have become considerably more diverse in recent years, and will continue that trend for the foreseeable future (Hussar, 2005), such diversity must not be mistaken racial equality of college outcomes.

The Purpose: Strengthening the Evidence, Assessing an Explanation

Despite intense and long-standing public and scholarly interest in the topic of race-related educational inequality, the existing research on the phenomenon remains hampered by a number of methodological limitations and theoretical blind spots. This dissertation attempts to overcome some of these limitations and shed some light on one such blind spot. Specifically, I hope to 1) provide strong evidence regarding the effect of student race on the likelihood of graduation from competitive-entry colleges and universities, and 2) test the hypothesis that such racial effects are the result of the race-specific differences in the frequency and impact of students’ non-college-life-events that occur while the attending college.

Thus, this dissertation asks the following two questions:

1) Do racial inequalities in four-year graduation rates at competitive-entry colleges and universities remain after accounting for a wide range of race-conditional pre-college influences?
2) If so, are such inequalities related to the frequency or effect of students’ non-college-life-events that occur while the attending college?

The Concept: Equal Educational Opportunity

Although not the first study to address issues of racial equality in American education, Coleman's (1966) landmark study acts as the foundation from which decades of public debate and hundreds of scholarly papers have grown. Initiated by the U.S. Commissioner of Education in response to the 1964 Civil Rights act, the study and its findings were immediately controversial. And although the bulk of the study, including the parts most frequently viewed as controversial, relate to equality in the public elementary and secondary schools, Coleman's definitions of “equal educational opportunity” also can be applied to the higher education sector.

Underlying the development of the surveys for the 1966 study, and expressed formally shortly thereafter (1969), Coleman articulated five progressive stages in the understanding of equal educational opportunity as a legal and social construct. The most basic definition measures equality in terms of the school resources, or "community's input to the school" (p. 18), like the quality of the facilities or per-pupil expenditures. The second definition, responding directly to the Brown v. Board of Education Supreme Court decision, essentially equates equality with the compositional integration of schools (i.e., race-proportional representation of students). The third definition refers to unseen intangibles that contribute to the quality of a school; this ambiguous definition has received little traction in subsequent literature.

In moving from his first three to his final two definitions of equal educational opportunity, Coleman transitioned from a focus on school resources or inputs to a focus on the outcomes or results of schooling (Riordan, 2004). The use of outcomes as a measure of educational opportunity is particularly relevant to studies of college effects. Such studies seek to
understand the manner in which an institution affects students. Of interest is not what resources are available to each institution, but rather how such resources can be leveraged to contribute to student success. As Coleman (1966) stated, "equality of output is not so much determined by the equality of resource inputs, but by the power of these resources in bringing about achievement" (p. 24).

Therefore, a fourth definition considers equality relative to "gross" outcomes. Equality of gross outcomes occurs when the average achievement of all races is equal (e.g., 80% of Blacks and 80% of Whites graduate from high school). This definition affords face-valid and easily computed measures of educational equality. Public discussions about race are rife with race-based comparisons of gross outcomes. However, as noted elsewhere in this study, considering equality based on gross measures of college outcomes comes with considerable limitations.

Coleman's (1969) fifth definition of equality, and the one that takes prominence in this study, can be termed "net equality." By this definition, equality occurs when students with the same "input" characteristics achieve the same outcomes regardless of race; the appropriate criterion becomes equal educational achievement net of students' background characteristics.

A similar definition of equality of educational opportunity is expressed by Howe (1997). He suggested three forms of (or standards by which one would measure) equality of educational opportunity. The first, labeled "formal" equality, simply requires that there be no legal or systematic denial of opportunities to people based on innate characteristics, such as race or gender. The United States could be said to have achieved formal equality, at least in its political system, with the passage of the thirteenth and nineteenth constitutional amendments. In the educational sphere, Howe defined formal equality in terms of school resources.
A slightly more progressive understanding of equal educational opportunity is reflected when efforts are made to help disadvantaged students compensate for their relative disadvantages. This “deficit” (or, in Howe’s language, “compensational”) approach has been used as justification for countless intervention programs like *Head Start* or *GEAR UP*. Nonetheless, the compensational approach to equality has come under fire in recent years (e.g., Cerna, Perez, & Saenz, 2009; Green, 2006; Griffin, 2006) amid contentions that such a perspective may actually hinder the development of actionable research and practical policies.

Underlying these critiques is the argument that compensational approaches reinforce the underlying social hierarchy that produced the original inequalities. With compensational approaches, the rich, White, male elite, the same set of powers that have held sway for hundreds of years (or more) still typically decide which items are worth having (e.g., reading skills, college education), who should receive the intervention (e.g., who are the "disadvantaged"), and how the interventions should be executed. It is from this perspective that many affirmative-action admissions programs were implemented. However, with the compensatory approach, those who are labeled as disadvantaged remain marginalized and inferior (Howe, 1997). The poor or minorities become the recipients of the elite's charity, not equal partners in efforts to ensure achievement by *all* members of a society. These individuals have little or no say regarding which goals are worthy of their aspirations. Therefore, Howe offers *participatory* equality as a third approach to defining equal educational opportunity.

*Participatory* equality requires that those who are perceived as disadvantaged – those whose deficits would otherwise make them recipients of compensational interventions – have a say in identifying which educational outcomes are important and how those goals should be pursued. In participatory approaches the diverse views, concerns, and desires of all people shape
both the outcomes to be equalized and the methods by which such equality can be achieved. A participatory perspective does not necessarily devalue the formal or compensatory perspectives. Rather, formal and compensational equality can be considered prerequisites for the achievement of participatory equality. Could racial minorities ever be said to participate if they were still denied the right to vote? Could the children of non-English-speaking immigrants forcefully contribute to current policy debates if they were not schooled to understand the English language? Thus, while some believe formal or compensational equality to be worthy end goals in-and-of-themselves, formal and compensational efforts can also be viewed as mechanisms through which all individuals can be empowered and valued as equal. Formal equality and compensational approaches may be necessary, but are not themselves sufficient, to achieve participatory equality. And while participatory equality can never be fully "achieved" such that it could be checked off a list, at its best participatory equality would render formal and compensational efforts obsolete and unnecessary.

The frameworks presented by Coleman (1969) and Howe (1997) have a critical place in discussions of equal educational opportunity by provide a shared understanding about the definitions of and approaches to equal educational opportunity. Situated relative to these frameworks, the current study employs a participatory perspective to examine the extent to which White, Black, Hispanic, and Asian students attending selective American colleges and universities, net of students' pre-college characteristics, have equal opportunities to graduate within four years.

The Contribution: Advancing Research, Informing Policy Debates, and Improving Practice

I anticipate this study will be relevant to research, policy, and practice related to inequality and higher education.
Advancing Research

This dissertation will advance research in two ways: methodologically and substantively. In terms of methods, this dissertation moves beyond the presentation of gross, aggregated data (e.g., the percent of adults with a college degree) to describe racial inequality in higher education. Instead, random-intercept multi-level models are used to account for institutional differences in graduation rates, and predictive models control for a wide range of students’ pre-college characteristics. These models provide evidence of net racial inequality among graduation rates at selective colleges and universities. Moreover, the use of independent race-conditional models allow the effects of demographic, academic, psychological, sociocultural, and financial variables to differ across racial groups – a phenomenon suggested by the literature but rarely applied in previous studies of educational inequality.

While employing these methodological advancements, I provide evidence that suggests most current models of college effects are overlooking a key piece of the student success puzzle. Specifically, I argue that college-effects models should be revised to reflect the manner in which students’ lives outside of college can affect students’ college outcomes.

Informing Policy Debates

This dissertation will inform debates about race-related policies in higher education by providing current, comprehensive, and methodologically rigorous evidence regarding the existence and severity of racial inequalities at selective American colleges and universities. Through this research, I hope to encourage policy-makers to move beyond politically charged arguments concerning affirmative action admissions policies – which define racial equality in terms of college access – to practical consideration of race gaps in college graduation rates.
Specifically, I attempt to reframe the debate about racial inequalities in education by arguing that racial equality should be defined not in terms of access, but in terms of net outcomes.

By accounting for a wide range of students’ pre-college characteristics, far more than just students’ socioeconomic status and SAT scores, my analyses provide robust evidence that racial gaps in college graduation rates are more than just the inevitable byproduct of eighteen years of pre-college inequality. Therefore, while efforts to alleviate pre-college and access-related inequalities remain necessary to advance racial equality, such efforts are not, themselves, sufficient. Both college administrators and government leaders must identify policy levers through which they can improve racial equality in college outcomes.

**Improving Educational Practice**

This research seeks to improve educational practice by calling attention to a critical area of students’ lives that often goes unnoticed by colleges and universities. Although students’ non-college life-events occur well outside an institution’s sphere of influence, these events can play an important role in shaping outcomes that are clearly within an institution’s sphere of interest: graduation. Thus, colleges and universities have an inherent, self-interest in students’ lives outside of college. Yet, there exist few current mechanisms by which an institution can identify those students who experience difficult non-college life-events.

Moreover, current institutional support mechanisms for students affected by such events are often spread across several administrative units, have very narrow foci, and serve potentially conflicting interests; even if institutional agents and offices are aware of students’ encounters with non-college life-events, few are currently well-positioned or explicitly trained to support the affected students. In many institutions, a student who loses a parent in the final weeks of a semester might need to contact several professors to request extended due dates or deferred
grades, wait for an appointment see a psychological counselor, and place formal requests with the bursar and financial aid offices to ensure continuation of financial aid if he/she takes deferred grades or a leave of absence. Few college students who experience such a traumatic non-college life-event would have the emotional strength or clarity of thought to navigate the maze of institutional policies and services that might otherwise have facilitated his or her continued progress toward graduation.

Therefore, I call for colleges and universities to address non-college life-events on two fronts. First, I suggest institutions use already-established programs (e.g., faculty early-alert systems, residence hall staff, and student surveys) to proactively identify students who experience detrimental non-college life-events. Second, I encourage institutions to develop flexible policies and integrated services explicitly designed to help affected students remain on-course to an on-time graduation.

A Note on Language

This manuscript describes research that addresses topics that are complex and controversial. Issues of race, gender, equity, equality, and college success are all complex, each in its own way; no single document can fully reflect the subtleties and sensitivities that have surfaced during the many scholarly and popular discussions of these topics. Therefore, while recognizing and respecting the variety of connotations associated with specific words, I have chosen to use relatively generic terminology throughout this dissertation. While taking efforts to adhere to the guidelines of the American Psychological Association whenever possible, I retain much of the language used by the researchers involved with the National Longitudinal Survey of Freshmen (NLSF) from which this study’s data are drawn.
For example, throughout the manuscript, students’ race/ethnicity will be described as White, Black, Asian, or Hispanic. These descriptions consider race and ethnicity to be a single construct. They also do not account for the possibility of multiple or “other” racial/ethnic identities. Nonetheless, these simplistic race categories reflect the data collection and reporting procedures adopted by the researchers who originally collected the data. Moreover, reflecting the language used by much of the literature on racial gaps in educational attainment, the term “underrepresented minority” occasionally is used to reference Black and Hispanic students, collectively; Asian students are not labeled as underrepresented, as their representation and achievement in colleges and universities rival (or surpass) that of White students (Alon, 2007b; Alon & Tienda, 2007; Bowen & Bok, 1998; Snyder, et al., 2008). Entirely absent from this analyses are Native American and international students, as the original NLSF did not collect data from these students. Like race/ethnicity, the dualistic presentation of “male” and “female” in this study is perhaps overly simplistic, but reflects the data collection and reporting procedures employed by the NLSF project staff.

Throughout this manuscript, the terms “equality” and “equity” are used interchangeably. Some might argue that these two terms reference different constructs, with equality referring to equal numbers, services, or output and equity referring to the provision of resources proportional to a person’s needs. Indeed, as discussed in Chapter 2, the last fifty years have seen these terms refined and revised in myriad ways. For the sake of clarity, equity and equality are both operationalized in this study as having occurred when students of all racial groups, net of differences in their pre-college backgrounds, have an equal likelihood of graduation from their original institution within four years.
Finally, the term “non-college life-event” (NCLE) is used throughout this manuscript. For the current study, non-college life-events are defined by the following four criteria:

1. Any event occurring within a student’s family,
2. That occurs fully outside the control of the institution, and
3. Occurs largely outside the control of the individual student, but that is
4. Likely to have (direct or indirect) adverse consequences (financial, physical, psychological, or academic) for the student.

For conceptual and empirical clarity, the primary non-college life-events variable is a scale indicating the number of so-defined events experienced by a student during his/her second college year. Among the fourteen items that comprise the scale are indicators of a student’s parents getting divorced, losing a job, or going onto public assistance; an unwed sister becoming pregnant; or a family member getting into legal trouble, going to drug rehab, or passing away. Complete details about the scale composition are presented in Table A-1.

Although this definition is broad enough to include a variety of non-college life-events, it excludes two types of events that might instinctively be labeled as non-college life-events. My definition does not include family events that, while likely stressful, are not clearly negative. A student’s parent getting remarried or taking a new job are thus excluded. So, too, are events in which the student is a direct actor/participant/recipient excluded from my definition; I do not examine the effects of a student becoming a parent, working full time, or becoming ill. Certainly, such events may affect student outcomes, and future research should investigate their effects.
CHAPTER 2: LITERATURE REVIEW

Racial Inequality in Education

Despite the decades of research and reforms intended to reduce inequalities in education, recent literature confirms the persistence of sizable racial gaps at nearly every stage of the college preparation “pipeline” (Advisory Committee on Student Financial Assistance, 2002; Cabrera & La Nasa, 2000). In fact, race-related gaps in test scores have been documented as early as elementary school (Entwisle, Alexander, & Olson, 2005; Fryer Jr. & Levitt, 2006; Reardon & Galindo, 2009). These inequalities continue throughout K-12 education, culminating in major gaps in high school graduation rates (Alexander, Entwisle, & Horsey, 1997); in 2006, while only 5.8% of Whites aged 16-24 dropped out before obtaining a high school diploma or GED, the corresponding drop-out rate for Blacks and Hispanics was 10.7% and 22.1%, respectively (Planty, et al., 2008). Thus, by the time students reach the doorway to higher education, the cumulative effects of years of inequality will have already closed the door on a disproportionately large number of Black and Hispanic students.

From Entry to Exit: Inequalities in College Outcomes

Although much work remains before America’s selective colleges and universities can be said to provide equal access to students of all races, several prominent scholars have urged those interested in equal educational opportunity to shift their focus from issues of access to issues of outcomes. For example, during a 2004 series of speeches addressing multiple forms of inequality in higher education, Bowen (2004), a leading voice in the debate on affirmative action in admissions, argued that programs and policies that improve access, without commensurate improvement in student outcomes, are a waste of “both public and private resources” (p. 10). He
challenged educators and researchers to evaluate the efficacy of our narrow focus on equality of access:

…we need to stop and ask ourselves if we (along with almost all other students of this subject) run the risk of paying too much attention to access (enrollment) and not enough to attainment (college completion). We do. Much more attention needs to be focused on attainment…(p. 9) [because] We don’t want improved “access” to turn out to be merely “fool’s gold.” (Bowen, 2004, p. 10).

Although Bowen specifically refers to attainment (i.e., graduation), students, parents, administrators, policy-makers, and researchers have considered a variety of outcomes that might constitute student success in college. Kuh and colleagues (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006) identified more than 20 definitions of “college student success,” which can be grouped into five categories: skill development and learning; psychosocial development; academic achievement; attainment; and post-college outcomes.

Each of these definitions has merit in certain contexts, but the attainment of a bachelor’s degree stands apart as an indicator of college success for several reasons. First, it is universally understood, by students, researchers, and the public. Second, for all constituencies, the benefits that accompany a bachelor’s degree are substantial, meaningful, and considerably greater than the benefits of other college achievements (e.g., associates degrees or attendance without graduation). Finally, college graduation is a cumulative outcome; students must complete specific courses and receive sufficient grades to earn the credits necessary for graduation.

Racial inequalities in college graduation rates mirror those related to college access. Nationally, 58.4 percent of all students who enter four-year institutions obtain a bachelor’s degree within six years (Snyder, et al., 2008). Another recent study (Hess, Schneider, Carey, & Kelly, 2009) found that the average six-year graduation rate for four-year colleges was just 53 percent, with dramatic variations between campuses with different levels of admissions
selectivity. Highly selective doctorate-granting institutions (where, among other things, the majority of admitted students are in the top 10% of their high school classes) graduate 80.2 percent of their undergraduates within six years, a rate more than 22 percent higher than institutions just one selectivity “tier” below (ACT Inc., 2008). However, even the nations’ highly selective institutions graduate only 58.9% of their students within four years (ACT Inc., 2008).

Graduation rates also vary widely by race. For students entering four-year institutions in 1995-96, approximately 61.9 percent of White and 69.1 percent of Asian students, but only 43.4 percent of Black and 44.0 percent of Hispanic students, graduate college within six years of starting (Snyder, et al., 2008). And just like the historical trends in college access, while the percent of 25-29 year olds with bachelor’s degree has increased for all races since 1971, the racial gaps in bachelor’s degree attainment have actually increased by 4-8 percentage points during that time period (Planyt, et al., 2008). There is also substantial state-level variation in graduation rates and racial gaps. In Delaware, for example, 73 percent of White students graduate college in six years, but only 41 percent of Black students. In Illinois, 65 percent of White students graduate compared to 45 percent for Hispanic students (National Center on Public Policy and Higher Education, 2008). Despite this relatively high degree of state-level variability, the extent of gross racial inequality in college graduation is made clear by one final statistic: in only four states do Black or Hispanic college students graduate at a rate equal to that of White students (National Center on Public Policy and Higher Education, 2008).

From Clarity to Confusion: Conflicting Research on Net Racial Inequality

The magnitude of the racial inequalities in college graduation rates, as suggested by aggregated national statistics, can be misleading. Although there are clear racial differences in college outcomes, there are also clear racial differences in college inputs – the knowledge, skills,
habits, and experiences students bring with them to college. For example, Black and Hispanic students are disproportionately first-generation college attendees, graduates of high-poverty K-12 schools, and children of single-parent families (Hoffman, Llagas, & Snyder, 2003; Horn & Nunez, 2000). In fact, Barton (2003) reports racial gaps in all of the fourteen pre-college correlates of student achievement, indicating that racial minorities are more likely than their White peers to have multiple “risk factors” that curtail academic success (Hoffman, et al., 2003, p. 62).

Perhaps when these pre-college factors are statistically controlled, net college outcomes may be racially equitable. Some studies even suggest that, when background characteristics like socioeconomic status, grades, and motivation are controlled, there is actually a positive association between minority status and educational outcomes (Light & Strayer, 2002; Murtaugh, Burns, & Schuster, 1999; Nora, Cabrera, Hagedorn, & Pascarella, 1996; Peng & Fetters, 1978; Perna & Titus, 2005; see also Reason, 2003). But recent findings from Alon (2007b), dealing specifically with students attending highly selective institutions like those included in this study, suggest Black and Hispanic students have a lower probability of graduation than their White peers, even when controlling for family background and academic preparation. Other research suggests that the apparent minority disadvantage operates largely through minority students’ lower college grades (Kuh, et al., 2007), and may play an increasingly less important role as time-to-degree increases (Desjardins, et al., 2002).

These varied findings contribute to the ambiguity and uncertainty regarding the causal reasons for the dramatic and persistent racial inequality in educational outcomes. Some scholars lament that such uncertainty has allowed higher education professionals to dismiss racial gaps as
a problem generated by K-12 educational systems, state funding policies, or larger societal issues (Perna, et al., 2006).

**General Pre-College Influences on Students’ College Outcomes**

Students do not come to college as proverbial blank slates, nor do they come with the same background characteristics. Failure to consider the manner in which these student inputs affect college outcomes would lead scholars and policy-makers to mistakenly attribute all of the differences in student outcomes to differences in students’ college environment (Astin 1993a). Most college-effects models (e.g., Bean, 1980; Kuh, et al., 2006; Terenzini & Reason, 2005; Tinto, 1993) avoid this attribution error by including students’ pre-college characteristics as the starting points of their models. Therefore, I examine the existing empirical literature addressing student-specific non-college factors that affect college student success to identify the pre-college characteristics that are likely to have an effect on students’ likelihood of college graduation. In doing so, I draw heavily from two recently proposed models of college effects (Kuh, et al., 2006; Terenzini & Reason, 2005). While the Terenzini and Reason (2005) and Kuh et al. (2006) models are by no means the only college-effects models that have appeared in the recent literature, two characteristics make them particularly relevant to this study. First, they address student success in the most general terms rather than modeling factors influencing a particular student outcome (e.g., critical thinking, political attitudes, persistence). Second, these two models represent the third generation of college-effects models, as both incorporate elements of and make improvements to first- (e.g., Sanford, 1962) and second-generation models of college effects (e.g., Bean, 1980; Pascarella, 1985a; Tinto, 1993).

To facilitate the use of various pre-college characteristics in the current study, I combine them into five categories: Demographic, Academic, Sociocultural, Psychological, and Financial.
Demographic data (e.g., race/ethnicity and gender) are included in nearly every study of college effects and are the explicit focus of research exploring equality of educational opportunity. Constructs and variables from the other four categories are discussed below, with each section highlighting relationships between a given factor and college student success outcomes. Although I can make no claim here to address all of the specific characteristics that may fit under a given category, the broad domains represented by these categories capture a wide range of students' pre-college characteristics that might affect their subsequent graduation.

**Academic**

**Educational preparation.** Success in college is strongly predicted by students’ educational preparation before college. Under the broad label of educational preparation fall things like high school grades, curricular track, and completion of particular courses. High school grades are particularly telling of students’ academic preparation for college success. Kuh et al. (2006; citing Pike & Saupe, 2002) estimate that students' high school grades generally account for 25-33% of the variance in their first semester college. For minority students, high school grades are strong indicators of college success at both historically Black or predominantly White institutions (W. R. Allen, 1992).

Students’ high school grade-point average serves as a rough composite of students’ academic preparation for college. More targeted indicators of educational preparation have also been shown to predict college success. During the 1970s and 1980s, when debate about student “tracking” was often public and contentious, several scholars examined the long-term effects of various track placements. These studies consistently showed that students in college-preparatory tracks obtained more positive educational outcomes than did students in the general or vocational curricular tracks (Alexander, Cook, & McDill, 1978; Alexander & McDill, 1976; Rosenbaum,
1980; Vanfossen, Jones, & Spade, 1987). More recent studies have found that completion of specific “gateway” courses, particularly a second-level algebra course, are also predictive of subsequent college-related outcomes (e.g., Adelman, 2006).

However, most commonly-used measures of high school academic preparation would prove uninformative for the students sampled for this study, as nearly all of the students attending these institutions were in college-prep curricular tracks, received mostly As and Bs for grades, and took at least some advanced coursework. Accordingly, my predictive models use the number of AP coursework taken by a student as an indicator of the rigor of his/her high school academics.

**Intellectual aptitude, achievement, or ability.** Of course, even students with similar levels of educational preparation come to college with different types and degrees of intellectual aptitude. Although criticisms of standardized testing have been strong and growing in recent decades, most selective colleges still require applicants to submit their scores on standardized tests, especially the ACT or SAT. Schools continue to require these tests, in part, because a long line of research has found that test scores are consistent, albeit imperfect, predictors of student success in college. Although figures vary across time and population under study, Deluca (2006) estimated that ACT and SAT scores predict up to 30% of the variance in first year GPAs; however, at least one recent large-scale study suggests such estimates are often overestimated (Rothstein, 2004).

**Sociocultural**

**Cultural capital.** In an effort to understand mechanisms of social reproduction and inequality, Bourdieu (1984) employed the phrase “cultural capital” to represent the values, beliefs, and tastes that provide subtle signals about one’s class standing. Farkas adapted
Bordieu’s terminology by describing cultural capital in more active terms: “skills, habits, and styles” (Farkas, 1996, p. 11). Classic examples of cultural capital include an appreciation for the arts or a worldly disposition. The accumulation and transmission of cultural capital, unlike human or economic capital, occurs outside of formalized institutional practices of schools (McDonough, 1997). In fact, Rhoads and Valadez (1996) suggest that colleges and universities often dismiss or devalue the skills, habits, and styles of students who operate outside of the institution’s cultural norms. Berger (2000) proposes that students who enter highly selective institutions without already possessing institutionally-valued cultural capital are disadvantaged twice; in addition to the challenges faced by all students without much cultural capital, these students must navigate an institution that itself has a strong and unfamiliar institutional culture.

**Social capital.** Like cultural capital, social capital is intangible. Rather, it is a form of capital that has value precisely because it can be turned into other forms of capital. Social capital has been defined by Lin (2000) as the “quantity and/or quality of resources that [a person]… can access or use [due to his/her] location in a social network” (p. 786). The consideration of social capital is particularly popular in examinations of college enrollment. When operationalized in terms of parent involvement in a student’s school and social life, social capital has been linked with increased college-going (Choy, Horn, Nunez, & Xianglei, 2000; Perna & Titus, 2005). Through formal school-based programs that create peer counselors, Tierney and Venegas (2006) argue that social capital can be developed among otherwise disadvantaged students, thus improving the chances of students’ educational success. Whether received by way of one’s social standing or developed through formalized outreach programs, social capital can be converted into knowledge and opportunities likely to facilitate student success in college.
Psychological

Motivation. Perhaps the most important psychological predictor of college success is the student’s motivation, broadly defined. Though motivation is necessarily tied to a specific subject/outcome/activity (an individual must be motivated to do a particular thing), students’ motivation for academic success of any kind has proven to be a strong predictor of college success. Student motivation is included in studies via any of a number of proxy variables. Often included are variables describing students degree aspirations/expectations; such aspirations have been linked to positive outcomes including persistence (W. R. Allen, 1992; Peng & Fetters, 1978), and graduation (Cabrera, La Nasa, & Burkum, 2001). A more psychometrically precise measure of motivation for achievement was recently linked to college student GPA, even when controlling for a variety of other background, academic, and psychological factors (Robbins, Allen, Casillas, Peterson, & Le, 2006). In fact, one recent study (Melguizo & Dowd, 2009) suggests that degree aspirations may counteract the effect of college attendance patterns (e.g., transferring to another school) in terms of predicting bachelor degree attainment – especially from elite institutions.

Self-efficacy. Even with high aspirations and strong motivation to succeed, some students do not believe that they will achieve their goals. That which is called self-confidence in the common parlance, educational researchers have adapted and embraced as the concept of self-efficacy. Although the concept has much in common with locus-of-control and self-attribution, educational researchers have defined academic self-efficacy as a measure of a student’s “self evaluation of one’s ability and/or chances for success in the academic environment” (Robbins, et al., 2004, p. 267). Having such a belief in one’s abilities facilitates student achievement in college, as studies have found self-efficacy to be related to various definitions of college success.
(Chemers, Hu, & Garcia, 2001; Zimmerman, Bandura, & Martinez-Pons, 1992). Presenting the most convincing evidence concerning the importance of self-efficacy, a recent meta-analyses (Robbins, et al., 2006) found self-efficacy to be among the best psychosocial predictors of both cumulative college GPA and persistence; in both cases, self-efficacy remained significant even after controlling for students’ socioeconomic status, high school grades, and ACT/SAT scores.

Financial

**The real cost of college attendance.** Tuition at most postsecondary institutions has increased dramatically during the last three decades (Baum & Ma, 2008). While the high sticker price associated with higher education is reported frequently in the media, such prices may not represent the *real* costs of college attendance. Many students receive financial aid from the institution, state, or federal government, thus lowering the actual costs for these students. Of course, not all aid is equally valuable, and some recent research has suggested that students respond to grants differently than they respond to loans (Alon, 2007a; St. John, Paulsen, & Carter, 2005). Nonetheless, summarizing the empirical research related to college outcomes, Pascarella and Terenzini (2005) conclude that “tuition… and unmet need (the gap between college costs and financial aid and family and student contributions) are all inversely related to persistence and graduation” (p. 439).

**Perceived ability to pay.** Moreover, regardless of a student’s actual ability to pay for college, his or her perception of his or her ability to pay for college can have an effect on student success (Dowd, 2008; Nora, et al., 1996). Because the real costs of college include a number of expenses, different types of aid, and multiple sources of funding – all of which are subject to annual change – many students make inaccurate estimates of their ability to pay for college. More often than not, people dramatically overestimate the real costs of college (Hartle, 1998).
Students’ (often inaccurate) perceptions of their ability to pay affect more than just their decisions about college attendance (Mcdonough, 1994); once in college, the psychological effects of financial concerns can affect students’ experiences and eventual graduation (Nora, Barlow, & Crisp, 2006).

**Race-Conditional Pre-College Influences on Students’ College Outcomes**

Although empirical evidence is somewhat limited, both theoretical and practical considerations suggest that the effects of students’ pre-college characteristics on later college outcomes may vary by race. Unfortunately, even comprehensively controlled measures of net graduation rates have often overlooked the conditional effects of pre-college characteristics and race. The lack of consideration for conditional effects occurs even as scholarly and public debates have poignantly argued about race-related differences in the manner in which pre-college factors affect college outcomes. These conditional effects are outlined below, using the same organization as the previous discussion of general effects.

**Academic**

Since the late 1960s (Cleary, 1968; Pfeifer & Sedlacek, 1971), scholars have warned that single-equation predictions of college outcomes which ignore race-conditional effects can lead to poor predictions of Black students’ college grades. Zwick and Skiar (2005) continue this line of research by testing the separate and combined predictive power of students’ high school GPA and SAT scores on students’ GPAs in the first year of college. Their results suggest that the use of the same prediction equation for White, Hispanic, and Black students tends to over-predict Black and Hispanic students’ college GPAs by .13 or .14 points. When separate equations were used with race-homogenous samples, high school GPA was a significant predictor for all racial
groups. But SAT scores were significant only for White students, though this result may be attributable to widely varying sample sizes for each of the racial groups. The Zwick and Skiar (2005) coefficients also suggest some degree of race-specific variability in the predictive power of high school GPA, with Whites having the strongest association between high school and college grades. Unfortunately, these researchers did not control for any other student characteristics, making it difficult to tell if the observed conditional effects of high school GPA and SAT scores are unique or are simply the result of unknown variance in other student characteristics (e.g., financial, psychological, or sociological differences).

**Sociocultural**

While in elementary and secondary school, friends and family constitute the bulk of students’ social networks. The breadth and strength of this network, and the unique characteristics of the individuals who comprise it, determine the quality of students’ social capital. Massey et al. (2003) argue that such quality can be measured by the extent to which a student’s parent(s) take an active role in the student’s daily life. Parental involvement, of course, comes in many forms, though the educational research tends to focus on parental involvement in a student’s school-related activities. Within the K-12 sector, such involvement appears far more influential for White students than for students of color (Mcneal Jr, 1999). With a similar inquiry specifically tied to higher education, Perna and Titus (2005) examined how students’ college destinations were affected by two different types of parent involvement. When defined in terms of “parent-initiated contact with the [high] school about academic issues,” parental involvement was particularly advantageous for Black students relative to White, Asian, and Hispanic students (Perna & Titus, 2005, p. 505). But when defined in terms of parent-student discussions about college, parent involvement had a smaller effect for Black students than those from any other
racial group. With both a variety of definitions and a mixed set of results, recent research hints at the possibility that students’ social and cultural capital may have race-conditional effects on academic outcomes.

**Psychological**

Empirical evidence regarding the conditional effects of student psychological characteristics, particularly students’ aspirations and motivations, is both scarce and mixed. Although at least one study has found that student aspirations and motivation for success affect college outcomes for both minority and non-minority students (Nora & Cabrera, 1996), a more recent study by Allen (1999) presents a more complex picture. When college GPA was used as the dependent variable, student motivation had no significant effect for White or minority students. However, in models predicting first- to second-year persistence, student motivation was found to have a statistically significant direct effect for minority students, but not for White students (D. Allen, 1999). Generalizations from either study, however, are severely hindered by each study’s design: both studies were from single cohorts of students at a single institution, and each combined all non-white students into a single minority category.

Nevertheless, the possibility of race-conditional effects of motivation on college graduation is supported by a theory attempting to reconcile the “attitude-achievement paradox” (Mickelson, 1990) for Black students. In trying to explain the apparent underachievement of Black students in America, particularly when compared to their largely high valuation of and aspirations for educational achievement, Mickelson builds off of Ogbu’s (1982, 1990) notion of an oppositional culture among “caste-like” minority groups (1990, p. 46) to argue that Black students really have two distinct perceptions of education. Black students generally have a positive “abstract” attitude (Mickelson, p. 45) toward education, acknowledging the widely
outed link between educational achievement and upward mobility. However, Black students also have more “concrete” attitudes toward education: an evaluation of education’s value based on their personal experiences and observations of people around them (Mickelson, p. 45). While some Black students (typically those in lower SES families) frequently hear accounts of race-related gaps in occupational outcomes (e.g., hiring, salaries) and thus develop more negative concrete attitudes toward education, other Black students observe their parents receiving considerable benefits from their educational achievements and develop more positive concrete attitudes. Mickelson found that the gap between Black students’ concrete and abstract attitudes were larger than for White students; she also found that one’s concrete attitude, but not one’s abstract attitude, was a significant predictor of educational attainment, especially for White students. Although Mickelson’s study does not address student aspirations per se, her findings suggest that students’ education-related attitudes are both important and race-conditional.

Financial

Studies of race-specific differences in the influence of financial considerations have typically focused on issues of college access. For example, financial aid, which can considerably reduce the “real” price of college attendance, appears to be more influential for Black and Hispanic students than for White students (Hu & St. John, 2001). Indeed, for reasons that cannot be fully explained by differences in income or ability, “black [sic] students are more sensitive to college costs than white [sic] students” (Heller, 1997, p. 647).

Alon (2007a) extends this line of inquiry by examining the effects of college costs on student graduation, specifically among those attending highly selective colleges and universities. Like Heller (1997) and Hu and St. John (2001), Alon (2007a) largely confirms that Black and Hispanic students are particularly affected by grant aid, though he finds no race-specific effect of
loans or work-study. Further complicating the issue are findings from Nora et al. (1996) that suggest the perception of financial need was a negative predictor of persistence for White students, but not minority students. Thus, as most clearly shown in Heller (1997) and Paulsen and St. John (2002), the intersection of race, money, and college is exceptionally complex, well beyond the scope of this dissertation. Although unable to sort out the intricacies of this intersection, in recognition that such an intersection appears to matter, analyses conducted for this dissertation allows the effect of college costs to vary across racial groups.

**The Occurrence of Non-College-Life-Events (NCLEs) While in College**

The general influence of pre-college factors on subsequent college outcomes is well recognized by scholars of higher education, as nearly all college effects models include some reference to students’ pre-college characteristics. There is also growing recognition of the potential for the effects of pre-college characteristics to have effects that are race-conditional in nature. Beyond pre-college characteristics, however, the manner in which students’ lives outside of college are referenced in college effects models suggests some uncertainty among scholars as to which, and how, student experiences outside an institution should be integrated into their models. For example, one of Bean’s early models (1983), which Cabrera and colleagues (Cabrera, Nora, & Castañeda, 1993) describe as “emphasiz[ing] the role of factors external to the institution” (p. 126), considered only two external/environmental variables: a single item representing the students’ “likelihood of marrying before completing college” and a two-item scale vaguely described as “the availability of alternative student roles in the organization’s environment” (p. 134). In one subsequent iteration of the model, Eaton and Bean (1995) labeled non-college experiences as “social avoidance” behaviors. In another, Bean and Eaton (2000),
depict “interactions external to institution” as a component of the “institutional environment” (p. 57).

Despite this uncertainty about the influence of non-college life-events or experiences, college effects research has generally interpreted empirical findings based on an assumption implicit in Astin’s (1970, 1993a) I-E-O model of college assessment: by subtracting the direct and indirect influence of students' relevant inputs (i.e., pre-college characteristics) on a particular outcome, the remaining variance explained by a statistical model could be attributed to some portion of the environment (i.e., the college). In many respects, this assumption made by today's higher education researchers mirrors assumptions made by K-12 scholars in the decade following Coleman's (1966) report.

However, such assumptions were upended by the findings of Heyns (1978). Her exploration of race- and class-based gaps in educational performance revealed that such gaps grew most during the summer months, when students were away from schools. In stark contrast to the prevailing perception of the time, Heyns demonstrated that even though race-related achievement gaps widened as students progressed through school, the school experience itself was serving to ameliorate or mitigate the coterminous and vast inequality in students' out-of-school experiences. Whereas previous researchers were quick to accuse the educational system of contributing to racial inequality, Heyns identified schools as a mechanism through which inequality was actually reduced.

Subsequent examinations of summer-learning differences have largely confirmed the original premise outlined by Heyns (1978). Perhaps what is worse, the effects of summer-learning differences appear to persist throughout elementary and secondary education, creating a cumulative disadvantage for some students. Tracing the long-term effects of summer learning
differences, Alexander, Entwisle, and Olson (2007) found that K-12 summer learning differences influence high school graduation and even college attendance. Just as elementary and secondary students are affected by experiences occurring outside the control of a school or system of education, so too are college students.

**Types of Non-College Life-Events**

Challenging non-college life-events (NCLEs) come in many forms. Legal, financial, or health crises – afflicting the students themselves, their families, or their friends – are likely to interfere with students’ college success. The manner and extent to which these events affect students is dependent on several factors, including the type and severity of the event (Holmes & Rahe, 1967), the frequency or number of events, and the characteristic of the affected student (Miller & Rahe, 1997). Also important are students’ individual coping mechanisms (Feenstra, Banyard, Rines, & Hopkins, 2001). Though lacking a common terminology or sufficient nuance to tease out the complexity inherent in such cause-effect patterns, current research provides some evidence that non-college events can affect college student outcomes. For example, using a scale that combined financial, emotional, academic, and non-college factors, Nettles, Thoeny, and Gosman (1986) found that students’ “interfering problems” had a strong negative effect on students’ cumulative college GPA. Similarly, Nora et al. (1996) discovered that non-college “pull factors” like family responsibilities had the “biggest detrimental effects on dropout behavior” for minority students (p. 447).

Indeed, at least one early college-effects model (Bean, 1983) acknowledged that changes in family responsibilities could affect persistence, a consideration that has received support from a recent study exploring the effects of pregnancy and parenthood (Sibulkin & Butler, 2005). Using the cohort-based National Longitudinal Survey of Youth (NLSY) data, Sibulkin and
Butler investigated the extent to which having a child during college interferes with graduation. Their results, even when controlling for several other factors, indicated that for Black and White women, and for Black men, having a child during college had a significant negative impact on one’s likelihood of graduation. Thus, Sibulkin and Butler propose that, because college-age Blacks are more likely than college-age Whites to have a child, childbearing may be an important, but often overlooked, variable when conducting studies predicting college graduation.

Other forms of challenging life-events may also have considerable effects on college student outcomes. Two separate lines of research have found that any number of difficult life-events can have both physical and psychological effects. In the first line of research, Rahe and his colleagues (Holmes & Rahe, 1967; Miller & Rahe, 1997; Rahe, Veach, Tolles, & Murakami, 2000) have developed a series of inventories that assign values to life-events based on the psychological stress related to such events. For example, Miller and Rahe (1997) find that one’s own personal illness or injury, going to jail, or the loss of one’s employment all cause more stress than, for example, beginning school or having trouble with one’s in-laws. In the second line of inquiry, Turner and Butler (2003) and Turner and Lloyd (1995) documented the long-term and cumulative effects of traumatic life-events. For example, Turner and Lloyd found that higher levels of cumulative trauma were associated with greater occurrence of major depression or substance abuse; the effects of such trauma were still visible, in some cases, years after the trauma occur.

Beyond the obvious stress resulting from life-events like financial hardship or pregnancy, minority students often face stressors not typically experienced by White students. Minority students may encounter hostile campus climates, negative stereotypes, overt discrimination, small numbers of same-race peers, and cultural pressures to articulate their racial identity (Fries-
Britt & Griffin, 2007; Greer & Chwalisz, 2007; S. Hurtado & Carter, 1997; S. Hurtado, Milem, Clayton-Pederson, & Allen, 1998; Nora & Cabrera, 1996; Schwitzer, Griffin, Ancis, & Thomas, 1999; Willie, 2003). Greer and Chwalisz (2007) remind us that individual students respond to these stressors by employing their own personal coping mechanisms, some of which lead to better outcomes than others. However, like many studies of college outcomes, the Greer and Chwalisz study presumes that all the stress these students face comes from college-related experiences. Ignored is the manner in which non-college stressors contribute to or magnify the stress students feel from school activities.

**Effects of Non-College Life-events**

Some events, like financial crises or pregnancy, have obvious and direct effects on a person’s ability to graduate from college; other events likely have more subtle, indirect effects on students’ educational attainment. This section describes life-events that may affect students in both direct and indirect ways.

**Direct effects: financial interference.** Financial factors play an important role in students’ college experiences and outcomes. For students dependent on their parents for tuition support, the financial and occupational status of their parents is particularly important. Sudden parental unemployment, death, or incarceration may cause an acute financial crisis for the student. Without a steady source of sufficient income from their parents, some students may have to get a job or increase their working hours to offset the lost income from their parents. Unfortunately, research shows those who have to work long hours spend less time doing coursework (Heller, 2002) and are more likely to leave before obtaining a degree (Ehrenberg & Sherman, 1987) than their non-working peers.
Of course, students’ responses to financial shortfalls vary dramatically, based on the cause of the crisis, its intensity, the students’ academic status, and a variety of other personal factors. If circumstances prevent students from gaining employment or taking out loans, students may transfer to less expensive schools. While such a transition may ease the immediate financial crisis, transfer students face many unique challenges (Townsend, Mcnerny, & Arnold, 1993; Townsend & Wilson, 2006; Volkwein, King, & Terenzini, 1986). These challenges are at least partially responsible for the deflated transfer-student outcomes; regardless of the reason, students who transfer typically graduate at lower rates and, if they remain enrolled, take longer to complete their programs (McCormick, 1997). Moreover, those students who move from a four-year to a two-year college (i.e., reverse transfer) are less likely to obtain a bachelor’s degree than those who transfer between four-year institutions (i.e., horizontal transfer) (McCormick, 1997). Other students, unable to spare the time or money to continue at any college, might leave college to go tend to their families, perhaps by becoming the primary source of financial support. And although many of these students would hope to return to college after the crisis has passed, dropouts often have trouble getting back into and through their original degree programs (Pascarella & Terenzini, 2005).

Clearly, the financial consequences of non-college crises can have a direct and immediate effect on students’ ability to pay for college. Unfortunately, the effects of such events may extend beyond the direct ability-to-pay consequences. If not already uncertain about their financial situations, a non-college life-event may cause students to realize that their college education is dependent upon vulnerable financial sources. As Cabrera, Nora, and Castaneda (1992) recognize, the intangible, psychological costs of worrying about funding serve to magnify
the direct effect of the lost income, further interfering with students’ academic and social integration into college.

**Indirect effects: psychological and physiological interference.** While the financial effects of traumatic life-events are somewhat obvious, direct, and easily quantifiable, they represent only one component of the compound effect resulting from such life-events. These events may also affect students’ emotional or psychological status, which may in turn affect student outcomes. Indeed, several studies (Arnold, 1993; Kenny & Donaldson, 1991; Kenny & Perez, 1996) have linked family issues with both practical and psychological difficulties among college students; there is also some initial evidence to suggest that various forms of traumatic life experiences, particularly those which have occurred recently, can interfere with students’ psychological well-being or resilience while in college (Banyard & Cantor, 2004; H. A. Turner & Butler, 2003).

For example, time spent communicating with family and friends while trying to deal with a critical non-college life-event may be taken at the expense of study time or class attendance. Traumatic life-events are also likely to cause anxiety, depression, or anger, all of which can affect one’s ability to concentrate. Even if NCLEs do not take up students’ time, such events may sap students’ energy and limit the intensity of their academic efforts – a critical but often forgotten component of Astin’s (1993b) notion of involvement. Moreover, these maladaptive responses to stress can also alienate friends, peers, and teachers, thus inhibiting social and academic integration into the institution (Tinto, 1993).

Furthermore, Rahe and colleagues (Rahe & Arthur, 1968; Rahe, Mahan, & Arthur, 1970; Rahe, Mckean, & Arthur, 1967) have demonstrated that stress from certain life-events increases the likelihood that a person will develop medical problems. While the link from external life-
events to internal physiological ailment is largely indirect (e.g., stress causes insomnia which weakens a body’s immune system), becoming ill following a major life-event may compound the negative consequences of the original life-event. Physical illness can limit students’ ability to attend class or get involved with co-curricular activities. Doctor visits, medical tests, and treatment regiments may also be expensive. It is clear, but unfortunate, that the effects of experiencing critical non-college life-events interfere with students’ chances for graduation in ways that are both complex and cumulative.

**Racial differences in the frequency and impact of critical non-college life-events.**

While everyone is susceptible to the psychological and financial trauma that accompanies, for example, serious injury, both the frequency and impact of such life-events may be related to race. Racial minorities appear to be disproportionately affected by such life-events, especially early in one’s life (H. A. Turner & Butler, 2003). For example, Black and Hispanic females of traditional college age – those aged 15-19 (Hoffman, et al., 2003) and 18-24 (Martin, et al., 2007) – are more likely to get pregnant than are White females. So, too, are Blacks at greater risk for death from certain illnesses (e.g., cardiomyopathy, diabetes, infections), suicide, and homicide (Howard, Anderson, Russell, Howard, & Burke, 2000). Blacks and Hispanics, particularly males, are also at increased risk of death from auto accidents (Braver, 2003). The Howard et al. (2000) and Braver (2003) studies note that at least some of the race-related risk of disease or death can be explained by other context-specific variables including socioeconomic status, which can itself serve as a proxy for the different environmental conditions in which people of different races often live.

Of course, students attending highly selective colleges – regardless of race – frequently come from comparatively wealthy, healthy, and well-protected home and school environments
Thus, the racial minorities attending selective institutions may not, themselves, be at any increased risk for health or legal problems. However, racial minorities may have larger social networks than Whites and, thus, be more likely to have friends and family experience traumatic life-events. For example, Hispanic students often maintain close ties with their families while in college, even across international borders (Hernandez, 2000; A. Hurtado, 1997); Black Americans often maintain extensive “fictive kin” networks that include both extended family and non-relatives (Chatters, Taylor, & Jayakody, 1994). These extended social networks cause many minority students to be “exposed to higher levels [than White students] of violence and disorder themselves, making an accumulation of negative life events within the social networks of minority students much more likely, thereby undermining academic performance” (Massey, 2006, p. 407) in college.

Finally, minority college students may be particularly sensitive to challenging life-events and more dramatically affected by them. Reviewing the notion of kin networks among African Americans from a historical perspective, Miller-Cribs and Farber (2008) argue that a long-term reliance on Blacks’ social networks has depleted the resources (e.g., financial capital, emotional support) that may have previously been provided by those networks. Black students who leave home to attend college may lose some of the support previously provided by such networks, as “the farther kin members move from one another, the less likely they are to participate in various kinds of resource exchange” (Miller-Cribbs & Farber, 2008, p. 47). Moreover, minority students at predominantly White institutions may not have large, local, or meaningful support groups on campus (Willie, 2003) and may struggle to establish supportive relationships with their predominantly White faculty instructors (Guiffrida, 2005). Racial minorities may also hesitate to seek the professional assistance made available on campus (Davidson, Yakushka, & Sanford-
Martens, 2004; Neighbors & Jackson, 1984), though research on the topic is equivocal (for example, see also Schnittker, Pescosolido, & Croghan, 2005; Snowden, 1998). Instead, minority students may turn to their relatively large social networks to help them cope with difficult life-events (Taylor, Chatters, & Celious, 2003; Taylor, Chatters, & Mays, 1988), although the academic demands of highly-selective colleges and the physical distance between students and their families likely hinder students’ ability to seek or receive assistance from extended families residing off campus.
CHAPTER 3: RESEARCH METHODS

This study examines net racial equality of four-year graduation rates at selective colleges and universities. Following the general outline presented in the literature review, the study proceeds through two phases of analyses. In overcoming two limitations common in previous research, the first phase uses race-conditional models to examine the extent to which students’ pre-college characteristics affect net racial equality. The second phase extends this line of research by testing the hypothesis that different frequencies or effects of non-college life-events can explain at least part of the race-specific gaps in graduation rates. All analyses use the same dataset and progress through several iterations of related multi-level models. The first half of this chapter provides an overview of the data and analytical procedures used in this dissertation. The second half of the chapter provides additional details about the specific analyses conducted to address each of the research questions.

Data

The data used in this study come from the public-use files made available by Douglas Massey and Camille Charles as part of the National Longitudinal Survey of Freshmen (NLSF). The NLSF was conducted as part of a Mellon Foundation grant conceived and executed as a formal follow-up to Bowen and Bok’s (1998) Shape of the River, a prominent text on the effects of race-sensitive admissions in higher education.

The National Longitudinal Survey of Freshmen was developed to extend the Shape analyses and to examine recent theories hoping to explain the apparent underachievement of Black and Hispanic students at America’s selective institutions. To do so, researchers conducted

\[1\] Details about the project’s purpose, sampling frame, solicitation methods, interview protocols, and participation rates are presented in Appendix B and at http://nlsf.princeton.edu.
up to five, wide-ranging interviews over a four-year period with students from competitive-admission, four-year colleges and universities. The NLSF design attempted to replicate the institutional sample included in the College and Beyond dataset and upon which the analyses in the *Shape* was based. However, because the NLSF staff added one institution (UC-Berkley) and was rebuffed by others, the NLSF’s institutional sample (with 28 institutions) is an imperfect replication of that from the College and Beyond dataset (which had 34 institutions).

Within each of the 28 participating institutions (see Table B-2 for a list), researchers attempted to interview an equal number of first-time, first-year domestic (i.e., U.S. citizen or resident alien) students from each of four racial groups: White, Black, Hispanic, and Asian. In the fall of 1999, NLSF staff attempted to interview 4,573 students across the 28 campuses. Of those, 3,924 participated in the first (Wave 1) interview: 998 White, 1,051 Black, 916 Hispanic, and 959 Asian students. Participating students were interviewed again in the Spring of their first, second, third, and fourth years (Waves 2-5, respectively). Response rates were high throughout the study, with roughly 95% of the students from Wave 1 also participating in Wave 2; more than 75% of those from Wave 1 participated in all five interviews over the four-year period. Subsequently, NLSF staff worked with the National Student Clearinghouse to collect graduation data for more than 99% of the original 3,924 participating students. From this original NLSF sample of 3,924 students at 28 institutions, 2,590 students from 22 institutions are sub-sampled for inclusion in the present analyses.

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2 Because NLSF staff interviewed students twice during their first year of college, but only once annually thereafter, Waves 3, 4, and 5 were actually conducted during years 2, 3, and 4. To maintain consistency and improve clarity, all variable names used for this analyses (see Appendix A for complete descriptions) include an indicator of the *wave* in which that data point was collected. For example, the variable named *Dorm3* reflects a student’s place of residence when data were collected during Wave 3 of the study, which occurred during the Spring of the student’s sophomore year.
Institutional and Student Sub-Samples

From the 28 schools included in the NLSF dataset, 22 were selected for inclusion in the present analyses. To be included, an institution needed to have at least 20 student cases for each of the four racial categories. Because the original institutions were not randomly sampled from nor repetitive of any specific population, the exclusion of these six institutions has no formal effect on sample representativeness or generalizability to other institutions. Moreover, the sub-sampling of institutions had little effect on the overall student sample size, decreasing the student pool by less than one percent, from 3,924 to 3,603. But by limiting the institutional sample to only those with schools with student samples ranging in size from 83 to 362 total students, I minimize the possibility of computational complications arising from model singularity/identity within an institution.

To be included in this study’s analytic sample, a student case must have complete data on all pre-college characteristics. Because the focus of this study is on net equity, it is critical that cases include complete data for all factors that act as pre-college control variables. It is only after a comprehensive accounting of students' pre-college characteristics that one can claim to evaluate the net equality of college outcomes. Of particular importance were students' scores on college admissions tests. Controlling for test scores (often viewed as a proxy for academic preparation or cognitive ability) is a de facto requirement for all studies of college effects. ACT and SAT scores are perhaps the most face-valid and research-tested predictors of student success in college. However, students' ACT and SAT scores were not collected until the study's third wave, when the students were in the spring of their sophomore years. The inclusion of ACT/SAT scores thus necessitated the elimination of students who did not participate in the third wave of data collection.
The requirement for full pre-college data restricted the participant pool to 2,590 students. Of the cases "lost" due to incomplete pre-college data, most were missing ACT/SAT scores. Of the 2,590 cases with complete pre-college data, the White sample includes 696 students; the Asian sample includes 695 students, while the Black and Hispanic samples include 608 and 591, respectively.

The inclusion of only those cases with complete pre-college data introduces additional sampling bias to the analyses. Descriptive analyses of the final analytical sample compared to the complete original sample (see Table B-3 in Appendix B) show that final sample is largely representative of the full sample of students at the twenty-two institutions (including demographics; measures of social and cultural capital; psychological dispositions; and indicators of financial well-being). However, the analytic sample has a slight overrepresentation of White and Asian Students, and it has a four-year graduation rate approximately three percentage points higher than the full sample (70% vs. 67%). Therefore, it is likely that the students included in this analyses are slightly more likely to graduate than the average of all students who entered a participating institution.

Of course, Massey et al. (2003) made no claim regarding the representativeness of the original NLSF sample; nor do I. While the data collection was designed to capture data from a wide range of institutions, it was never formally related to a specific population of interest. My sub-sampling further limits the ability to claim representativeness. Nonetheless, what is lost in terms of population representation is counterbalanced by the scope, depth, completeness, and longitudinal nature of the data. The analyses presented here, while not formally attempting to represent the effects of a particular population of campuses or their students, are derived from a multi-institution study of selective schools and garnered thousands of cases over a four-year
period. As such, even if not statistically representative, the data used in this study are considerable for both their quality and their magnitude, making the findings based on their analyses worthy of careful consideration by researchers, educators, and policy-makers.

**Comparative Sample Adequacy**

Although not without its shortcomings, the NLSF dataset is particularly appropriate for the current study. For example, it allows the consideration of conditional effects (those factors that differentially affect certain groups), which Pascarella and Terenzini (2005) argue often fall victim to data limitations. Second, despite falling short of Kreft's (1996) general rule of thirty cases within each of thirty groups/institutions, the data are sufficient, albeit not ideal, for the use of multilevel modeling (see Hox, 2002; Raudenbush & Bryk, 2002; Snijders & Bosker, 1999). Recognizing the limitations inherent in the NLSF data, I explored several other datasets in hopes of finding a more suitable dataset. Each of the potential alternative data sources had their own limitations, and each was judged to be less capable of supplying the data necessary to answer the questions posed in this study. Four alternative data sources were examined.

First, I considered data from the National Survey of Student Engagement (NSSE). NSSE has data from a large number of participating schools. It also has good college experience data, especially for first-year students. While the NSSE surveys have several experience scales and a few self-reported indicators of learning and development in college, there is no objective outcome measure like test scores or graduation. Moreover, NSSE provides very little data regarding students' pre-college characteristics, psychological dispositions, social or cultural capital, or experiences beyond the first year of college. Finally, before releasing data to external researchers, NSSE administrators will randomly eliminate data from 80 percent of participating
schools. There are also limitations on the specificity with which schools can be identified for inclusion.

Second, I considered data from the Cooperative Institutional Research Program (CIRP) Freshman Survey from UCLA’s Higher Education Research Institute. Like NSSE, the CIRP has a large number of participating schools. The data collected by the freshman survey collects a fair amount of detail regarding students' pre-college experiences and attitudes. The CIRP datasets, however, do not track students through to graduation. Therefore, the CIRP data does not have any information about students' college experiences or outcomes. Linkage to other surveys containing additional college experience data is possible, but such linkages add considerable complexity while substantially shrinking the pool of potential schools and student cases.

Third, I considered data from two national studies that tracked students from high school into college: the National Educational Longitudinal Study (NELS) and Educational Longitudinal Study (ELS) studies from the National Center for Education Statistics (NCES). These datasets include a number of pre-college variables, as they collected data from students, families, and teachers while the student was in high school. However, because these surveys are heavily focused on the K-12 sector of education, and because the study puts considerable effort into the tracking of students who do not attend college, the ELS/NELS studies do not have a great depth of data related to students' college experiences. Moreover, because students are cluster-sampled in K-12 settings, the usable sample for college-specific analyses is shrunk dramatically. Only about half of the students from the original sample attend college of any kind, and even smaller proportions attend four-year institutions. While students are tightly clustered within high schools, they are widely dispersed when going to college. With no more than a handful of student cases
for each college or university, reliable analyses of institution-level inequality would be impossible.

Finally, I considered using the NCES’s survey of Beginning Postsecondary Students (BPS). This dataset has a very large pool of institutions, with 334 public and private four-year institutions and approximately 4,000 of their students included in the dataset. It also follows students in the years following their entrance to the school, acquiring transcript-related data including graduation indicators. In addition, because the student sample is initially drawn from the pool of students applying for financial aid, BPS contains good data on student financial status and college costs. But, because the study takes interest only in students’ college experiences and subsequent outcomes, there is little data related to students' pre-college experiences or characteristics. Moreover, the BPS study is intentionally broad in its design. As such, questions are worded to be applicable to students in a wide variety of educational environments (e.g., two and four-year schools). As such, the questions are relatively superficial and generic in nature. Finally, the distribution of sampled students within the schools cause some challenges for modeling race-specific and school-specific effects. With a relevant sample size of 4,000 students in 334 institutions, the average school is represented by only 12 students of varying racial composition.

Additional Considerations when using Data from Selective Institutions

Use of data from highly selective institutions comes with at least one major limitation. Because these institutions attract and enroll a relatively small and exclusive cadre of students, findings based on analyses of data from selective institutions may not be transferable to less-selective institutions. Nonetheless, researchers need not dismiss such data as irrelevant. In fact, the use of data from elite institutions provides several advantages in the current study.
Limited generalizability. The major limitation of data from selective institutions relates to generalizability. By virtue of being selective, these institutions are few in number and serve a relatively small portion of the nation's college population. Moreover, the racial composition of these institutions differs from the composition of most other American colleges (Saenz, Oseguera, & Hurtado, 2007). Highly selective institutions enroll disproportionally high numbers of White and Asian students but disproportionately low numbers of Black students, Hispanic students, first-generation students, and those from lower socioeconomic strata (Carnevale & Rose, 2004). It follows that findings from studies of these institutions and students may not be generalizable to the more mainstream schools and students. Indeed, evidence of the limitations inherent in the use of data from highly selective institutions can be seen in the significant challenges to traditional student development and retention theories in the last few decades. Some of the field's most prominent early theories, many of which grew from research conducted with largely homogenous and exclusive samples (e.g., Perry, 1970; Sanford, 1962), have been strongly critiqued and revised in recent years because they have limited applicability to racial minorities, women, or students attending less-selective institutions (e.g., Belenky, Clinchy, Goldberger, & Tarule, 1997; Tierney, 1992). Despite this limitation on generalizability, the use of data from selective colleges and universities has some benefits.

Student ability. First, the competitive admissions processes at these institutions effectively filter the student sample in this study. To have been admitted to these institutions, students were required to demonstrate success in high school; strong intellectual development and achievement; records of social responsibility, service, and involvement; strong writing skills; and any number of intangibles that impressed the selection committee. In the current sample, the average SAT score was 1,308, with over 95 percent of the students receiving scores above 1,000.
Ninety percent of them took at least one advanced placement (AP) course, with students averaging 3.4 AP courses each. Together, these statistics suggest that the students in this study are academically well-prepared for the rigors of a bachelor’s degree program. Those students who leave college before attaining a bachelor’s degree, then, do so for some reason(s) other than a lack of academic ability.

Moreover, because these institutions are so selective, students must be intentional and consistent in their pre-college experiences in order to qualify for admission. Students do not simply "default" to these schools. Students applying to highly selective schools have spent years cultivating the academic and personal resumes that make them attractive to elite schools. All of these students, then, enter college having demonstrated that they are motivated toward academic success and are at least somewhat aware of the things that are most important to college readiness. In other words, all of these students have at least some degree of academic preparation, motivation to succeed, and self-discipline. Thus, while there is considerable variability within this population, all of these students in the study are able to succeed in college. As a result, findings from this study cannot be easily attributed to student inability.

**Policy relevance.** Second, active public, political, legal, and scholarly discussions regarding racial equality in higher education revolve around affirmative action policies. Although this study does not attempt to measure the effects of race-sensitive admissions policies (see Bowen & Bok, 1998), the results from this study may be relevant to policy-makers considering such affirmative action policies. Despite its position as a central, and controversial, public policy issue, postsecondary affirmative action – as it has thus far generally been adopted for admissions – has been studied primarily as it relates to elite or highly selective institutions (e.g., Bowen & Bok, 1998; Card & Krueger, 2005; Massey, et al., 2003; Saenz, et al., 2007).
These scholars focus on elite institutions because 1) the individual benefits of an elite education are substantial and 2) affirmative action policies have their greatest effects on these universities. Indeed, affirmative action in college admissions is only applicable at institutions that have sufficient pools of applicants from which they can draw qualified candidates of any race. Only the most selective institutions, those selective enough to turn away otherwise qualified applicants, are in such a position. Thus, to make an immediate, direct, and sizable impact on current public policy discussions, studies of equality in higher education would be well-served to focus their attention on the selective institutions at the center of the affirmative action debate.

Analytic Procedures

The major analytic technique employed for this study involves the extension of the generalized linear model to build multi-level models using logit link functions. In addition to allowing a comprehensive investigation of the research questions, the analytical procedures used in this study are designed to overcome two major limitations of previous studies of college outcome equality.

Overcoming Limitations in Previous Research

Perhaps the biggest critique of previous studies, and nearly all of the public or political arguments about race-based inequality in higher education outcomes, is that these studies have relied heavily on simple, gross, aggregated statistics indicating long-term, consistent, large, and (in many cases) growing disparities between White and minority students. Such a focus on gross outcomes, at least among scholars, may be the result of data availability. Relatively few researchers have access to data that includes adequate numbers of diverse student cases from an adequate numbers of institutions. Even the use of national datasets from NCES provides only
limited opportunities for analyses. Some longitudinal studies, like NELS or HSB, provide a large number of background and academic variables. However, because they draw their samples from K-12 students, these datasets lose nearly half of their cases when students graduate high school, have only limited data on college experiences, and have so few students per institution as to make random-intercept models inappropriate. College-focused datasets have some potential, but often lack the detailed academic, psychological, and sociological background characteristics that allow for the controlling of pre-college characteristics. Even the Integrated Postsecondary Education Data System (IPEDS), the massive federal warehouse for college data, is insufficient for analysis of net outcomes. While schools must report their graduation rates by race and gender, schools do not need to provide any data regarding racial differences in students ACT/SAT scores or any number of other phenomena that would need to be controlled in any effort to measure the net effect of college.

This dissertation effectively overcomes this data-availability limitation. All of the predictive models include a wide range of pre-college characteristics (demographic, academic, psychological, sociocultural, and financial) that may affect students’ college experiences or outcomes, thus allowing examination of net outcomes. Accordingly, all the parameters of interest for this study will be calculated net of students’ other measured pre-college characteristics.

The second major analytic challenge facing studies of educational inequality relate to the use of data from multiple institutions. When students are aggregated across institutions, traditional OLS or logistic regression procedures, even when including institutional variables (e.g., size or selectivity), ignore unknown differences between institutions. In such cases, the parameter estimates for institutional predictors are biased toward apparent statistical
significance, as their standard errors are consistently underestimated with such techniques (Bryk & Raudenbush, 1992; Hox, 2002; Raudenbush & Bryk, 2002). Thus, using traditional techniques would ignore the unknown sources of variability in graduation rates while overestimating the effect of any variable used to differentiate between institutions. To overcome this problem I employ a random intercept multi-level model, which allows the intercept for a given model to be school specific. Thus, all of my models account for the unknown sources of variability in the overall graduation rates between schools.

Variables Included in Analyses

The National Longitudinal Survey of Freshmen includes a number of variables relevant to the study of racial inequality in college outcomes. Throughout these analyses, the dependent/outcome/criterion variable is a dummy-coded indicator of whether a student graduated from his/her original institution within four years. My analyses make use of independent/predictor variables representing four distinct, but related, constructs: 1) students’ pre-college characteristics, 2) students’ college experience, 3) students’ non-college life-events, and 4) students’ graduation from college. I describe these variables briefly below, and present complete details in Table A-1.

College graduation. Graduation within four years at students’ original institution.

Pre-college characteristics. My review of the literature revealed several pre-college characteristics that are likely to affect a student’s likelihood of college success. In addition to race, this analyses includes eleven variables representing students’ pre-college demographic, academic, sociocultural, psychological, and financial backgrounds.
College experiences. Although not the focus of this study, students’ college experiences nonetheless affect their likelihood of graduation, and supplemental models include a variable indicating whether a student lived on-campus during his/her sophomore year.

Non-college life-events (NCLEs). This study’s second research question asks whether racial gaps in graduation rates are related to difficulties in students’ lives outside of college, operationalized as a scale variable indicating the number of adverse non-college life-events experienced by a student during his/her second college year. Non-college life-events include:

1. Any event occurring within a student’s family,
2. That occurs fully outside the control of the institution, and
3. Occurs largely outside the control of the individual student, but that is
4. Likely to have (direct or indirect) adverse consequences (financial, physical, psychological, or academic) for the student.

Among the fourteen items that comprise the scale are indicators of a student’s parents getting divorced, losing a job, or going onto public assistance; an unwed sister becoming pregnant; or a family member getting into legal trouble, going to drug rehab, or passing away. A complete list of component items appears in Table A-1; a description of two alternate NCLE variables used in supplemental analyses appears in Table A-2.

Race-Specific Comparisons of Descriptive Statistics

The formal examination of racial inequalities begins by comparing the descriptive profiles of sampled students of each race. For categorical variables, chi-square tests are used to confirm the statistical significance of observed racial differences. For continuous variables, two statistical procedures determine whether mean values for the measured variables (i.e., pre-college characteristics and non-college life-events) differ across race. First, a one-way analyses of
variance (ANOVA) is used as a preliminary indicator that there exist at least some race-specific differences for a given variable. When ANOVA tests indicate that a variable varies across race, bivariate Bonferroni-adjusted post-hoc comparisons of race-specific means are used to identify more precisely which racial groups have differing mean values. All reported racial differences in descriptive statistics have associated p-values of .05 or smaller.

Multi-Level Modeling (HGLM with Logit Link Function)

Subsequent analyses use HLM software (Raudenbush, Bryk, & Congdon, 2004, version 6.06) and employs an extension of the generalized linear model to build multi-level models using a logit link function. The outcome variable is an indicator of an individual’s graduation status after 4 years (1 = graduated from original school, 0 = did not graduate from original school). The dichotomous nature of the outcome variable invalidates the maximum likelihood computations that would otherwise be used were the outcome variable to be normally distributed. Instead, the non-linear hierarchical model use high-order Laplace procedures and a logistic link function, following the Bernoulli distribution, to approximate maximum likelihood estimates. As detailed in Raudenbush, Yang, and Yosef (2000) and summarized in Raudenbush and Bryk (2002), the Laplace approach ensures that the estimated coefficients remain unbiased even when accommodating high levels of variability in the institutional graduation rates.

For each question, I model four-year graduation using fixed-effects, or random intercept, models in which the effects of a given independent variable are fixed across institutions. The intercept, however, includes an error term (i.e., a random effect) that effectively allows the overall graduation rate for that racial group to vary across institutions. The choice to use fixed-effects models is based on initial analyses of these data, with results that mirror those of Small and Winship: “institutions do not specifically differ in their ability to graduate Black students.
Rather, they [institutions] have different black \textit{sic} graduation rates because they differ in their ability to graduate students more generally” (Small & Winship, 2007, p.1,272). Like Small and Winship, initial analysis for this study suggest that \textit{institutional} differences in race-specific graduation rates is more a function of the institutions’ \textit{overall} graduation rates; institutions with the highest overall graduation rates also generally had the highest graduation rates for each specific racial group.

All independent variables (except gender, with female=1, male=0) are centered around the \textit{grand mean} for the entire sample and are added simultaneously to each model. See Table 1 for complete specification of these variables.

For each question, I first estimate a single model for the whole-sample (including students of all races); I then proceed to develop independent models for each racial group (i.e., Black, White, Asian, Hispanic). Interpretation of the results from these two modeling approaches requires different calculations, but the two approaches reflect only one substantive difference. The whole-sample, single-equation model approach assumes that the effects of pre-college characteristics and non-college life-events are the same for students of all races; the race-specific models allow for the possibility that such effects are different for students of different races (i.e., fully race-conditional effects).

Results from the multilevel models are drawn from HLM program output for the population-average estimates (sometimes called marginal estimates) with robust standard errors. These estimates are most appropriate because racial \textit{gaps} are, by definition, about differences between groups, not individuals. Moreover, “population average inferences are based on fewer assumptions [than are “unit-specific” estimates] and will be quite robust to erroneous assumptions about random effects in the model” (Raudenbush & Bryk, 2002, p. 304).
**Single-equation, whole-sample models.** For the single equation models, I first calculate a baseline model that includes only the intercept, dummy-coded race variables (with White as reference group), and a dummy-coded indicator of sex. Results from this model provide a baseline against which the results from subsequent models are compared. Next, I add the block of variables reflecting students’ pre-college characteristics. The final single-equation model adds the primary non-college life-event variable (NCLE3num).

Interpretation of the results from these single-equation models involves examination of the dummy-coded coefficients for each racial group. With White students serving as the reference group, the coefficients for Black, Hispanic, and Asian students (\(B_B\), \(B_H\), \(B_A\), respectively) will reflect the change (relative to White students) in the log-odds of graduation for students of a particular race. I formally test the null hypothesis that each coefficient is equal to zero via t-tests with a critical value of \(p<.05\). Statistically-significant race coefficients indicate that students from a given racial group graduate at a rate different from that of their White peers.

After pre-college and non-college life-event variables are added to the model, I re-examine the race coefficients. If race coefficients become smaller or non-significant after new variables are added to the model, it can be said that these new variables account for some part of the racial gaps.

Although traditional tests of effect size are inappropriate for these coefficients (due to the non-linear nature of the models), the magnitude of the racial inequality can be approximated after converting the models’ coefficients into race-specific predicted probabilities of graduation within four years. Similarly, by observing how the size of the gaps in predicted probabilities change as new variables are added to the model I can estimate the extent to which pre-college characteristics and non-college life-events can explain the overall racial gaps. Predicted
probabilities are calculated using the formula $1/[1+\exp(Br+B_t)]$, where $B_t$ is the particular race coefficient and $Br$ is the intercept ($B_0$, plus the gender coefficient, $B_f$, when calculating the probability for women). I calculate the predicted probabilities separately for men and for women, as the models’ logistic distribution means that the racial effect on predicted probabilities is non-linear; accordingly, the size of the racial effect will differ for men and women if the sex variable has a statistically significant relationship with graduation.

**Fully race-conditional models.** The reviewed literature also suggests potential race-specific differences in the predictive power of individual variables. Acknowledging the possibility that such *conditional effects* may contribute to the apparent race-specific graduation gaps, I split the overall sample into four race-homogenous sub-samples and build separate models for each racial group. Like the whole-sample models, these split-sample models are developed in three stages. In each stage, the same variables are entered into the models for each race. Accordingly, while variable coefficients can differ across races, the models’ structural composition will be the same for all racial groups. The first race-conditional models include only students’ sex as a predictor and again serve as the baseline for subsequent comparisons. The second set of models adds the block of pre-college variables. The third set of models adds the main non-college life-event variable (NCLE3num).

Interpretation of the race-specific models differs from the interpretation of the whole-sample models. A t-test, again with a critical value of .05, determines whether the NCLE variable has an effect on students’ likelihood of graduation. For each model, the intercept for each race-specific model indicates the log-odds that a male student of a given race graduates from his original college within four years, if he was otherwise like the average student in the overall sample of 2,590 students with regard to all included variables. To ease interpretation,
these log-odds are again converted into race-specific (and sex-specific) probabilities of graduation and compared across races to compute predicted racial gaps. The predicted racial gaps from the baseline models are subsequently compared to the gaps predicted by the pre-college and non-college life-event models. A reduction in predicted gaps as the models become more comprehensive would suggest that pre-college characteristics and/or non-college life-events account for some part of the overall racial gaps in graduation.

There exists no consensus regarding formal tests of statistical significance to compare logistic regression coefficients across models or groups (Allison, 1999; Hoetker, 2004; Williams, 2009). The lack of clear testing procedures is the result of the statistical computation of a generalized linear model with a dichotomous outcome variable. Specifically, the coefficients from a logistic model “are scaled by the unknown variance of their residual variation” (Hoetker, 2004, p. 1) which may differ for each group. Comparing coefficients across groups would require the assumption that the residual variance of each group’s model is equivalently distributed; Alison (1999) argues that “In most cases… there is insufficient justification for that assumption” (p. 190). Applied to the questions asked in this dissertation, I, too, concur that such an assumption is not justified. Indeed, much of the literature I reviewed in the previous chapter suggests that students of different races are differentially affected by various pre-college characteristics. So, too, are many college effects, which remain unmeasured in the current analyses, conditional upon or varied across racial groups (Pascarella, 1985b; Pascarella & Terenzini, 2005). Therefore, standard comparisons of coefficients across models “can reveal differences where none exist, conceal differences that do exist, and even indicate differences in the reverse direction of the actual situation” (Hoetker, 2004, p. 1).
Instead, Hoetker (2004) offers two alternate methods to compare the relative effect of predictors across models for different groups. Most basically, he suggests that when the particular coefficient has widely differing p-values for different groups, the results are informative, especially if the “samples are of roughly the same size, the model appears well specified, and the p-values do not straddle a particular significance level.” Moreover, “although the significance of the coefficients in each group is informative, the relative magnitude of the coefficients across groups is uninformative” (p. 16).

The relative magnitude of cross-group differences in coefficients can be approximated by comparing ratios of coefficients across groups (Hoetker, 2004). For the present analyses, I calculate such a ratio for each group by dividing the coefficient for students’ non-college life-events (NCLE3num) over the coefficient for students’ SAT test scores (SATfinal). The resulting ratio reflects, for each racial group, the effect of NCLEs relative to the effect of students’ SAT scores. Comparing these ratios across groups allows rough estimation of differences in the relative influence of non-college life-events. Although intuitively appealing and potentially informative, the ratio comparison has two shortcomings. First, as Hoetker (2004) demonstrates, “even large differences in ratios may not be statistically significant” using the appropriate Wald chi-squared test (p. 14). Second, differences in the ratios across groups, while no longer attributable to differences in unmeasured residual variance, are affected by racial differences in the effect of students’ SAT scores – a phenomenon that both the literature and preliminary analyses suggest likely exists.

Accordingly, although I follow both of Hoetker’s (2004) recommendations and conduct two forms of supplemental analyses, my comparisons of racial differences in the effect of non-
college life-events should be considered merely suggestive and in need of further empirical validation.

**Supplemental Analyses: Additional Evidence of the Negative Effects of Non-College Life-Events**

The consideration of non-college life-events is novel in examinations of college outcomes. Consequently, the results presented in this dissertation cannot be validated simply by their congruence with results from similar previous studies. Although the analyses thus far have employed advanced statistical procedures and incorporated a comprehensive set of pre-college measures, there remain several methodological limitations that preclude one from placing full confidence in my results regarding the effect of non-college life-events. Therefore, in supplemental analyses I address two of these limitations and provide further evidence of the detrimental effects NCLEs have on college graduation.

**Alternate specification of the non-college life-events variables.** The primary non-college life-event variable (NCLE3num) used in the analyses thus far reflects just one way of operationalizing the underlying construct. Although a comprehensive examination of the myriad possible formulations of NCLE variables is beyond the scope of this dissertation, to confirm that the general findings related to non-college life-events is not the spurious result of a particular variable specification, I re-run the appropriate models with two alternate variable specifications.

The first alternate variable (NCLE2num) is identical to the primary NCLE variable (NCLE3num) except for the timing of the non-college life-events; the NCLE2num variable reflects the number of events each student experienced during the two year period preceding the end of his/her first year of college. Because these events may have taken place before students even arrived on a college campus, their effects on students’ college outcomes may not be
dramatic. Therefore, though I do not expect the influence of NCLE2num to be as clear or of the magnitude presented by NCLE3num, I expect that the results of models with the NCLE2num variable will have a pattern of results similar to that of the NCLE3num models.

The second alternate variable (NCLE3any) is dummy-coded indicator of whether the student experienced any of the non-college life-events that comprise the primary NCLE variable (NCLE3num). Thus, while the NCLE3num variable accommodates the likely cumulative effect of the non-college life-events, the NCLE3any variable reflects the assumption that a student’s subsequent experience of such an event during a given year has no detrimental effect beyond that resulting from his/her experience of the first non-college life-event. Because the NCLE3any variable discounts the likely cumulative effect of non-college life-events, I anticipate the coefficients for the NCLE3any variable will be similar in direction but smaller in size than those for the NCLE3num variable.

Mediating effects of students’ college experiences. The analyses described thus far control for a variety of pre-college student characteristics; they do not account for students’ differing college experiences. By controlling for only pre-college characteristics, and leaving the college experience as the proverbial black box, the results of my analyses thus far represent an upper bound for the effects of NCLE on students’ likelihood of graduation within four-years. A comprehensive investigation of the manner in which students’ college experiences moderate the effects of non-college life-events, or contribute to racial gaps in four-year graduation rates, is beyond the scope of this dissertation. Nonetheless, as an initial exploration of the possible college-experience-conditional nature of the non-college life events, I build one final set of models in which I add an interaction term indicating whether the student was living on campus during the year in which the non-college life-events occurred. Specifically, the variable (N3xD3)
is the interaction of Dorm3 (a student’s residence during his/her second year, coded 1= on campus, 0= off campus) and NCLE3num. The statistical significance of this interaction term is determined by the appropriate t-test and, if significant, will indicate the residence-conditional nature of students’ non-college life-events.

**Limitations**

Although these analytic methods were chosen specifically to account for limitations in previous studies of college inequalities, the results and implications presented in subsequent chapters are themselves subject to a number of limitations.

**Secondary Data Analyses**

Data analyzed in this study are drawn from the public-use datasets of the National Longitudinal Survey of Freshman, a study led by Douglas S. Massey (Princeton University) and Camille Z. Charles (University of Pennsylvania), housed in the Office of Population Research at Princeton University, and funded by the Mellon Foundation. Although the NLSF study is an exemplary dataset in many respects, it was developed by researchers and with a purpose fully independent of the analyses conducted for the present study. Accordingly, the present analyses makes use of “as-is” data from the original NLSF data collection process; there exists no opportunity to revise questionnaires or modify the pool of participants. The use of secondary data has several implications for the present analyses.

**Narrow Sample of Institutions and Students.** The schools participating in the NLSF all have admissions processes that allow them to be selective, generally admitting fewer than half of the students who apply. The students participating in the NLSF, then, have pre-college records (e.g., SAT scores) well above that of the “typical” college applicant in the United States. The
unique composition of the NLSF sample, therefore, prohibits generalizability to more “typical” students and institutions.

In addition, these analyses are limited by two idiosyncrasies in the NLSF data collection procedures. First, despite holding two interviews with students during their first year of college, researchers did not collect SAT data from students until the spring of students’ sophomore year. Because the use of student test scores is ubiquitous in studies of racial gaps in educational attainment, the SAT scores are a *de facto* requirement for my models. Therefore, all students in my analytic sample had persisted at least until the spring of their sophomore year; students who dropped out during or immediately after the first college year are not included in my analyses.

Second, the questions asked as part of the NLSF data collection process differ across interviews. When asked during students’ sophomore year, questions about students’ non-college life events were restricted to those events happening in the previous twelve months. But when asked during students’ first year, these questions referred to events that happened during the previous twenty-four months, a time period that included both students’ senior year of high school and their first year of college. Therefore, despite suspicions that non-college life-events occurring during students’ first year of college might be more detrimental than those occurring later in students’ college experiences, data limitations prevented such an analyses. I suspect future research will find that students in their first college year are particularly susceptible to the detrimental effects of non-college life-events.

**Pan-Ethnic Racial Descriptors.** Throughout this study, I examine *intergroup* differences between the educational outcomes of students from four broad racial groups. Although the terms White, Black, Hispanic, and Asian reflect the coding structure employed by
NLSF project staff, the coding structure makes no allowance for multi-racial or Native American students and specifically excludes international students and illegal immigrants.

Furthermore, the use of pan-ethnic racial descriptors likely masks considerable intragroup variability. These broad racial descriptors do not allow analytic distinctions based on immigrant status, language competency, or geographical origins. For example, the NLSF dataset does not differentiate between first- and second-generation (or beyond) American citizens, a distinction that previous research has noted as affecting the academic success of minority students (Reardon & Galindo, 2009; but see also Buriel, 1988). Moreover, in failing to distinguish race from students’ place of origin, these pan-ethnic terms implicitly equate Puerto Rican students with those of Mexican, Brazilian, or Chilean heritage; lump together Chinese, Taiwanese, Laotian, and Hmong; and miss differences among students’ whose families hail from Egypt, the Congo, Jamaica, and Kenya. Thus, the analysis presented herein can be said to reflect inequality in the most general of racial terms.

**Definition of Non-College Life-Events**

Students’ lives outside of college are far more complicated than can be adequately captured by a single variable. Although the measure of students’ non-college life-events accounts for fourteen different events, all of these events fall under a relatively narrow definition. To maintain conceptual clarity, the variable does not account for events happening directly to students (e.g., illness, jail, drugs, pregnancy, job loss) that might have more direct effects on student outcomes. Nor does it account for students’ intentional activities outside of college (e.g., paid employment, community involvement). Also excluded are family events that, while potentially stressful, do not have clearly negative consequences (e.g., parent getting married or changing jobs). Some of these unmeasured non-college life-events, like working for pay off
campus, have elsewhere been shown to have consequences for student outcomes (see, for example, Ehrenberg & Sherman, 1987). When considering the implications from these analyses, readers should keep in mind the narrow range of events under examination in this study.

**Limited Examination of College Experiences**

Despite decades of research and thousands of studies that describe the manner in which students’ college environments and experiences shape student outcomes (see Pascarella & Terenzini, 1991; 2005), this study does little to account for the manner in which students’ college experiences affect their likelihood of graduation. Instead, I leave the college experience as a “black box” into which students enroll and from which they graduate. Because I leave measures of students’ various college experiences out of my predictive models, the results reflect an upper bound of potential effects of non-college life-events on graduation. I suspect that college experiences mediate or moderate the effect of students’ non-college life-events. The supplemental analyses, in which students’ places of residence are included in the models, serves as an initial effort to determine whether NCLEs have different effects for students in different college environments. If the current analyses show non-college life-events to have a statistically significant net effect on students’ likelihood of graduation, future analyses should explore whether, and which, college experiences and environments help students affected by such events remain on-track for on-time graduation.

**Assumptions of the Hierarchical Generalized Linear Models**

Although the use of race-conditional hierarchical generalized linear models overcomes many of the methodological limitations evident in previous research on educational inequality, these procedures introduce a few limitations of their own. These random-intercept models
assume that the effects of each independent variable (including race) are equal for all institutions. Weary of such an assumption, I conducted preliminary analyses implementing various “random-slope” (Raudenbush & Bryk, 2002) models in which different independent variables were allowed to vary across institutions. Despite testing at least six preliminary models, only one had a statistically significant random component for any of the race variables. However, any modification of that model caused the random component to fall out of statistical significance, suggesting it was likely a statistical artifact. Therefore, analyses proceeds using random intercept (i.e., fixed-effects) models.

A second assumption implicit in my modeling a procedure relates to students’ sex. In the single-equation, whole-sample analyses, none of the independent variables (i.e., pre-college characteristics and non-college life-events) are modeled to have conditional effects. The race-conditional models, however, are structured in such a manner to allow the effects all pre-college and NCLE variables to vary across races. Although the effects of pre-college characteristics and non-college life-events are allowed to vary across racial groups, the effects for a particular racial group are not differentiated by sex. Although the inclusion of a dummy-coded indicator of student sex allows me to calculate male- and female-specific graduation rates for students of each race, the models from which I derive these graduation rates are built upon the assumption that pre-college characteristics and non-college life-events have an equal effect on men and women of a particular race. The choice to use race-conditional models instead of sex-conditional models reflects my focus on racial gaps in college outcomes. Nonetheless, there exists some evidence to suggest that certain NCLEs are more stressful for women than for men (Miller & Rahe, 1997), and the results from the current analyses suggest that students’ sex may make a unique contribution to racial inequality in college graduation rates.
Limited Tests of Statistical Significance

The use of hierarchical generalized linear models offers many advantages over more-traditional analytic procedures. For example, several studies have found estimates of person-specific effects (i.e., level-1 coefficients) to be unbiased when using maximum-likelihood estimation procedures for multilevel models (see Hox, 2002; Maas & Hox, 2005). However, some caution must be used when interpreting the standard errors associated with these effects. Maas & Hox (2005) used a large simulation study to find that standard errors for level-1 coefficients are biased slightly downward about six percent when there are only thirty level-2 clusters (institutions). With only ten groups, the minimum number of groups recommended by Snijders and Bosker (1999), level-1 standard errors were underestimated by 6-10 percent. Accordingly, because there are 22 institutions in the current study, one must be slightly cautious when interpreting findings of level-1 effects with marginal statistical significance.

Finally, the use of a dichotomous outcome variable, an indicator of whether a student graduated within four years, necessitates the use of models based on the logistic distribution. Many of the tests of statistical significance that are common in ordinary least squares analyses, however, are not appropriate for logistic models, thereby limiting the use of formal statistical tests to confirm modeled racial differences. Although the whole-sample, single-equation models provide a significance test for each of the race coefficients, there exists no consensus regarding formal tests of statistical significance to compare logistic regression coefficients across models or groups (Allison, 1999; Hoetker, 2004; Williams, 2009). Therefore, although I follow the recommendations of Hoetker (2004) and employ multiple criteria when interpreting differences in race-specific results, any observed racial differences must be considered more suggestive than definitive.
CHAPTER 4: RESULTS

This chapter presents the results from analyses described in Chapter 3. First, I describe results related to race-specific differences in the influence of students’ pre-college characteristics on their likelihood of graduation from their original institution within four years of original matriculation. Presentation of these results is divided into two major sections. In the first section, I report descriptive statistics that suggest race-specific differences in students’ pre-college characteristics contribute to subsequent racial gaps in college graduation rates. In the second section, I outline results from my predictive models confirming that pre-college differences can partially account for differences in college graduation rates. However, even after introducing statistical controls for racial gaps existing before college entry, meaningful college graduation gaps remain unexplained.

In the second half of this chapter, I present results related to the influence of students’ non-college life-events. This presentation of results related to NCLEs is divided into two parts. First, I report descriptive statistics that outline race-specific differences in the occurrence of such events during students’ first-year of college. Subsequently, I present results from models in which NCLEs are included as predictors of whether a student graduates within four years. On the whole, these models indicate that non-college life-events, although having a deleterious effect on minority student graduation, do little to account for the observed racial gaps in four-year graduation rates.

Overall Racial Differences

As expected, the descriptive portrait of the students in this sample reflects considerable racial differences in students’ pre-college characteristics, non-college life-experiences, and four-year college graduation rates. These data provide some prima fascia support to the notion that
racial gaps in college graduation rates are due, at least in part, to the racial gaps that have
developed before students even begin college or the non-college life-events they experience after
arriving on campus.

**Pre-College Characteristics**

Descriptive statistics, accompanied by ANOVA and Bonferroni-adjusted post-hoc
comparison of means, indicate racial differences exist in nine of the ten pre-college measures
(the exception being students’ estimates of the total cost of their first college year). Presentation
of these results follows the organizational pattern established in the literature review sections
above. Specifically, differences are discussed in the following order: demographic, academic,
sociocultural, psychological, and financial. Racial differences in pre-college characteristics are
presented in Table 1.

**Demographic differences.** Students of color are more likely than White students to be
the first in their families to attend college. Nearly seventeen percent (16.8%) of Hispanic
students are first-generation college students. In contrast, fewer than five percent (4.3%) of
White students did not have at least one parent attend college. Bonferroni-adjusted analyses
confirms that White students are the least likely, and Hispanic students are the most likely, to be
first-generation college students.
Table 1
Racial Differences in Pre-College Characteristics (Mean Scores)

<table>
<thead>
<tr>
<th></th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
<th>Asian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First generation</td>
<td>4%</td>
<td>10%</td>
<td>17%</td>
<td>9%</td>
</tr>
<tr>
<td>Female student</td>
<td>51%</td>
<td>64%</td>
<td>56%</td>
<td>53%</td>
</tr>
<tr>
<td>Academic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAT score (verbal + math)</td>
<td>1,363</td>
<td>1,209</td>
<td>1,288</td>
<td>1,378</td>
</tr>
<tr>
<td>Number of Advanced Placement courses taken</td>
<td>3.7</td>
<td>2.8</td>
<td>3.4</td>
<td>4.3</td>
</tr>
<tr>
<td>Sociocultural</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural capital</td>
<td>14.4</td>
<td>11.6</td>
<td>14.8</td>
<td>13.3</td>
</tr>
<tr>
<td>Social capital</td>
<td>11.4</td>
<td>9.8</td>
<td>10.7</td>
<td>9.5</td>
</tr>
<tr>
<td>Psychological</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>18.8</td>
<td>19.1</td>
<td>19.0</td>
<td>18.1</td>
</tr>
<tr>
<td>Aspirations</td>
<td>2.5</td>
<td>2.7</td>
<td>2.6</td>
<td>2.6</td>
</tr>
<tr>
<td>Financial</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income in $25k intervals</td>
<td>3.51</td>
<td>2.85</td>
<td>2.93</td>
<td>3.25</td>
</tr>
<tr>
<td>Estimated college costs</td>
<td>$27,905</td>
<td>$27,500</td>
<td>$28,834</td>
<td>$27,838</td>
</tr>
<tr>
<td>Unmet need</td>
<td>$3,489</td>
<td>$4,486</td>
<td>$4,444</td>
<td>$2,890</td>
</tr>
</tbody>
</table>

Note. Mean values are listed; chi-square or ANOVA tests of significance have p-values of .05 or less.

**Academic differences.** Pre-college academic preparation and aptitude are measured in two ways: the students’ combined SAT math and verbal scores by the number of advanced placement (AP) courses taken by students during high school. Race gaps in SAT scores are dramatic. White and Asian students averaged scores of 1,363 and 1,378, while Black students averaged scores of 1,209 – a gap of more than 150 points. Hispanic students averaged 1,288 points. Bonferroni post-hoc comparisons confirm that White and Asian students have similarly high SAT scores, with a statistically significant drop in scores for Hispanic students, and further drop in scores for Black students. Asian students took an average of 4.3 AP courses while in high school, more than students from any other racial group. Black students took the fewest AP courses, averaging 2.8 AP courses each. Bonferroni analyses confirms that Asian students take more, and Black students take fewer, AP courses than White or Hispanic students.

**Sociocultural differences.** Race-specific differences in social and cultural capital are also evident, although the distinctions may be somewhat surprising. Hispanic students report the
highest levels of cultural capital, although Bonferroni analyses indicates that White students report similarly high levels of cultural capital. White students also report the highest levels of social capital, with a statistically significant gap between their scores and those of Hispanic students, who have the next highest levels of social capital. Black students report the lowest levels of cultural and social capital, though there is no statistical distinction between the levels of social capital reported by Black and Asian students.

**Psychological differences.** Small, but statistically significant, racial differences in student aspirations are revealed by the ANOVA and Bonferroni analyses. Black students have the highest levels of educational aspirations, with 70.1 percent aspiring to graduate or professional school; similarly, 68.6 percent of Asian students have such aspirations. In contrast, only 55.7 percent of White students have aspirations beyond a bachelor’s degree. Hispanic students’ aspirations fall between those of White and Asian students. In terms of self-efficacy, Asian students stand out for having the lowest scores. Although no statistical distinction can be made between the reported self-efficacy of White, Hispanic, and Black students, each of these other racial groups report significantly higher self-efficacy than do Asian students.

**Financial differences.** Students from all racial groups gave similar estimates of the total costs associated with their first year of college. However, indicators of students’ ability to pay those costs show clear racial disparities. The average unmet need for Black and Hispanic students is $4,486 and $4,443, respectively. In contrast, the average Asian student has $2,889 in unmet need, roughly $1,600 less than Black and Hispanic students. White students have average unmet needs of $3,488. More than half (53.1%) of Asian students report having their first year college costs covered entirely by family, grants, or fellowships. Only 39.2 percent of White, 37.1 percent of Hispanic, and 36.3 percent of Black students were in the same financial position.
Differences in levels of unmet need may be related to racial differences in students’ families’ annual incomes. More than sixty-eight percent (68.1%) of White students come from families making at least $75,000 annually. So, too, do 57.4 percent of Asian students. Far fewer Black (39.1%) and Hispanic (43.7%) students come from such financially well-off families. Instead, Black and Hispanic students are disproportionately from families at the low end of the income distribution; roughly fourteen percent of Black (14.8%) and Hispanic (14.2%) students have families earning less than $25,000 annually. Fewer than eight percent of Asian students (7.9%), and fewer than three percent (2.9%) of White students, come from such economically disadvantaged families.

**Non-College Life-Events**

As suggested by the literature, potentially detrimental non-college life-events are not equally distributed across racial groups. As Table 2 indicates, Black and (especially) Hispanic students are nearly twice as likely to experience at least one, and nearly three times as likely to encounter multiple, non-college life-events than are Asian students. In all measures, White students experience NCLEs nearly as often as Black and Hispanic students, but Asian students have far fewer such events than do students from any other racial group. Although most students do not report any NCLEs in a given year, more than one third of White, Black, and Hispanic students do experience at least one such event; more than one in ten must deal with *multiple* non-college life-events.
Table 2

*Racial Differences in the Occurrence of Non-College Life-Events*

<table>
<thead>
<tr>
<th>Non-College Life-Events (NCLE)</th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
<th>Asian</th>
</tr>
</thead>
<tbody>
<tr>
<td>During the second year of college</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent experiencing at least one NCLE</td>
<td>33%</td>
<td>36%</td>
<td>40%</td>
<td>21%</td>
</tr>
<tr>
<td>Percent experience two or more NCLEs</td>
<td>10%</td>
<td>13%</td>
<td>14%</td>
<td>5%</td>
</tr>
<tr>
<td>Average number of NCLEs</td>
<td>.48</td>
<td>.59</td>
<td>.62</td>
<td>.28</td>
</tr>
</tbody>
</table>

*Note.* A similar distribution of non-college life-events also occurs during other timeframes available in the full NLSF dataset.

a. Chi-square test indicates significant differences: p < .05.

b. ANOVA test indicates significant differences: p < .05

**Actual Graduation Rates**

Across all racial groups, students in this sample graduate from their original institutions within four years at a rate (70.3%), twice that of the national average (34.5%) (Knapp, Kelly-Reid, & Whitmore, 2006). Given the status of both the institutions and students in the analyses, this rough indicator of student success is not surprising. Somewhat more dramatic are the racial differences in graduation rates presented in Table 3. Although roughly seventy-six percent of White (75.9%) and Asian (76.4%) students graduate within four years, graduation rates are significantly lower for Hispanic (68.2%) and Black (59.2%) students. These racial gaps in overall graduation rates, while important in their own right, mask meaningful gender-related differences.

Table 3

*Actual Four- and Six-Year Graduation Rates, by Race and Sex*

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White Black Hispanic Asian</td>
<td>White Black Hispanic Asian</td>
</tr>
<tr>
<td>4-year graduation rate</td>
<td>74.6% 49.1% 64.3% 77.1%</td>
<td>77.1% 64.8% 71.2% 75.7%</td>
</tr>
<tr>
<td>6-year graduation rate</td>
<td>88.4% 72.3% 80.9% 87.8%</td>
<td>87.5% 83.4% 86.7% 91.0%</td>
</tr>
</tbody>
</table>
For female students, the graduation rate for minorities is between two and twelve percentage points below that of Whites; but for male students, the gaps are even wider. Although Asian males graduate at a rate four percentage points higher than their White counterparts, Black and Hispanic males graduate at rates twenty-five and ten percentage points, respectively, below that of White male students. For both Black and Hispanic students, the race gap (relative to White students) is approximately twice as big for male students as it is for female students.

Finally, although not the focus of this study, it is worth noting that four-year graduation rates differ from six-year graduation rates for all racial groups. For Black and Hispanic students especially, these statistics indicate that a substantial portion of students who eventually graduate do so after their fifth or sixth year. The racial gaps in six-year graduation rates, though smaller than the gaps in four-year graduation rates, nevertheless remain clear.

**Effect of Pre-College Characteristics on Four-Year Graduation Rates**

The descriptive statistics presented earlier suggest that the racial gaps in graduation rates might be the result of differences in students’ pre-college characteristics. To test this conclusion, each of the pre-college characteristics was entered into models predicting students’ likelihood of graduating from their original institution within four years.

**Single-Equation, Whole-Sample Models**

For the purpose of comparison to the complete pre-college model, a baseline single-equation HLM model (with only race and sex as predictors) results in statistically significant negative coefficients for both Black (-.815, p<.001) and Hispanic (-.436, p<.001) students, but not for Asian students. As shown in Table 4, these results suggest that, without considering any other differences among students, White males are predicted to graduate at a rate 17.9 percentage
points higher than Black males and 9.0 percentage points higher than Hispanic males. For women, the predicted graduation rate for White students is 15.5 and 7.5 percentage points higher than that of Black and Hispanic women.

Table 4

Results from Single-Equation Baseline Model

<table>
<thead>
<tr>
<th></th>
<th>Coeff.</th>
<th>S.E.</th>
<th>Odds Ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.11</td>
<td>0.17</td>
<td>3.05</td>
<td>0.000</td>
</tr>
<tr>
<td>Female</td>
<td>0.35</td>
<td>0.08</td>
<td>1.42</td>
<td>0.000</td>
</tr>
<tr>
<td>Asian</td>
<td>0.02</td>
<td>0.14</td>
<td>1.02</td>
<td>0.910</td>
</tr>
<tr>
<td>Black</td>
<td>-0.82</td>
<td>0.16</td>
<td>0.44</td>
<td>0.000</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-0.44</td>
<td>0.11</td>
<td>0.65</td>
<td>0.000</td>
</tr>
<tr>
<td>White</td>
<td>0.00</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Graduation Rate - Male -</th>
<th>Graduation Rate - Female -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>75.6%</td>
<td>81.5%</td>
</tr>
<tr>
<td>Female</td>
<td>57.4%</td>
<td>65.7%</td>
</tr>
<tr>
<td>Asian</td>
<td>66.3%</td>
<td>73.7%</td>
</tr>
<tr>
<td>Black</td>
<td>75.3%</td>
<td>81.3%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>75.6%</td>
<td>81.5%</td>
</tr>
</tbody>
</table>

When students’ pre-college characteristics are added to the single-equation baseline model, the predicted racial gaps remain but decrease in size. Again, results indicate no significant difference between White and Asian students in their likelihood of graduation. Although Table 5 indicates that the coefficients for Black and Hispanic students remain statistically significant, they have shrunk to approximately 60 percent of their original size (-.474, p=.002 for Black, -.252, p=.040 for Hispanic). When pre-college characteristics are taken into consideration, White males are predicted to graduate at a rate 10.3 percentage points higher than Black male students with the same background; the gap between White and Hispanic males is predicted to be 5.3 percentage points (see Table 4). For women, the White-Black gap is predicted to be 8.7 percentage points, and the White-Hispanic gap is predicted to be 4.4 percentage points. Collectively, these results suggest that differences in pre-college characteristics account for roughly 40 percent of the White-Black and White-Hispanic gaps in four-year graduation rates.
Table 5
Results from Single-Equation Pre-College Model

<table>
<thead>
<tr>
<th></th>
<th>Coeff.</th>
<th>S.E.</th>
<th>Odds Ratio</th>
<th>p-value</th>
<th>Graduation Rate - Male -</th>
<th>Graduation Rate - Female -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.99</td>
<td>0.17</td>
<td>2.68</td>
<td>0.000</td>
<td>74.8%</td>
<td>81.3%</td>
</tr>
<tr>
<td>Female</td>
<td>0.38</td>
<td>0.09</td>
<td>1.46</td>
<td>0.000</td>
<td>62.5%</td>
<td>70.9%</td>
</tr>
<tr>
<td>Asian</td>
<td>0.10</td>
<td>0.15</td>
<td>1.11</td>
<td>0.487</td>
<td>67.6%</td>
<td>75.3%</td>
</tr>
<tr>
<td>Black</td>
<td>-0.47</td>
<td>0.15</td>
<td>0.62</td>
<td>0.002</td>
<td>69.2%</td>
<td>72.0%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-0.25</td>
<td>0.12</td>
<td>0.78</td>
<td>0.040</td>
<td>72.8%</td>
<td>79.6%</td>
</tr>
<tr>
<td>White</td>
<td>0.00</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>76.4%</td>
<td>80.6%</td>
</tr>
</tbody>
</table>

Race-Specific Models

The models thus far presented do not account for the potential that students’ pre-college characteristics have race-conditional effects on graduation. To account for these potential conditional effects, I split the sample into race-homogenous groups and build separate models for each racial group. Results from these models are presented in Table 6.

Table 6
Predicted Graduation Rates for Race-Conditional Baseline and Pre-College Models

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>Black</td>
</tr>
<tr>
<td>Baseline models</td>
<td>76.4%</td>
<td>52.6%</td>
</tr>
<tr>
<td>Pre-college models</td>
<td>72.7%</td>
<td>59.0%</td>
</tr>
</tbody>
</table>

The baseline race-conditional models (in which sex is the only predictor variable) highlight the racial differences regarding the manner in which students’ sex relates to their likelihood of graduation. Whereas the single-equation model generated results suggesting the racial gaps were similar for both male and female students, the race-conditional models suggest that racial inequality is much more evident for men than for women. With the race-conditional baseline models, the estimated White-Black graduation gap is 23.8 percentage points for men, but only 11.4 percent for women. Similarly, White males are predicted to graduate at a rate 12.1
percentage points higher than Hispanic males, while the corresponding gap for females is 8.6 percentage points. Asian males have a predicted graduation rate 2.5 percentage points higher than White males, but White females are predicted to graduate at a rate 1.6 percentage points higher than Asian women.

Subsequently, all of the pre-college characteristics are added to each of the race-conditional baseline models. On the whole, the effects attributable to pre-college characteristics occur in the expected direction. There also appear to be several differences between models for each racial group. Limitations inherent in the use of a dichotomous outcome variable precludes formal statistical tests of the race-conditional nature of any individual predictor variable (Allison, 1999; Hoetker, 2004).

However, the estimated coefficients can be used to calculate the likelihood that students of a particular race and sex, but whose pre-college characteristics are otherwise like those of the average student in the sample, will graduate from his/her original institution within four years. Results presented in Table 6 indicate that, for men, 72.7% of White, 78.6% of Asian, 65.9% of Hispanic, and 59.0% of Black students would likely graduate within four years. For women, the corresponding rates are 77.8%, 78.3%, 75.4% and 75.0%. Put in terms of racial gaps, after controlling for differences in pre-college characteristics, White students are predicted to graduate at a rate 13.7 percentage points higher than their otherwise-similar Black peers; the predicted White-Hispanic gap is 6.8 percentage points, and Asian males are predicted to graduate at a rate 6.0 percentage points higher than comparable White males. For women, the predicted racial gaps have shrunk dramatically from the baseline models. The White-Black gap is 2.8 percentage points, the White-Hispanic gaps is 2.4 percentage points, and Asian women are predicted to graduate at a rate one half of a percentage point higher than their comparable White peers.
This comparison of predicted graduation rates for these race-conditional pre-college models reveals that pre-college characteristics explain roughly 40 percent of the male student racial gaps predicted by the race-conditional baseline models; in contrast, roughly 80 percent of the female racial gaps can be explained by differences in students’ pre-college characteristics. Thus, even when controlling for students’ pre-college characteristics, White and Asian students are likely to graduate at a rate higher than that of Black or Hispanic students, particularly for males. Therefore, racial gaps in graduation rates cannot be simply dismissed as the result of pre-college racial inequalities. However, it appears that pre-college inequalities at least contribute to eventual college outcome inequalities.

**Effect of Non-College Life-Events on Four-Year Graduation Rates**

Because racial gaps in four-year graduation rates remain even after introducing numerous statistical controls – for varied graduation rates across institutions, for differences in students’ demographic, academic, sociocultural, psychological, and financial backgrounds, and for the race-conditional effects these characteristics have on students’ likelihood of graduation – researchers must develop and test new hypotheses to explain why Black and Hispanic students graduate at rates below those of their White and Asian counterparts, particularly among male students. In the remainder of this chapter I examine one such hypothesis. Specifically, I test the hypothesis that the remaining racial gaps in four-year graduation rates can be explained by race-specific differences in the frequency and effect of non-college life-events that adversely affect college students.
**Single-Equation, Whole-Sample Model**

This section presents results from a model in which I add to the single-equation pre-college model a single variable indicating the number of non-college life-events experienced by students during their second year of college. When the non-college life-event variable (NCLE3num) is added to the model, the coefficients, odds-ratios, standard errors, and p-values for each of the race variables remain essentially unchanged from the pre-college model. As seen in Table 7 coefficients for Black and Hispanic students remain statistically significant (coeff. = -.471, p=.005 for Black; coeff. = -.234, p=.050 for Hispanic); results also still indicate no significant difference between White and Asian students’ likelihood of graduation.

Table 7

*Results from Single-Equation Non-College Life-Events Model*

<table>
<thead>
<tr>
<th></th>
<th>Coeff.</th>
<th>S.E.</th>
<th>Odds Ratio</th>
<th>p-value</th>
<th>Graduation Rate - Male -</th>
<th>Graduation Rate - Female -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.00</td>
<td>0.17</td>
<td>2.73</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0.37</td>
<td>0.09</td>
<td>1.45</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0.05</td>
<td>0.15</td>
<td>1.05</td>
<td>0.737</td>
<td>74.2%</td>
<td>80.6%</td>
</tr>
<tr>
<td>Black</td>
<td>-0.47</td>
<td>0.17</td>
<td>0.62</td>
<td>0.005</td>
<td>63.0%</td>
<td>71.2%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-0.23</td>
<td>0.12</td>
<td>0.79</td>
<td>0.050</td>
<td>68.4%</td>
<td>75.8%</td>
</tr>
<tr>
<td>White</td>
<td>0.00</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>73.2%</td>
<td>79.8%</td>
</tr>
<tr>
<td>Non-college life-events</td>
<td>-0.23</td>
<td>0.06</td>
<td>0.79</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Nonetheless, the non-college life-events variable has an effect that is both negative and statistically significant. (coeff. = -.230, p<.001). Thus, although non-college life-events do not appear to account for the racial *gaps* in graduation rates, these events do negatively affect students’ *likelihood* of graduation within four years. This single equation model, however, may mask race-specific differences in the *effect* of non-college life-events. Therefore, I again split the sample and ran separate models for each racial group.
Race-Specific Models

To account for the possibility that the effects of non-college life-events differ for students in different racial groups, I again split the sample and ran four independent race-specific models. Results from these race-conditional models indicate that the non-college life-events have a statistically significant and negative effect on White, Black, and Hispanic students, but not Asian students. Despite results hinting at the race-conditional nature of the non-college life-event effect, the racial gaps in four-year graduation rates are only marginally affected by the addition of these events to the predictive models.

Detrimental effects of non-college life-events. Results presented in Table 8 indicate that the effects of non-college life-events are similar in both magnitude and levels of statistical significance for White (coeff. = -.244, p<.05), Black (coeff. = -.256, p<.01), and Hispanic (coeff. = -.239, p<.01) students; however, the coefficient for Asian students (coeff. = -.173, p>.1) is not statistically significant.

Table 8
Select Coefficients from Race-Conditional Non-College Life-Events Models

<table>
<thead>
<tr>
<th></th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
<th>Asian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.97**</td>
<td>0.39^</td>
<td>0.69**</td>
<td>1.28**</td>
</tr>
<tr>
<td>Female</td>
<td>0.28</td>
<td>0.71**</td>
<td>0.48*</td>
<td>-0.03</td>
</tr>
<tr>
<td>Non-college life-events</td>
<td>-0.24*</td>
<td>-0.26**</td>
<td>-0.24**</td>
<td>-0.17</td>
</tr>
</tbody>
</table>

^ = p < .1; * = p<.05; ** = p < .01

When these coefficients are used to calculate race-specific predicted graduation rates, it becomes possible to examine the extent to which these non-college life events can be said to account for the racial gaps in four-year graduation rates. Table 9 presents the predicted graduation rates. Although the magnitude of the racial gaps decrease in size (relative to the pre-college models) for five of the six race- and sex-specific comparisons (the predicted gap between
Black and White females increases slightly), the reduction in the gaps is small and of marginal practical significance.

Table 9
Predicted Graduation Rates and Racial Gaps from Race-Conditional Non-College Life-Events Models

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th></th>
<th>Females</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>Black</td>
<td>Hispanic</td>
<td>Asian</td>
</tr>
<tr>
<td>Baseline models</td>
<td>76.4%</td>
<td>52.6%</td>
<td>64.2%</td>
<td>78.9%</td>
</tr>
<tr>
<td>Pre-college models</td>
<td>72.7%</td>
<td>59.0%</td>
<td>65.9%</td>
<td>78.6%</td>
</tr>
<tr>
<td>Non-college life-</td>
<td>72.7%</td>
<td>59.6%</td>
<td>66.5%</td>
<td>78.2%</td>
</tr>
<tr>
<td>events models</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|                      | Males          |              | Females         |              |
|                      | White¹ | Black | Hispanic | Asian | White¹ | Black | Hispanic | Asian |
| Baseline models      | 23.8% | 12.1% | -2.5%    |       | 11.4% | 8.6%  | 1.6%     |       |
| Pre-college models   | 13.7% | 6.8%  | -6.0%    |       | 2.8%  | 2.4%  | -0.5%    |       |
| Non-college life-    | 13.1% | 6.2%  | -5.5%    |       | 3.0%  | 1.6%  | 0.1%     |       |
| events models        |       |       |          |       |       |       |          |       |

¹ Predicted racial gaps are calculated with White students as the reference group, such that the gap equals the predicted graduation rate for White students minus the predicted graduate rate for students of the other listed racial group.

**Compound effects of multiple non-college life-events.** Although the addition of non-college life-events does little to reduce racial gaps among students who are otherwise average for the sample, the detrimental effects of non-college life-events become even more clear when one considers the effect of experiencing *multiple* non-college life-events in a single year. Table 10 presents the predicted graduation rates for students who experienced different numbers of non-college life-events during their second college year. Figure 1 presents these results graphically.
Table 10

Predicted Graduation Rates Amid Multiple Non-College Life-Events, Using Race-Conditional Non-College Life-Events Models

<table>
<thead>
<tr>
<th># NCLEs</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>Black</td>
</tr>
<tr>
<td>0</td>
<td>75.0%</td>
<td>62.5%</td>
</tr>
<tr>
<td>1</td>
<td>70.1%</td>
<td>56.3%</td>
</tr>
<tr>
<td>2</td>
<td>64.8%</td>
<td>50.0%</td>
</tr>
<tr>
<td>3</td>
<td>59.0%</td>
<td>43.6%</td>
</tr>
<tr>
<td>4</td>
<td>53.0%</td>
<td>37.5%</td>
</tr>
<tr>
<td>5</td>
<td>46.9%</td>
<td>31.7%</td>
</tr>
</tbody>
</table>

Figure 1. Predicted graduation rates amid multiple non-college life events. Estimates are drawn from race-conditional, non-college life-events models.
These results indicate that graduation rates drop off dramatically as the number of non-college life-events increase. For example, Hispanic males who do not experience any non-college life-events have a predicted graduation rate of 69.0%, whereas those who experience five such events have a predicted graduation rate of 40.3% - a decrease of more than 25 percentage points. An effect of similar magnitude is seen for White and Black males, as well. Predicted graduation rates for Asian males also decrease as the number of non-college life events increase, but the magnitude of the decrease is smaller than that for White, Black, or Hispanic males. Predicted graduation rates among women follow a similar pattern, with the predicted graduation rates for White, Black, and Hispanic students dropping more precipitously than do the rates for Asian students as the number of non-college life-events increases.

**Racial differences in the effect of non-college life-events.** Although methodological limitations preclude direct comparisons across races, these results hint that non-college life-events have less detrimental effects for Asian students than for White, Black, and Hispanic students. To gather additional evidence regarding the race-conditional effects of non-college life-events, and following Hoetker’s (2004) recommendation, for each racial group I compute a ratio in which the coefficient for the non-college life-events variable (NCLE3num) is divided by the coefficient for students’ SAT scores. In doing so, I create a measure of relative effect size. Each racial group’s ratio would then represent the effect of each non-college life-event as the number of SAT point decrease that would result in an equivalent decrease in students’ likelihood of graduation. For example, the NCLE3num/SAT ratio for White students is -240. Thus, for each non-college life-event that a student experiences during his/her second college year, the student’s likelihood of graduation is approximately the same as for a similar student who did not experience any such event but whose SAT score was 240 points lower. The corresponding ratios
for Black, Hispanic, and Asian students are -183, -120, and -244 respectively. Using Hoetker’s (2004) relative effect size ratio, results suggest that non-college life-events are most detrimental for White and Asian students.

Although the Hoetker ratio comparison successfully overcomes the problems caused by unknown residual variance across models (see Allison, 1999), interpretation of the Hoetker ratio is complicated by the introduction of the SAT score as the denominator. Although SAT scores are recognized widely as an indicator of student aptitude, SAT scores have different effects for students of difference races. For example, the non-college life-events models indicate that SAT scores are statistically significant predictors of graduation for Hispanic students (p=.002) but not for White, Black, or Asian students. Thus, the Hoetker ratio for Hispanics is smaller than the ratio from any other racial group in part because it is the only racial group for which the SAT score variation has a statistically non-zero relationship with graduation. These contradictory results and methodological limitations make it impossible to draw confident conclusions regarding racial differences in the effect of non-college life-events.

**Supplemental Analyses: Additional Evidence of the Negative Effects of Non-College Life-Events**

Two types of supplemental analyses are conducted to provide further evidence of the detrimental effect of non-college life-events. In the first, I alter the specification of the non-college life-events variable; in the second I explore whether the detrimental effects of students’ non-college life-events are moderated by their place of residence.

**Alternate specification of the non-college life-events variables.** In supplemental analyses, I ran additional models in which I replaced the original non-college life-event variable with one of two alternate variable specifications. For the first supplemental analyses, the new
variable (NCLE2num) measured the same set of non-college life-events, but included only those events that occurred within the students’ last year of high school or first year of college. Thus, this first supplemental model differed from the main model only by the timeframe in which the non-college life-events occurred. The results show that the effect of non-college life-events occurring during this earlier timeframe are far smaller in magnitude than witnessed in the original model, with the coefficient remaining statistically significant only for Black students (coeff. = -.13, p < .05). The Hoteker ratio (NCLE2num/SAT) is also largest for Black students.

The second alternately-specified variable (NCLE3any) converts the original non-college life-events variable to a dichotomous indicator of whether a student experienced any of the 14 measured non-college life-events during his/her second college year. When this variable is included in the models, results indicate that experiencing any of the non-college life-events has a statistically significant and negative effect on graduation rates of Black students only (coeff. = -.40, p < .01); the effect for White students is of marginal statistical significance (coeff. = -.40, p < .1). The Hoteker ratio (NCLE3any/SAT) is larger for White (-385) than it is for Black (-297) students, and far larger than for Hispanic (-149) and Asian (-113) students.

Mediating effects of students’ college experiences. Of course, students’ likelihood of graduation depends on far more than his/her background characteristics and experiences with non-college life-events. However, all analyses presented thus far ignores students’ college experiences. Therefore, in the final supplemental analyses I build models that include an indication of students’ residence during their second college year. Specifically, I add to the full pre-college models three variables, all of which are in their original metric (i.e., not grand mean centered): an indicator of the number of non-college life-events a student experienced during his/her second year (variable named “NCLE3num”), a dummy-coded indicator of the student’s
place of residence during the second year (variable named “Dorm3”; 1 = on-campus, 0 = off-campus), and a variable interacting these two variables (NCLE3num X Dorm3).

Students’ campus residence has a statistically significant relationship with graduation rates only for White students; the interaction effect is not significant for any racial group. However, the main non-college life-event variable remains statistically significant and negative for both Black (coeff = -.239, p < .05) and Hispanic (coeff = -.453, p < .01) students. Thus, even amid statistical controls for students’ place of residence, non-college life-events continue to have a detrimental effect on Black and Hispanic students’ graduation rates.

Figure 2 highlights the manner in which students’ place of residence relate to the effects of multiple non-college life-events. Although Black students living off campus are predicted to graduate at lower rate than similar Black students living on campus, the detrimental effect of non-college life-events does not appear related to campus residence (note the parallel red lines in both figures). However, non-college life-events are particularly detrimental to Hispanic students living off-campus. Off-campus male Hispanic students who do not experience any non-college life-events have a predicted graduation rate of 70.4%; for those experiencing five such events, the likelihood of graduation drops to 19.9%. For female Hispanic students living off campus, the predicted graduation rate is 79.2% for those without any non-college life-events but 28.4% for those who experience five such events.
Figure 2. Predicted graduation rates for Black and Hispanic students, by sex, place of residence (on or off campus), and number of non-college life-events.
Summary of Findings

As Table 11 shows, fewer than fifty percent of Black men graduate within four years. Fewer than seventy percent of Black women or Hispanic men graduate within four years; White and Hispanic students of both sexes graduate at higher rates. However, were all students to enter college with identical pre-college characteristics, the racial gaps would close dramatically: Black and Hispanic students would have higher graduation rates than they currently do, though White and Asian students’ rates would be lower. Adding a measure of students’ non-college life-events has little effect on predicted graduation rates.

Table 11
Actual and Predicted Graduation Rates for Race-Conditional Models

<table>
<thead>
<tr>
<th>Actual Four-Year Graduation Rate</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>Black</td>
</tr>
<tr>
<td>74.6%</td>
<td>49.1%</td>
<td>64.3%</td>
</tr>
<tr>
<td>Race-Conditional HLM Models</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline Models</td>
<td>76.4%</td>
<td>52.6%</td>
</tr>
<tr>
<td>Pre-College Models</td>
<td>72.7%</td>
<td>59.0%</td>
</tr>
<tr>
<td>Non-College Life-Event Models</td>
<td>72.7%</td>
<td>59.6%</td>
</tr>
</tbody>
</table>

Note. Model-specific predicted graduation rates reflect the likelihood that students of a particular race and sex, who is otherwise like the average student in the whole sample, will graduate from his/her original institution within four years.

Table 12 compares the predicted graduation rates from Table 11 to compute predicted racial gaps in four year graduation rates. In all models, and for both sexes, White students are predicted to outperform their Black and Hispanic counterparts. Asian students generally graduate at comparable, and often higher, rates than White students. Both the actual and predicted graduation rates also indicate that racial gaps in graduation rates are larger among men than among women.
Table 12

Actual and Predicted Racial Gaps in Four-Year Graduation Rates

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>W-B</td>
<td>W-H</td>
</tr>
<tr>
<td>Actual Gaps in Four Year Graduation Rates</td>
<td>25.5%</td>
<td>10.3%</td>
</tr>
<tr>
<td>Race-Specific HLM Models</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline Models</td>
<td>23.8%</td>
<td>12.1%</td>
</tr>
<tr>
<td>Pre-College Models</td>
<td>13.7%</td>
<td>6.8%</td>
</tr>
<tr>
<td>Non-College Life-Event Models</td>
<td>13.1%</td>
<td>6.2%</td>
</tr>
</tbody>
</table>

Note. Following historical precedent, racial gaps are calculated as the (predicted) graduation rate for White students minus the (predicted) graduation rate for minority students [W = White; B = Black; H = Hispanic; A = Asian]. Negative numbers reflect Asian students having higher predicted graduation rates than their otherwise similar White peers.

Pre-college characteristics account for roughly forty percent of the White-Black [(23.8 - 13.7) / 23.8 = 42.4% reduction] and White-Hispanic [(12.1 - 6.8) / 12.1 = 43.8% reduction] gap among men; for women, pre-college characteristics explain more than seventy percent of the White-Black [(11.4 - 2.8) / 11.4 = 75.4% reduction] and White-Hispanic [(8.6 - 2.4) / 8.6 = 72.1% reduction] gaps. Models with equalized pre-college characteristics predict that Asian students of both sexes would graduate at rates higher than their White counterparts.

Results from analyses of students’ pre-college characteristics tell a relatively complex story. Racial gaps in college graduation rates are clear, but vary substantially for males and females. The gaps are also sensitive to changes in the definition of “successful” college outcomes: gaps in four-year graduation rates are more dramatic than are six-year graduation gaps. Race-specific differences also appear in many of the pre-college characteristics that the literature suggests are critical to student success in college, though the nature and magnitude of these differences are somewhat inconsistent. Moreover, despite suggestions from the literature and empirical results that appear to support the notion that the students’ pre-college
characteristics have race-conditional effects on college graduation, methodological limitations prevent statistical confirmation.

Despite these complexities, the broad conclusion to be drawn from the pre-college analyses is both straightforward and predictable. White and Asian students, on the whole, do graduate at rates higher than Black or Hispanic students. White and Asian students also generally have more-advantageous pre-college characteristics. These race-specific differences in pre-college characteristics account for the majority of the racial gaps in four-year graduation gaps among female students; but they explain only about half of the racial gap for men. Thus, although pre-college characteristics contribute to racial gaps in four-year graduation rates, such characteristics cannot explain all of the gaps.

Results from analyses of students’ non-college life-events also tell a complex story. Students who experience non-college life-events during their sophomore year graduate at rates lower than those who do not experience such events; the primary variable measuring non-college life-events (NCLE3num, top panel of Table 13) is statistically significant and negative for three of the four racial groups. Nonetheless, the effects of non-college life-events appear to vary by race, place of residence, and the number of events experienced. Supplemental analyses (bottom two panels of Table 13) suggests that non-college life-events are most clearly detrimental for Black and Hispanic students. The cumulative effects of multiple non-college life-events also appear particularly detrimental for Hispanic students living off campus. Despite these apparent race-related differences, on the whole, the results presented in Table 11 and Table 12 suggest that very little of the overall racial gaps in college graduation rates can be attributed to differences in non-college life-events.
Table 13

Odds Ratios for Non-College Life-Event Variable

<table>
<thead>
<tr>
<th>Primary Non-College Life-Event Variable</th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
<th>Asian</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCLE3num</td>
<td>0.78*</td>
<td>0.77**</td>
<td>0.79**</td>
<td>0.84</td>
</tr>
</tbody>
</table>

Supplemental – Alternate NCLE Variable Specifications

| NCLE3any     | 0.67^   | 0.67**  | 0.75     | 0.88    |
| NCLE2num     | 0.94    | 0.88*   | 0.92     | 0.95    |

Supplemental – Controlling for Place of Residence a

| NCLE3num (main effect) b | 0.87    | 0.79*   | 0.64**   | 1.04    |

Note. Odds ratios drawn from independent, race-conditional models in which all pre-college characteristics are also included. NCLE3num refers to the number of non-college life-events experienced during second college year. (max = 14). NCLE3any is a dummy-coded indicator of whether student experienced one or more non-college life-events during his/her second college year. (0 = no; 1 = yes). NCLE2num reflects the number of non-college life-events experienced during last year of high school or first year of college. (max = 14). a The race by residence interaction variable was not significant for any racial group. b For the supplemental analyses controlling for place of residence, the relevant variables were not centered, so the odds-ratio should not be directly compared to the odds ratios of the other non-college life-event variables presented in Table 13. ^ = p < .1; * = p < .05; ** = p < .01
**CHAPTER 5: DISCUSSION AND IMPLICATIONS**

Major racial gaps in four-year graduation rates remain a persistent problem in American colleges and universities. Policy- or practice-driven efforts to alleviate this problem can be effective only if they address the underlying sources of the inequality. The analyses presented in this study explore two such potential sources: 1) differences in students’ pre-college backgrounds, experiences, and characteristics, and 2) the unequal distribution and impact of students’ non-college life-events. Using data from the National Longitudinal Survey of Freshmen, a six-year study of students at selective colleges and universities, this study employs hierarchical generalized linear models to identify the race-conditional effects of students’ pre-college characteristics and non-college life-events on students’ likelihood of graduation within four years. The results have implications for educational policy, practice, and research. However, because these results must be considered more suggestive than conclusive, I also outline several lines of inquiry that build upon the analyses reported herein.

**Accounting for the Racial Gaps**

**Pre-College Characteristics**

Nearly every model of how college affects students recognizes that students come to college with different types of backgrounds, preparation, and experiences (Astin, 1993a; Bean & Eaton, 2000; Kuh, et al., 2006; Terenzini & Reason, 2005). Mountains of research in a variety of fields have documented significant racial differences in students’ home lives, K-12 school quality, test scores, and several measures of pre-college educational success (Advisory Committee on Student Financial Assistance, 2002; Cabrera & La Nasa, 2000; Entwisle, et al., 2005; Fryer Jr. & Levitt, 2006; Hoffman, et al., 2003; Horn & Nunez, 2000; Reardon & Galindo,
2009). Taken together, these now axiomatic propositions suggest that the racial differences in students’ pre-college characteristics likely lead to racial differences in students’ college outcomes. This study provides a partial confirmation for such a conclusion.

As may be expected, this study’s results document significant racial differences in nearly all measures of pre-college characteristics: White and Asian students generally come to college with advantageous educational, sociocultural, psychological, and financial backgrounds. Such a finding becomes somewhat more remarkable when one remembers the institutions and students who were sampled for this analyses. Of the 22 schools analyzed, all but one have median SAT scores above 1,200 and get the majority of their first-year students from the top ten percent of students’ high school classes. Students attending these institutions are among the best in the country: the sampled students have an average SAT score of 1,314 and nearly all have taken at least one Advanced Placement course while in high school. The descriptive portrait of these highly qualified students reveals that the racial gaps in pre-college characteristics occur even among the nation’s “best” high school graduates.

Thus, more than a century after W.E.B. DuBois (1903) charged them with the task of leading the fight against White oppression, many in the Black and Hispanic “talented tenth” have pre-college experiences that place them in a disadvantageous position (relative to White and Asian students) from which to pursue social change. The inequalities of pre-college characteristics – occurring even among some of the most well-prepared college students – seem more likely to perpetuate, rather than ameliorate, the long-term racial inequalities DuBois sought to rectify. Indeed, results from the current study confirm that these pre-college inequalities have effects that persist through students’ entire college careers: differences in pre-college characteristics explain non-trivial portions of the eventual racial gaps in four-year graduation
rates. My models predict that racial gaps in graduation rates would be cut by approximately 40 percent for men and 75 percent for women, were students of all races to enter college with the same background characteristics. Thus, although pre-college inequalities cannot be blamed for the entirety of racial gaps in four-year graduation rates, it seems clear that college-outcome inequalities have their roots in the eighteen (or more) years of racial inequality that precede students’ entrance to college.

Although such a reduction in graduation gaps would be substantial and important, it is also largely hypothetical and counterfactual: the discussion of college inequalities as though pre-college inequalities did not exist would require a willful and naïve ignorance of reality (Alon, 2007b). Yet, even when students’ pre-college characteristics are assumed to be the same, racial gaps in four-year graduation rates remain clear, particularly among men.

My general finding that students’ pre-college characteristics are strong predictors of eventual college outcomes, and that race-specific differences in pre-college characteristics are at least a partial or indirect cause of racial inequalities in college outcomes, is largely consistent with findings from previous studies. Consistent with Barton’s (2003) finding of racial differences across 14 correlates of college success, this study’s findings suggest that Black and Hispanic students enter college with lower tests scores, fewer resources, and more “risk factors” (Hoffman, et al., 2003, p. 62) than their White and Asian peers at the same institutions.

However, results from the current study contrast starkly with the body of literature suggesting that racial minorities would outperform White students if they were to enter college with the same academic, social, or financial backgrounds (e.g., Light & Strayer, 2002; Nora, Cabrera, Hagedorn, & Pascarella, 1996; Peng & Fetters, 1978; Perna & Titus, 2005). Although, these racial differences in pre-college characteristics likely contribute to lower grades for Black
and Hispanic students (Massey, 2007) which, in turn, may contribute to racial differences in subsequent measures of college success (Desjardins, et al., 2002; Kuh et al., 2007), this study’s findings reinforce Alon’s (2007b) contention that racial differences in family background and educational preparation are only partly responsible for the racial gaps in graduation rates at selective institutions.

**Non-College Life-Events**

That racial inequalities exist beyond those attributable to differences accumulated over students’ years before college entrance suggests that other factors, likely those occurring after students enter college, contribute to racial gaps in college graduation rates. This research explicitly tests the hypothesis that the unequal distribution and influence of certain non-college life-events could explain the racial gaps that remain after accounting for students’ pre-college characteristics. The hypothesis rests on three related propositions:

1. **The likelihood of experiencing** one (or more) detrimental non-college life event(s) vary by race.

2. **The magnitude of the effect** such experiences have on the likelihood of graduation vary by race.

3. If either of the first two propositions is confirmed, the final proposition states that the unequal distribution and/or influence of certain non-college life-events account for the otherwise unexplained racial gaps in four-year graduation rates.

In testing these propositions, I find clear confirmation of the first, some support for the second, but only marginal indications of the third. Specifically, descriptive analyses shows that Black and Hispanic students are more likely than their White and Asian counterparts to experience non-college life-events; Black and Hispanic students are also more likely to
experience multiple such events in a single year. Moreover, although the primary race-
conditional models indicate that non-college life-events negatively affect graduation rates for
White, Black, and Hispanic students, supplemental analyses suggests that such events are
particularly detrimental for Black students. Despite this evidence in support of the first two
propositions, the results offer no more than marginal and tenuous support for the third. For both
male and female students, non-college life-events account for only minor, perhaps even trivial,
proportions of the racial gaps in four-year graduation gaps.

Implications

Implications for Research

One model does not fit all races. Examinations of substantive sources of or causes for
racial gaps employ a variety of methodological approaches. Although the specific methods
employed for a given analyses depend on a wide variety of considerations (e.g., data availability,
analyst expertise), the methods are chosen to enable the most precise and unbiased examination
of the substantive phenomenon under study. In the service of a substantive argument,
methodological decisions should fade into the background. However, results from the current
study highlight the manner in which methodological choices might introduce bias rather than
remove it.

In particular, the use of a single equation to predict outcomes for students of all races
falsely assumes that the effects of each predictor variable occur independent of race. Likely the
result of both data limitations and historical methodological norms, the single-equation approach
fails to account for racial differences related to the meaning of money, the importance of social
or cultural capital, or the merit of the SAT as an indicator of student aptitude – differences
highlighted by the research literature throughout the last decade (e.g., Alon, 2007a; Heller, 1997; Hu & St. John, 2001; Zwick & Sklar, 2005). Single-equation approaches to modeling inequality explicitly assume that there are no race-conditional effects; the multiple equation, race-conditional approach makes no such assumption, allowing for the possibility that predictor variables have race-conditional effects without the encumbrance of a-priori assumptions. Thus, the use of independent, fully race-conditional models allows the analytic methods to operate in a manner consistent with the most recent scholarly understanding of race, college outcomes, and inequality.

The analyses conducted for this study make possible a limited assessment of the manner in which modeling decisions influence results and interpretation. By building models in two ways, via a single equation using the whole sample and via independent race-homogenous models, I can document the extent to which the differences in methodologies lead to different results. To do so, I compare the predicted graduation rates for men and women of each race across the two modeling strategies. I also compare the predicted graduation rates against the actual, observed graduation rates for each group. Although each of these statistics is available separately in the results chapter, Table 14 combines them to ease comparisons.
Table 14

*Actual vs. Predicted Graduation Rates, Comparing Single-Equation and Race-Conditional Baseline Models*

<table>
<thead>
<tr>
<th></th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
<th>Asian</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Males</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual Graduation Rate</td>
<td>74.6%</td>
<td>49.1%</td>
<td>64.3%</td>
<td>77.1%</td>
</tr>
<tr>
<td>Single-Equation, Whole-Sample Model</td>
<td><strong>75.3%</strong></td>
<td>57.4%</td>
<td>66.3%</td>
<td><strong>75.6%</strong></td>
</tr>
<tr>
<td>(0.7%)</td>
<td>(8.3%)</td>
<td>(2.0%)</td>
<td></td>
<td>(1.5%)</td>
</tr>
<tr>
<td>Independent, Race-Conditional Models</td>
<td>76.4%</td>
<td><strong>52.6%</strong></td>
<td>64.2%</td>
<td>78.9%</td>
</tr>
<tr>
<td>(1.8%)</td>
<td>(3.5%)</td>
<td>(0.1%)</td>
<td></td>
<td>(1.8%)</td>
</tr>
<tr>
<td><strong>Females</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual Graduation Rate</td>
<td>77.1%</td>
<td>64.8%</td>
<td>71.2%</td>
<td>75.7%</td>
</tr>
<tr>
<td>Single-Equation, Whole-Sample Model</td>
<td>81.3%</td>
<td><strong>65.7%</strong></td>
<td>73.7%</td>
<td>81.5%</td>
</tr>
<tr>
<td>(4.2%)</td>
<td>(0.9%)</td>
<td>(2.5%)</td>
<td></td>
<td>(5.8%)</td>
</tr>
<tr>
<td>Independent, Race-Conditional Models</td>
<td><strong>80.6%</strong></td>
<td>69.2%</td>
<td><strong>72.0%</strong></td>
<td>79.0%</td>
</tr>
<tr>
<td>(3.5%)</td>
<td>(4.4%)</td>
<td>(0.8%)</td>
<td></td>
<td>(3.3%)</td>
</tr>
</tbody>
</table>

*Note.* Numbers in parentheses are the absolute value of the difference between predicted and actual graduation rates for each race and sex combination. Bold numbers indicate the modeling approach with the smallest model error for each race and sex combination.

Because the predicted graduation rates in Table 14 are based on baseline models (i.e., with only sex and race as predictors) the rates should approximate the actual observed graduation rates for each race and sex combination. Differences between the actual graduation rates and those predicted by the baseline models reflect various sources of error introduced by my efforts to measure and model student graduation. Because the same set of variables are used for both single-equation and race-conditional modeling approaches, measurement error is the same for both approaches; any differences in overall model error are, therefore, the result of differences in model specification. Thus, the better modeling approach is the one that has the smallest overall deviation between the predicted and actual graduation rates.

As indicated by the bold numbers in Table 14, for five of the eight race and sex combinations, the independent, race-conditional model approach more accurately predicts actual
graduation rates than does the single-equation, whole-sample approach. The total model error for each modeling approach (the sum of absolute values of model error/deviation for each of the eight race and sex combinations) equals 25.9% for the single equation approach and 19.0% for the independent, race-conditional approach; thus, overall, the race-conditional approach reduces model error and produces more accurate results than the single-equation approach.

**Race gaps as a distinctively male problem.** Beyond simply reducing modeling error and operating in accordance with the most recent literature, the use of independent race-conditional models brings to the surface sex-related findings that otherwise would have been obscured by improper model assumptions. The results from the race-conditional baseline models (see Table 12) indicate that racial gaps among men are much larger than the corresponding gaps among women – a result that reflects the actual, observed sex differences in racial gaps; the results from the single-equation model do not show such a clear distinction between the sexes.

A single-equation model that includes race-by-sex interaction variables would also reveal overall sex differences. However, the extent to which pre-college characteristics or non-college life-events close the racial gaps for men vs. women would be difficult to identify via a single equation with several interaction terms. For each main effect added (e.g., pre-college characteristics, non-college life-events), three additional interaction terms would be required (four racial groups minus one reference group). For the models used in this study (with at least eleven predictor, or main effect, variables), the single model with interactions approach would require 33 interaction terms and would yield a model that is both impractical and statistically cumbersome.

Although the use of race-conditional model approach instead of a single-equation approach does not lead to a marked *reduction* in predicted racial gaps, such an approach allows
the racial gaps to be differently allocated between the sexes. The results of these race-conditional models demonstrate that pre-college characteristics do more to explain the racial gaps among women than among men. Additional supplemental analyses (not included here) provide further evidence that racial gaps in graduation rates are largely a male-specific phenomenon. Specifically, results from independent sex-conditional models (as opposed to the race-conditional models used elsewhere in the current study), with controls for students’ pre-college characteristics, none of the race variables were statistically significant for females; however, the coefficient for Black students was negative and statistically significant for males. Thus, this study’s measures of both gross and net racial inequality suggest that racial inequality in graduation rates is largely a male-specific phenomenon. The use of sex-conditional models in future research may allow researchers to identify the specific pre-college characteristics that are most powerfully related to racial inequality among female students.

**Modification of college-effects models.** Although statistical models controlling for students’ non-college life-events do little to explain racial gaps in graduation rates, the results from these models reflect predicted graduation rates for students who experience the average number of non-college life-events. The vast majority of students from all races experience no more than one such event in a given year; on average, students encounter 0.48 non-college life-events during the sophomore year. Perhaps the general infrequency of such events has led to their largely being overlooked by models depicting the factors that influence students’ change during their time in college (e.g., Bean & Eaton, 2000; Kuh, et al., 2006; Terenzini & Reason, 2005; Tinto, 1993).

But some students, disproportionately those who are Black or Hispanic, must deal with multiple non-college life-events taking place within a single year (see Table 2). Like Alon
(2007b), who examined background characteristics of students at selective institutions, I found that “under-represented minority students are more likely to suffer from overlapping disadvantages than whites [sic] and Asians” (p. 1,495). The disproportionately high number of Black and Hispanic students who experience multiple NCLEs amplifies the graduation gaps predicted by my models, for it is among these students that NCLEs most clearly contribute to racial gaps in graduation. The compounded effects of multiple non-college life-events are thus particularly detrimental to Black and Hispanic students.

Although the influence of non-college life-events may be most dramatic for Black and Hispanic students, these findings suggest that such events have a negative effect on the likelihood of graduation for White students as well. Thus, the non-college life-events that occur outside the influence of an institution nevertheless affect a key student outcome about which an institution is likely to be concerned. Students’ lives outside of the college environment per se, and particularly those non-college life-events included in this study, should, therefore, be included in models of student change during college.

**Implications for Policy**

**Equality of Access as “Fool’s Gold.”** To the general public, selective colleges and universities may epitomize higher education as an “ivory tower.” These schools may be perceived as elitist, slow to change, and typical of the institutions that perpetuate the advantages of the White and wealthy. In part to combat this image, many selective institutions have adopted very public policies designed to improve opportunities for historically underrepresented minorities. Although they take any number of forms, these affirmative action policies have

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3 This heading plays off a speech made by William Bowen. (Bowen, 2004, p. 10).
focused on increasing institutional diversity by explicitly considering race in the admissions process (Hawkins & Clinedinst, 2006).

While such actions may represent a sincere effort by these schools to be more equitable, such efforts are undermined by findings indicating that underrepresented minority students attending these colleges do not perform as well as their White or Asian peers in terms of grades (Massey & Mooney, 2007) or graduation (Astin & Oseguera, 2005). My findings confirm that, even after accounting for differences in students’ pre-college characteristics and non-college life-events, Black and Hispanic students are less likely to graduate within four years than are White or Asian students. In these relative terms, the equality of college outcomes has failed to keep pace with the improved equality of access associated with race-conscious admissions policies.

To be clear, I am making no claims regarding the legitimacy or consequences of affirmative action admissions policies. Rather, I am suggesting that this study’s results substantiate Bowen’s (2004) concern that the heretofore-narrow focus on equal access for underrepresented minority students may well have been pursued without a commensurate regard for the equality of outcomes once students get into college.

**Policies of Rigidity.** With thousands of students entering institutions of higher education each year, formal policies are required to maintain efficient institutional operations. But these same formal policies, be they at the institution, state, or federal level, can be complex in their design and rigid in their application – a combination made all the more difficult when students must comply with formal policies while also addressing challenging non-college life-events. Take, for example, Georgia’s HOPE scholarship.

Although considered a leading model of state support for improving access to higher education, eligibility for HOPE funds is determined by a complex set of rules and formulas
enacted by both state regulators and institutional administrators. As might be expected, the state-run organization that administers the scholarship has strict requirements for student eligibility. Among these rules is the requirement that students must maintain a cumulative GPA of 3.0 or higher once in college. Although this condition appears straightforward, it is further complicated by the requirement that a student “must be making Satisfactory Academic Progress as determined by your institution even if [the student has] not reached the renewal checkpoints” (p. 3, GAcollege411.org – Maintaining Eligibility for the HOPE scholarship) at 30, 60, and 90 credit hours. Because determination of “satisfactory academic progress” occurs at the campus level, each HOPE-eligible institution in Georgia is free to set its own definition. Thus, although Kennesaw State University and The University of Georgia’s use nearly identical criteria, the definition at Emory University differs across of the University’s schools and divisions.

The University of Georgia does have an appeal process for students who fail to meet satisfactory academic progress due to circumstances beyond their control. The appeal form specifically outlines the documentation required for appeals based on a personal illness or the death of a family member; it also allows students to make appeals based on “other circumstances beyond the student’s control” so long as they submit “documentation that supports the situation” (p.1, UGA form SAP121). Although this appeals process appears simple and straightforward, its efficacy is unknown. Moreover, the formal appeals committee at UGA meets only once a year. Appeals are reviewed more frequently at Kennesaw State University (three times annually) and the Savanna College of Art and Design (monthly), but even at these schools “appeal decisions are not guaranteed by the Fee Payment Deadline date therefore students must pay out of pocket and get reimbursed once a decision has been made and financial aid is awarded, if eligible” (p.1, KSU Satisfactory academic progress 2009-2010 appeals form, bold and italics in
the original). Thus, students may be required to pay thousands of dollars up front, money they had never before been required to pay, at precisely the time when their resources are depleted by the non-college life-events for which they are seeking an exception to the satisfactory academic progress requirements. Although ultimate responsibility for maintaining scholarship eligibility falls on the student, complex eligibility requirements and cumbersome appeals processes may confuse or discourage students whose lives are interrupted unexpectedly by traumatic family events.

Policy complexity and rigidity are perhaps most problematic for international students. These students are likely far away from their families in need and may even have to leave to country to attend to the needs of their families, a trip that is likely to be both expensive and time consuming. Moreover, by leaving their institutions and the country, these students become subject to an incredibly complex intersection of policies that might permanently derail the students’ hope of graduation. In addition to the academic and financial issues these students must address with their colleges and universities, international students are subject to increased scrutiny related to homeland security (e.g., security checks upon travel home and back) and immigration (e.g., visa restrictions). Taken together, the rigidity of these policies likely exacerbate the already considerable barriers to success – financial, academic, psychological, and geographic – faced by students who encounter challenging non-college life-events.

**Implications for Practice**

**Identification of students experiencing non-college life-events.** Perhaps it is no surprise that graduation rates for students who encounter difficulties in their lives outside of college are lower than for those students who move through college unencumbered by the challenges associated with certain non-college life-events. Perhaps it is no surprise that
underrepresented minority students are most likely to be affected by such events. What may be surprising, however, are the number of students, regardless of race, who experience NCLEs during college. In a single year, between twenty and forty percent of the sampled students experience at least one of the non-college life-events measured for this study; between five and fourteen percent of students experience more than one.

But how would an institution know which, and when, its students are dealing with difficult non-college life-events? By what institutional mechanism are these students now identified? Currently, institutions often find out about students’ “outside” lives only if the student self-identifies as having had a traumatic non-college life-event. Such self-identification most likely occurs when a student visits a campus’ psychological support services; other students may mention the NCLE(s) during an exit interview. In both cases, the institution is likely to learn about the NCLE only after the psychological or academic consequences of such an event have already manifest themselves as missed deadlines, skipped classes, unpaid bills, or psychological damage – well after effective intervention may have prevented major problems.

There are several possible reasons why students would be reluctant to notify campus officials of their experiences with challenging non-college life-events in a timelier manner. First, because these NCLEs happen largely outside of public view, student may believe that such events are rare and that few others would understand what they are going through. Second, students may feel as though the institution wouldn’t care about students’ personal lives, or that the school could do little to help affected students. Third, students may not recognize the extent to which the non-college life-events are affecting them or try to “tough it out” because they feel the events shouldn’t be affecting their academic success.
Regardless of the specific reason for students’ hesitancy to inform the institution about the difficulties they face outside of college, colleges and universities could take any of several steps to increase the likelihood that students would disclose their experiences with non-college life-events. An informational marketing campaign could be particularly effective. Posters, websites, and campus presentations acknowledging the widespread occurrence of NCLEs would let students they are not alone. These same publicity materials could encourage students to talk to their residential advisors, instructors, or psychological services office about their lives off campus. In doing so, an institution would simultaneously raise awareness of the issues associated with NCLEs, highlight campus resources available to students, and demonstrate to students the institution’s compassionate interest in the students’ well-being.

Some schools have taken another proactive approach and adopted “early alert” systems in which faculty members are asked to report any students who show signs of personal or academic distress. Faculty members see the same students on a regular basis and, therefore, might be well positioned to see students change over the course of a semester. Unfortunately, few faculty members actively engage with students outside of class (Cox & Orehovec, 2007; Einarson & Clarkberg, 2004; Lundberg & Schreiner, 2004), making it difficult for faculty to develop the kinds of relationships in which students would feel comfortable discussing potentially embarrassing family difficulties.

Other institutional representatives may be better positioned to learn of students’ non-college life-events. Some academic advisors, for example, have embraced “intrusive advising” models in which the advisor actively engages students in regular conversations about long-term academic and personal issues that may affect the students’ success. For students living on campus, residence hall staff may be well positioned to identify affected students. Resident
assistants often live in close proximity to the students with whom they work. Moreover, residence hall staff see their students frequently (often on a daily basis) and in settings that are more relaxed, more social, and less formal than do faculty members. In these settings, students may be more willing to talk openly about their personal or family problems. Residence hall staffs already receive extensive training regarding institutional policy, student development, and co-curricular programming. Perhaps training sessions could be enhanced to highlight the potentially detrimental effects of certain non-college life-events and provide tips on how to spot their occurrence. Regardless, the supplemental analyses conducted for this study found that the negative effects of non-college life-events become statistically non-significant for White students once students’ residence was added to the predictive models. This finding suggests that White students living on-campus are getting something that helps them overcome the hardship that might otherwise result from the experience of non-college life-events.

But what about the students who do not live in residence halls? The supplemental analyses also suggest that the effects of non-college life-events are particularly detrimental for Hispanic students living off campus. Often, these students come onto campus only to attend class and are less-actively engaged with the campus community than are residential students. For these students, effective faculty or advisor intervention programs may prove critical.

Alternately, institutions could simply ask students if they have experienced any difficult non-college life-events during the previous year. Students at American colleges and universities are already bombarded with surveys on a remarkable range of topics. Many institutions have adopted standardized national surveys (e.g., CIRP’s Survey of Freshmen, the National Survey of Student Engagement) and offer such surveys on a regular cycle. Other campus- or service-specific surveys reach students in classes, via telephone, and through email. Students need not
complete a new, NCLE-specific survey; rather, it seems there already exist many opportunities for campus officials to insert a question or two about NCLEs into current assessment efforts.

**Student services and institutional policies.** But what should happen after a student is identified as dealing with one or more NCLEs? What mechanisms are in place to help the student cope with the psychological, academic, financial, and/or social consequences? In many cases, services for such a student are non-existent, disconnected, or poorly equipped to address the unique needs of students facing NCLEs. Therefore, institutions might develop flexible policies and integrated services explicitly designed to help affected students remain on-course to an on-time graduation.

Of course, certain already-existing support services might have some role in helping students affected by non-college life-events. Most institutions offer some form of psychological counseling services for their students. These service centers are typically set up to address short-term issues, often placing a cap on the number of sessions students can receive without cost. Moreover, doctor-patient confidentiality, which may encourage students to discuss sensitive matters they would not otherwise mention to faculty members or administrators, also explicitly bars counselors from contacting those institutional agents. Although counseling centers may be able to address students’ short-term emotional needs, these centers are unable to initiate or coordinate a multi-faceted support network for the affected student. Perhaps this limitation contributes to results from supplemental analyses indicating that student attendance at a campus psychological service center has a *negative* relationship with the likelihood of graduation within four years.⁴

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⁴ Because these analyses require use of a further-restricted sub-sample which may not be directly comparable to the sample used for all other analyses in this study, I do not present detailed results here.
Moreover, although anyone can encourage a student to seek counseling, none can compel a student to receive treatment – except in the most extreme cases for which on-time graduation would be the least of a student’s concerns. Instead, students must voluntarily seek such services by self-identifying as needing help to handle his or her non-college life-events. Not all students are willing to do so. In fact, students’ willingness to seek psychological counseling varies by race and gender (Levy, Thompson-Leonardelli, Smith, & Coleman, 2005): among this study’s sample of students, Black males are far less likely than any other students to visit a campus counseling center.⁵

If psychological service centers are not well-positioned to comprehensively address the needs of students who encounter difficult non-college life-events, what other institutional resources may be leveraged in support of these students? Perhaps a campus liaison could be tasked with coordinating the institutional response to learning of a students’ non-college life-event. Rather than expecting an affected student to contact perhaps dozens of institutional agents (e.g., professors, academic advisor, residence assistant, financial aid representative, registrar, psychological service center), institutions could designate a single point of contact for students who encounter difficult non-college life-events. This liaison could then ensure that all relevant institutional agents receive accurate and consistent information about the student’s circumstances. In addition, this liaison could lead institutional efforts to establish a straightforward procedure by which an affected student could seek a non-medical-hardship exception to normal institutional policies. Such a procedure would provide an avenue through which students could petition for across-the-board grade deferments or tuition reimbursement if he or she must withdraw due to the non-college life-event. Although precautions must be taken

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⁵ Although Black males in my study are the most likely of all race/gender groups to experience one, or multiple, non-college life-events, they visited a campus psychological services office at a rate approximately one-half as often as did students from any other race/gender group.
to ensure students do not abuse such a system, perhaps embellishing or manufacturing NCLEs in an effort to avoid the consequences of poor class attendance or a failure to complete assignments, such an approach could build good will and institutional commitment among an institution’s students – which may, in turn, facilitate student persistence and graduation.

**Future Directions**

The results from this study suggest that non-college life-events have a detrimental effect on many students’ chances of graduation within four years. The results also indicate that racial gaps in four-year graduation rates cannot be fully explained by students’ pre-college characteristics or non-college life-events. Yet, the results from this study raise several questions that should be explored by future research. Four specific questions offer rather straightforward avenues for further investigation.

**Do this study’s findings hold true for other student populations?**

The students participating in the current study were not “typical” college students; nor were participating institutions “typical” colleges or universities. Indeed, both the students and institutions involved in this study represent only a small portion of American higher education. Thus, the results from this study cannot be generalized to the whole population of college students in the United States. Studies employing a more representative sample of students and institutions may find that, because of greater variability in student backgrounds and experiences, pre-college characteristics can account for nearly all of the eventual race gaps in graduation rates. Perhaps non-college life-events are even more detrimental for students who are academically under-prepared or whose institutions lack the resources to provide comprehensive student services.
Is racial inequality a sex-specific issue?

This study’s unexpected findings related to students’ sex warrant further theoretical consideration and empirical examination. Although the race-conditional models for this study revealed that racial inequality among female students was largely the result of racial differences in pre-college characteristics, the study’s design precludes an in-depth analysis of the gendered nature of those pre-college influences. The use of sex-conditional models in future research may allow researchers to identify the specific pre-college characteristics that are most powerfully related to racial inequality among female students.

Do all non-college life-events have the same effect?

Fourteen different non-college life-events comprise the NCLE scale in these analyses. Despite this apparent inclusiveness, the scale employs a restrictive definition that excludes several events (e.g., working off campus) that have elsewhere been shown to affect student outcomes (Ehrenberg & Sherman, 1987; Pascarella, Edison, Nora, Hagedorn, & Terenzini, 1998). Moreover, the NCLE scales give equal weight to all of the component items, obscuring the potentially differential effects of each type of non-college life-event. As Rahe and colleagues (Holmes & Rahe, 1967; Miller & Rahe, 1997; Rahe, et al., 1970) have reported for the last forty years, some life-events are more stressful than others. Some events directly affect students’ financial status, while others affect students’ social or emotional well-being. Future research should examine other non-college life-events and attempt to identify the extent to which each type of event affects student outcomes.
What are the short-term consequences of non-college life-events?

This study examines the manner in which four-year graduation rates are affected by non-college life-events that happen during students’ second college year. In doing so, it asks whether NCLEs have any consequences that linger two or three years after an event’s occurrence. Some traumatic life-events have long-term or permanent consequences (Duncan, 2000; Fowler Jr, 2006; H. A. Turner & Butler, 2003; R. J. Turner & Lloyd, 1995). But many non-college life-events seem likely to have only short-term consequences. The financial strain resulting from a parent getting laid-off may be alleviated if the parent soon finds a new job. Learning that a family member went to a drug rehabilitation center may come as a shock to a student, but a successful rehabilitation experience may actually free the student from the long-term consequences of affiliation with an addict. Thus, future research should examine intermediate outcomes (e.g., semester GPA or persistence) to determine whether NCLEs have short-term academic consequences that remain hidden in the current study.

Conclusion

The analyses presented in this study is meant to serve two purposes: 1) to provide strong evidence regarding the effect of student race on the likelihood of graduation from competitive-entry colleges and universities, and 2) to test the hypothesis that such racial effects are the result of the race-specific differences in the frequency and impact of students’ non-college-life-events that occur while the attending college.
Two Tentative Answers

In addressing these issues, this study asked two seemingly straightforward questions. Overall, despite the complexities presented in the preceding chapters, results from these analyses support seemingly straightforward answers.

**Question one:** Do racial inequalities in four-year graduation rates at selective colleges and universities remain after accounting for a wide range of race-conditional pre-college influences?

**Answer to question one:** Yes, racial inequalities in four-year graduation rates at selective colleges and universities remain, even amid comprehensive statistical controls for institutional variation in overall graduation rates; individual variation in students’ demographic, academic, psychological, sociocultural, and financial backgrounds; and race-specific variation in the relative importance of students’ pre-college characteristics.

**Question two.** Are such inequalities related to the frequency or effect of students’ non-college-life-events that occur while the attending college?

**Answer to question two.** No, despite the clearly detrimental effects of certain non-college life-events and statistically significant racial differences in the frequency with which students encounter such events, racial inequalities in four year graduation rates at competitive-entry colleges and universities cannot be explained by racial differences in the frequency or effect of students’ non-college life-events.
The simplicity of the preceding summaries, however, masks considerable complexity and uncertainty: this study’s results are more suggestive than conclusive and prompt more questions than they answer. Perhaps the most provocative of these questions asks if colleges and universities themselves contribute to racial inequalities in four-year graduation rates.

**One Provocative Question**

Overall, I find that Black and Hispanic students graduate at rates below those of Asian or White students, even when controlling for a wide range of pre-college characteristics and non-college life-events. One possible conclusion, then, is that the colleges and universities these students attend are not only perpetuating the race-related educational inequalities manifest during students' lives outside of college but are actually exacerbating those inequalities. Such a conclusion would fit with the widely-held notion that America's selective institutions of higher education are "ivory towers" with discriminatory racial climates that contribute to the reproduction of America's social stratification. Although the analyses presented here could be leveraged to support such a conclusion, further analyses is required before colleges themselves can be blamed for the expanding inequality in educational attainment.

As Pascarella and Terenzini (2005) note, one cannot make a claim of a college effect simply because a change occurs while a student is in college. Several other explanations must be discounted before college can be said to affect a particular outcome. Although the present study has effectively accounted for two of the most feasible non-college explanations for racial gaps in four-year graduation rates (i.e., differences in pre-college characteristics and/or non-college life-events), several other potential influences remain unexamined.

Methodologically, the alternate explanation that is most difficult to disprove relates to the natural maturation of young adults. As students grow from 18 to 22 years old, might they simply
undergo physical, psychological, financial, and social changes that would occur regardless of their status as a college student? Nonetheless, it may be possible to dismiss the maturation hypothesis out-of-hand, at least as an explanation for the racial gaps in outcomes. For the maturation hypothesis to be a valid explanation for the observed net racial gaps in graduation rates, there must exist evidence that the degree of maturation occurring during the college years differs between races. Although such differing rates of maturation may have roots in social or cultural differences, substantial evidence has discredited the possibility that different intellectual maturation rates result from biological differences between races (Fischer, et al., 1996; Vera, Feagin, & Gordon, 1995). Therefore, although lacking definitive evidence on the issue, it is highly unlikely that racial gaps in graduation rates are the result of racial differences in the natural maturation process.

More likely is the possibility that graduation rates are affected by non-college life-events that have not been examined in the current study. A key premise of this study argues that students’ lives outside of college have an effect on students’ college outcomes. Indeed, decades of previous research confirm that retention rates, graduation rates, and other indicators of student success are lower for students who become a parent, fall ill, or spend long hours working for pay off campus (L. K. Berkner & Choy, 2008; Ehrenberg & Sherman, 1987; Nora, et al., 1996; Sibulkin & Butler, 2005; Wilson-Sadberry, Winfield, & Royster, 1991). Other non-college life-events may also affect student outcomes. Nonetheless, the current study examines fourteen different non-college life-events likely to have financial and/or psychological consequences and finds that these non-college factors have remarkably little effect on racial gaps in four-year graduation rates. Thus, although it is reasonable to assume that other non-college factors (i.e., those not addressed in this study) may have some effect on the racial gaps, it seems unlikely that
such factors would account for *much*, let alone *all*, of the yet-unexplained net racial gaps in graduation rates.

If racial gaps in graduation rates cannot be fully explained by differences in students’ non-college life-events, their natural maturation processes, or their demographic, academic, psychological, sociocultural, or financial backgrounds, what else remains as a potential contributor to racial inequality in college graduation rates? *Might selective colleges and universities themselves be contributing to, rather than ameliorating, racial inequality in the United States?*
REFERENCES


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APPENDIX A: VARIABLES USED IN ANALYSES

The variables used in analyses for this study are derived from the public-used datasets of the National Longitudinal Survey of Freshmen (NLSF). The tables in Appendix A define the specific variables used in the current study. Appendix B provides additional details about the original NLSF data collection procedures.

Table A-1
Specification of the Variables in Main Analytic Models

<table>
<thead>
<tr>
<th>Outcome/Criterion Variable</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Graduation (Grad4Orig):</strong></td>
<td>Dummy-coded indicator of whether a student had graduated, from their original college of entry, by the end of their fourth year. 1=graduated; 0=did not graduate</td>
<td></td>
</tr>
<tr>
<td><strong>Demographics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Race/Ethnicity (Black, Hispanic, Asian, White):</strong></td>
<td>A series of dummy-coded variables indicating a student’s race. All students were placed into single race category. When analyses is run on a sample with all races combined, White race is used as the reference category. Derived from NLSF variable w1qzeth</td>
<td></td>
</tr>
<tr>
<td><strong>Gender (Female):</strong></td>
<td>Dummy-coded indicator of student gender. Female=1; Male=0. Derived from NLSF variable sex</td>
<td></td>
</tr>
<tr>
<td><strong>First-Generation (FirstGen):</strong></td>
<td>A dummy-coded variable, with a value of 1 assigned if either of a student’s parents attended college, regardless of graduation status. Derived from NLSF variables w1q151 &amp; w1q152</td>
<td></td>
</tr>
<tr>
<td><strong>Academic</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Test Scores (SATfinal):</strong></td>
<td>A students’ self-reported combined SAT-verbal and SAT-quantitative score, with a maximum possible score of 1,600. If no SAT score was reported, an SAT score was imputed via concordance with ACT composite score. (See <a href="http://www.act.org/aap/concordance/index.html">http://www.act.org/aap/concordance/index.html</a> for concordance table.) Derived from NLSF variables w3q28a, b, &amp; c</td>
<td></td>
</tr>
<tr>
<td><strong>AP Tests (APtests):</strong></td>
<td>Used as a proxy for a students’ curricular challenge in high school, this variable indicates the total number of AP courses taken by a student. Derived from NLSF variables w1q6lap through w1q6jp</td>
<td></td>
</tr>
</tbody>
</table>
Table A-1 (cont.)

Sociocultural

*Cultural Capital (culcap)*: A 12-item index scale representing the extent to which a student’s parents fostered a broad world view at ages 6, 13, and 18. Index is taken directly from NLSF staff coding, with a maximum value of 44, alpha = .886. See the top panel of Table A-3 for a complete list of the items comprising this scale.

*Social Capital (soccap)*: A 4-item index scale representing the extent to which a student’s parents were involved with students’ friends at ages 13 and 18. Index is taken directly from NLSF staff coding, with a maximum value of 16, alpha = .778. See bottom panel of Table A-3 for a complete list of the items comprising this scale.

Psychological

*Self-Efficacy (effic)*: A 6-item index scale representing the student’s belief that he/she is involved and in control of his/her life. Index is taken directly from NLSF staff coding, with a maximum value of 24, alpha = .691. See Table A-4 for a complete list of the items comprising this scale.

*Educational Aspirations (aspire)*: Variable indicating the students’ aspirations for college. A value of 1 is given to any student planning to “take college one year at a time…” the value 2 is for those planning to “graduate from college”, and the value 3 is given to those planning to “…go to graduate or professional” school. Derived from NLSF variable *w1q90*.

Financial

*Family Income (Income4)*: An ordinal variable indicating students’ “estimate of the annual income of the household in which you spent your senior year.” Broken into 4 strata, with the value 1= <$25,000; 2=$25,000<$50,000; 3=$50,000<$75,000; 4=$75,000 or more.

*Perceived Unmet Need (UnMetDol)*: The amount of perceived college price that is not being covered by family or grants/fellowships. Calculated as *w2q25* minus the sum of variables *w2q26a* through *w2q26d*.

*Perceived Price of College (w2q25)*: Students’ “best estimate of the total amount of money you needed to attend college this current academic year,” in dollars.
Table A-1 (cont.)

Non-College Life Events

*Number of Non-College Life-Events Experienced during Sophomore Year (NCLE3num):* A scale indicating the number of non-college life-events encountered by a student during his/her second college year, with a maximum value of 14. The variable is the sum of twelve dummy-coded component items (see list below). An additional one point was added for students who had both parents die; an additional one point also was added for students who both parents lose their jobs. Derived from NLSF variables w3q51 c, d, g, h, i, j, k, l, m, o, p, & q.

*Question 51 Intro:* “I’m going to read a list of things that may happen in families that could affect young people. Since we interviewed you last year, have any of the following things happened in your family?”

W3Q51C: My parents got divorced or separated?

W3Q51D: A parent lost a job? [potential of two points in NCLE3num scale]

W3Q51G: An unmarried sister became pregnant?

W3Q51H: A brother or sister dropped out of school?

W3Q51I: A member of my immediate family went on public assistance?

W3Q51J: A member of my immediate family used illegal drugs?

W3Q51K: A member of my immediate family spent time in a drug or alcohol rehabilitation program?

W3Q51L: A member of my immediate family was the victim of crime?

W3Q51M: A member of my immediate family got into trouble with the law?

W3Q51O: A member of my immediate family became homeless for a period of time?

W3Q51P: A parent died? [potential of two points in NCLE3num scale]

W3Q51Q: Another member of my immediate family died?
### Non-College Life Events

**Experience of ANY Non-College Life-Events During Sophomore Year (NCLE3any):**
A dummy-coded variable indicating whether, during his/her second college year, the student encountered any of twelve non-college life-events. The twelve component items indicate whether, for example, “a parent lost a job,” “a brother or sister dropped out of school,” “a member of [the student’s] immediate family got into trouble with the law,” or “a parent died. Derived from NLSF variables w3q51 c, d, g, h, i, j, k, l, m, o, p, & q. See table A-1 for details.

**Number of Non-College Life-Events Experienced During Final Year of High School or First Year of College (NCLE2num):**
A scale indicating the number of non-college life-events encountered by a student during his/her second college year, with a maximum value of 14. The variable is the sum of twelve component items indicating whether, for example, “a parent lost a job,” “a brother or sister dropped out of school,” “a member of [the student’s] immediate family got into trouble with the law,” or “a parent died.” An additional one point was added for students who had both parents die; an additional one point was also added for students who had both parents lose their jobs. Derived from NLSF variables w2q24 c, d, g, h, i, j, k, l, m, n, p, q, & r.

### Residential Status

**Living On-Campus During Sophomore Year (Dorm3):**
A dummy-coded variable indicating whether a student was living on campus during the spring of his or her second college year. (1 = on campus, 0 = off campus). Derived from NLSF variable w3q29.
Table A-3
Construction of Cultural Capital and Social Capital Variables

<table>
<thead>
<tr>
<th>Age and Item</th>
<th>Response Range</th>
<th>Scale Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Minimum</td>
</tr>
<tr>
<td><strong>Cultural Capital</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Age 6</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent(s) Took R to Museum</td>
<td>Never to always</td>
<td>0</td>
</tr>
<tr>
<td>Parent(s) Took R to Science Center</td>
<td>Never to always</td>
<td>0</td>
</tr>
<tr>
<td>Parent(s) Took R to Zoo or Aquarium</td>
<td>Never to always</td>
<td>0</td>
</tr>
<tr>
<td>Parent(s) Took R Traveling Abroad</td>
<td>Never to always</td>
<td>0</td>
</tr>
<tr>
<td><em>Age 13</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent(s) Took R to Museum</td>
<td>Never to always</td>
<td>0</td>
</tr>
<tr>
<td>Parent(s) Took R to Science Center</td>
<td>Never to always</td>
<td>0</td>
</tr>
<tr>
<td>Parent(s) Took R to Plays or Concerts</td>
<td>Never to always</td>
<td>0</td>
</tr>
<tr>
<td>Parent(s) Took R Traveling Abroad</td>
<td>Never to always</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Cronbach's Alpha</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Social Capital</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Age 13</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent(s) Talked to R's Friends</td>
<td>Never to always</td>
<td>0</td>
</tr>
<tr>
<td><em>Age 18</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent(s) Talked to R's Friends</td>
<td>Never to always</td>
<td>0</td>
</tr>
<tr>
<td>Mother Knew Who R's Friends Were</td>
<td>Strongly disagree to strongly agree</td>
<td>0</td>
</tr>
<tr>
<td>Father Knew Who R's Friends Were</td>
<td>Strongly disagree to strongly agree</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Cronbach's Alpha</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table A-4  
*Construction of the Self-Efficacy Variable*

<table>
<thead>
<tr>
<th>Item</th>
<th>Response Range</th>
<th>Scale Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-Efficacy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don't Have Control Over Life</td>
<td>Strongly disagree to strongly agree</td>
<td>0 4</td>
</tr>
<tr>
<td>Good Luck More Important Than Hard Work</td>
<td>Strongly disagree to strongly agree</td>
<td>0 4</td>
</tr>
<tr>
<td>Something Stops Me from Getting Ahead</td>
<td>Strongly disagree to strongly agree</td>
<td>0 4</td>
</tr>
<tr>
<td>Certain I Can Make Plans Work</td>
<td>Strongly disagree to strongly agree</td>
<td>0 4</td>
</tr>
<tr>
<td>Feel Left Out of Things Going on Around Me</td>
<td>Strongly disagree to strongly agree</td>
<td>0 4</td>
</tr>
<tr>
<td>If I Work Hard I Can Do Well</td>
<td>Strongly disagree to strongly agree</td>
<td>0 4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>0 24</td>
</tr>
<tr>
<td>Cronbach’s Alpha</td>
<td></td>
<td>0.691</td>
</tr>
</tbody>
</table>

APPENDIX B: 
DATA COLLECTION AND SAMPLE DESCRIPTION

Data analyzed in this dissertation are drawn from the public-use datasets of the National Longitudinal Survey of Freshman, a study led by Douglas S. Massey (Princeton University) and Camille Z. Charles (University of Pennsylvania), housed in the Office of Population Research at Princeton University, and funded by the Mellon Foundation.

The descriptions of the National Longitudinal Survey of Freshmen (NLSF) presented in Appendix B are taken verbatim from the NLSF website: http://nlsf.princeton.edu. However, the present analyses did not use the entire NLSF dataset. For details about the sub-sampling procedures used for this study, see Chapter 3 and Table B-3 in this Appendix B. In total, Appendix B includes a narrative description of the data collection procedures, as well as four Figures and Tables:

Figure B-1 depicts the data collection waves and timeline

Table B-1 describes response rates and sample size for each wave of the NLSF

Table B-2 lists the schools participating in the NLSF

Table B-3 compares the full NLSF sample to the sub-sample used in this dissertation.

The institutions we chose to sample mirror those examined by Bowen and Bok (1998) in their College and Beyond Survey. Our principal modification was the addition of the University of California at Berkeley, which is not only a large and selective institution (currently rated as number one among public universities by US News and World Report), but also a school that

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6 The descriptions of the National Longitudinal Survey of Freshmen (NLSF) presented in Appendix B are taken verbatim from the NLSF website: http://nlsf.princeton.edu. Note, however, that the present analyses did not use the entire NLSF dataset. For details about the sub-sampling procedures used for this study, see Chapter 3.
recently abandoned its historical commitment to affirmative action (as a result of Proposition 209, which was approved by California’s voters in 1995). The other modification was to include historically black colleges and universities.

We initially asked 35 schools to participate in the survey. The sample was stratified by the relative size of the black student body. Institutions with relatively large black student populations (1000+) were assigned a target sample size of 280 respondents (70 in each of four racial/ethnic groups); those with black student populations of 500-1,000 got a target size of 200 interviews (50 in each group); those with 100-500 black students had a target size of 80 respondents (20 in each group), and those with fewer than 100 black students were assigned a quota of 40 interviews (10 in each group). The historically black schools were given a target of 70 interviews per institution.

Although most schools were enthusiastic about participating, five schools declined the invitation outright (Duke, Vanderbilt, Wellesley, Hamilton, and Xavier). A major disappointment, however, was the response received from four historically black institutions we had targeted for study. Although only Xavier declined to participate outright, we were only able to secure a sample of freshmen in one historically black institution. Despite the fact that the Presidents of both Morehouse and Spelman agreed on behalf of their institutions to participate, the Registrars Offices at both colleges could not provide a list of freshmen from which we could draw a sample. This left only Howard University to represent historically black institutions.

The final institutional participation rate was 80%. The loss of seven institutions out of 35 cut our expected sample size from a planned 4,160 to only 3,550 students. To make up for the lost cases we increased the number of interviews conducted at other institutions. In all, we approached 4,573 respondents across 28 institutions. Of these, 3,924 completed the survey, for
an overall response rate of 86%, which by the standards of survey research is very high, particularly for a long (2+ hours) face-to-face interview that for all intents and purposes was unpaid (respondents received a token payment of $15 for participating). The final sample included 959 Asians, 998 whites, 1,051 African Americans, and 916 Latinos. In order to be eligible for inclusion in the sample, a respondent had to be enrolled at the institution in question as a first-time freshman and be a U.S. citizen or resident alien. Foreign and returning students were excluded from the sample.

![Figure B-1. NLSF data collection timeline. Reprinted from http://nlsf.princeton.edu/about.htm](image)

Of the 4,573 students initially contacted, 86% agreed to be interviewed and were included in the baseline panel. The completion rate ranged from 83% among whites to 89% among blacks, with rates around 86% for both Asians and Latinos. When they were re-contacted during the spring of 2000 the vast majority agreed to continue participating, yielding a 95% follow-up rate on the Wave II phone survey. During each of the next three springs, students in the baseline were contacted again and those who agreed were re-surveyed by telephone. Interviews were completed with 89% of baseline respondents in Wave III and 84% in Wave IV. The final wave, when most participants of the original panel were graduating seniors, was
completed in the summer of 2003 with a completion rate of 79%. The final completion rates are listed in below. On the last wave of the survey these ranged from 75.9% for blacks to 81.6% for whites.

Table B-1
*Number of respondents to the National Longitudinal Survey of Freshmen Wave I-V*

<table>
<thead>
<tr>
<th>Wave</th>
<th>Total</th>
<th>White</th>
<th>Asian</th>
<th>Latino</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave I: Fall 1999</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number Selected</td>
<td>4,573</td>
<td>1,202</td>
<td>1,118</td>
<td>1,071</td>
<td>1,182</td>
</tr>
<tr>
<td>Percent Competed</td>
<td>85.8%</td>
<td>83.0%</td>
<td>85.8%</td>
<td>85.5%</td>
<td>88.9%</td>
</tr>
<tr>
<td>Number in Baseline</td>
<td>3,924</td>
<td>998</td>
<td>959</td>
<td>916</td>
<td>1,051</td>
</tr>
<tr>
<td>Wave II: Spring 2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed Follow-Up</td>
<td>95.0%</td>
<td>93.7%</td>
<td>95.9%</td>
<td>94.3%</td>
<td>96.0%</td>
</tr>
<tr>
<td>Number in Wave II</td>
<td>3,728</td>
<td>935</td>
<td>920</td>
<td>864</td>
<td>1,009</td>
</tr>
<tr>
<td>Wave III: Spring 2001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed Follow-Up</td>
<td>88.6%</td>
<td>87.9%</td>
<td>89.3%</td>
<td>88.4%</td>
<td>88.7%</td>
</tr>
<tr>
<td>Number in Wave III</td>
<td>3,475</td>
<td>877</td>
<td>856</td>
<td>810</td>
<td>932</td>
</tr>
<tr>
<td>Wave IV: Spring 2002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed Follow-Up</td>
<td>83.6%</td>
<td>84.4%</td>
<td>85.6%</td>
<td>83.5%</td>
<td>81.1%</td>
</tr>
<tr>
<td>Number in Wave IV</td>
<td>3,280</td>
<td>842</td>
<td>821</td>
<td>765</td>
<td>852</td>
</tr>
<tr>
<td>Wave V: Spring 2003</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed Follow-Up</td>
<td>79.0%</td>
<td>81.6%</td>
<td>79.8%</td>
<td>78.7%</td>
<td>75.9%</td>
</tr>
<tr>
<td>Number in Wave V</td>
<td>3,098</td>
<td>814</td>
<td>765</td>
<td>721</td>
<td>798</td>
</tr>
</tbody>
</table>

*Note.* Table reprinted from http://nlsf.princeton.edu/about.htm
Table B-2

*Schools Participating in the National Longitudinal Survey of Freshmen*

<table>
<thead>
<tr>
<th>Categories and Schools</th>
<th>Median SAT</th>
<th>% Freshmen in Top 10% of Class</th>
<th>Acceptance Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Historically Black Colleges</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Howard University</td>
<td>1105</td>
<td>18</td>
<td>56</td>
</tr>
<tr>
<td><strong>Schools with 1,000+ Black Students</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Michigan, Ann Arbor</td>
<td></td>
<td>63</td>
<td>64</td>
</tr>
<tr>
<td>University of North Carolina, Chapel Hill</td>
<td>1250</td>
<td>68</td>
<td>39</td>
</tr>
<tr>
<td>University of California, Berkeley</td>
<td>1315</td>
<td>98</td>
<td>27</td>
</tr>
<tr>
<td><strong>Schools with 500-1,000 Black Students</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Columbia University</td>
<td>1400</td>
<td>87</td>
<td>14</td>
</tr>
<tr>
<td>Emory University</td>
<td>1355</td>
<td>90</td>
<td>42</td>
</tr>
<tr>
<td>Miami University</td>
<td></td>
<td>32</td>
<td>79</td>
</tr>
<tr>
<td>Northwestern University</td>
<td>1385</td>
<td>83</td>
<td>32</td>
</tr>
<tr>
<td>Penn State University, University Park</td>
<td>1190</td>
<td>42</td>
<td>49</td>
</tr>
<tr>
<td>Stanford University</td>
<td>1455</td>
<td>88</td>
<td>15</td>
</tr>
<tr>
<td>Tulane University</td>
<td>1292</td>
<td>52</td>
<td>78</td>
</tr>
<tr>
<td>University of Pennsylvania</td>
<td>1400</td>
<td>91</td>
<td>26</td>
</tr>
<tr>
<td><strong>Schools with 100-500 Black Students</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Georgetown University</td>
<td>1350</td>
<td>78</td>
<td>23</td>
</tr>
<tr>
<td>Oberlin College</td>
<td>1325</td>
<td>59</td>
<td>50</td>
</tr>
<tr>
<td>Princeton University</td>
<td>1450</td>
<td>92</td>
<td>11</td>
</tr>
<tr>
<td>Rice University</td>
<td>1415</td>
<td>86</td>
<td>27</td>
</tr>
<tr>
<td>Tufts University</td>
<td>1340</td>
<td>70</td>
<td>32</td>
</tr>
<tr>
<td>University of Notre Dame</td>
<td>1345</td>
<td>83</td>
<td>35</td>
</tr>
<tr>
<td>Washington University</td>
<td>1355</td>
<td>79</td>
<td>34</td>
</tr>
<tr>
<td>Wesleyan University</td>
<td>1365</td>
<td>70</td>
<td>29</td>
</tr>
<tr>
<td>Williams College</td>
<td>1410</td>
<td>84</td>
<td>23</td>
</tr>
<tr>
<td>Yale University</td>
<td>1465</td>
<td>95</td>
<td>16</td>
</tr>
<tr>
<td><strong>Schools with &lt;100 Black Students</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barnard College</td>
<td>1315</td>
<td>73</td>
<td>37</td>
</tr>
<tr>
<td>Bryn Mawr College</td>
<td>1300</td>
<td>61</td>
<td>59</td>
</tr>
<tr>
<td>Denison University</td>
<td>1215</td>
<td>52</td>
<td>69</td>
</tr>
<tr>
<td>Kenyon College</td>
<td>1295</td>
<td>50</td>
<td>68</td>
</tr>
<tr>
<td>Smith College</td>
<td>1280</td>
<td>52</td>
<td>56</td>
</tr>
<tr>
<td>Swarthmore College</td>
<td>1418</td>
<td>82</td>
<td>22</td>
</tr>
<tr>
<td><strong>Overall Institutional Average</strong></td>
<td>1243</td>
<td>71</td>
<td>40</td>
</tr>
</tbody>
</table>

Table B-3

Comparison of Original and Analytic Student Sub-Sample, For the 22 Institutions Included in the Present Study

<table>
<thead>
<tr>
<th></th>
<th>Original Sample</th>
<th>Analytic Sub-Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DEMOGRAPHIC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>26%</td>
<td>27%</td>
</tr>
<tr>
<td>Black</td>
<td>26%</td>
<td>23%</td>
</tr>
<tr>
<td>Asian</td>
<td>25%</td>
<td>27%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>24%</td>
<td>23%</td>
</tr>
<tr>
<td>Female</td>
<td>56%</td>
<td>56%</td>
</tr>
<tr>
<td>First-Generation</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td><strong>ACADEMIC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAT Score</td>
<td>1,309</td>
<td>1,314</td>
</tr>
<tr>
<td># AP Tests</td>
<td>3.43</td>
<td>3.57</td>
</tr>
<tr>
<td><strong>SOCIOCULTURAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural Capital</td>
<td>13.65</td>
<td>13.55</td>
</tr>
<tr>
<td>Social Capital</td>
<td>10.39</td>
<td>10.35</td>
</tr>
<tr>
<td><strong>PSYCHOLOGICAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>18.77</td>
<td>18.73</td>
</tr>
<tr>
<td>Aspirations</td>
<td>2.57</td>
<td>2.58</td>
</tr>
<tr>
<td><strong>FINANCIAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income (in $25k intervals)</td>
<td>3.14</td>
<td>3.15</td>
</tr>
<tr>
<td>Unmet Financial Need</td>
<td>$3,685</td>
<td>$3,780</td>
</tr>
<tr>
<td>Estimated College Costs</td>
<td>$27,559</td>
<td>$28,003</td>
</tr>
<tr>
<td><strong>OUTCOMES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four Year Graduation Rate (Same Institution)</td>
<td>67%</td>
<td>70%</td>
</tr>
<tr>
<td>Six Year Graduation Rate (Same Institution)</td>
<td>84%</td>
<td>87%</td>
</tr>
<tr>
<td><strong>SAMPLE SIZE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3,603</td>
<td>2,590</td>
</tr>
<tr>
<td>White</td>
<td>928</td>
<td>696</td>
</tr>
<tr>
<td>Black</td>
<td>922</td>
<td>608</td>
</tr>
<tr>
<td>Asian</td>
<td>895</td>
<td>695</td>
</tr>
<tr>
<td>Hispanic</td>
<td>858</td>
<td>591</td>
</tr>
</tbody>
</table>

*Note.* Data reflect samples from the 22 institutions included in current analyses.

^ In terms of racial composition, the analytic sub-sample is not representative of the original student sample for the 22 included institutions (chi-square = 11.00, with 4 df, p < .05). However, the analytic sub-sample is representative in terms of both sex and first-generation status.
Curriculum Vita

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EDUCATION

M.Ed. in Higher Education Administration & Student Affairs: University of South Carolina (2004)
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RESEARCH EXPERIENCE IN HIGHER EDUCATION

Graduate Research Assistant (August 2006 – December 2009)
CENTER FOR THE STUDY OF HIGHER EDUCATION
PENNSYLVANIA STATE UNIVERSITY

Coordinator of Research and Public Information (June 2004 – July 2006)
NATIONAL RESOURCE CENTER FOR THE FIRST-YEAR EXPERIENCE AND STUDENTS IN TRANSITION
UNIVERSITY OF SOUTH CAROLINA

SELECT PUBLICATIONS


TEACHING EXPERIENCE

Assistant to Instructor: Higher Education Students and Clientele: Pennsylvania State University (2009)
Instructor, University 101: University of South Carolina (2004, 2005)