UNIVERSITY OF CALIFORNIA

Los Angeles

Underrepresented and Underserved:
College Undermatch and School Counseling

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy
in Education

by

Abigail Kiyoko Bates

2017

ABSTRACT OF THE DISSERTATION

Underrepresented and Underserved:
College Undermatch and School Counseling

by

Abigail Kiyoko Bates
Doctor of Philosophy in Education
University of California, Los Angeles, 2017
Professor Sylvia Hurtado, Chair

The pathways to higher education have broadened to increase students who partake in postsecondary education, yet continuing social inequities persevere related to *where* students access these higher education opportunities. Persistent racial minority underrepresentation at selective institutions may be due to academic undermatch in the college choice process whereby students apply, are admitted, or attend institutions below their level of academic qualifications. Furthermore, it is unclear the extent to which access to school counseling programs influence undermatch. The purpose of the study was to examine the pervasiveness of academic undermatch, and the relationship between high school counseling programs and students' college choice.

Guided by Bourdieu's Social Reproduction Theory and Giddens' Theory of Structuration, I used logistic regression and HGLM analyses for a nationally representative sample of 12,940 students at 940 high schools. The unique longitudinal dataset drew from the High School Longitudinal Survey of 2009 (HSLS:09), Barron's Admissions Competitive Index, and IPEDS.

Findings point to the pervasiveness of academic undermatch at the application, admission, and attendance stages in the college choice process. White students undermatch at higher rates than any of the other racial groups and Asian students undermatch the least. However, undermatch rates at community colleges reveal that not only do Hispanic students undermatch at the highest rates by institutional level, but their rates are more than *one-and-a-half times* higher than White students by institutional level. Thus, undermatch is a complex phenomenon, with important nuances across and within racial groups. Characteristics of school counseling programs predict undermatch, for example, the more hours counselors devote to college counseling preparation activities, the less likely their graduates are to undermatch at any stage in the college choice process. The findings suggest the need to implement high school strategies and counselor training to provide students with quality college counseling support. At the college level, higher education practitioners are encouraged to reflect on admissions practices regarding college outreach to recruit from more diverse high schools than the typical feeder networks. Implications for policy speak to expanding enrollment and revisiting goals to include access to resourced institutions. For P-20 education, it is important to provide opportunities for students to attend the best matched institutions that will lead to their educational success.

The dissertation of Abigail Kiyoko Bates is approved.

Mark Kevin Eagan, Jr.

Meredith Phillips

Robert Teranishi

Sylvia Hurtado, Committee Chair

University of California, Los Angeles

2017

Dedication

For all the students, past, present, and future, who continue to fight for equity and justice.

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

Figures

Tables

ACKNOWLEDGEMENTS

This dissertation is the result of a community effort, despite the fact that only my name appears on the cover. There are so many people who are part of this and deserve recognition, thanks, and appreciation.

To my committee. Thank you so much for all the critical feedback and supportive encouragement. Your input and belief in me has made this whole thing possible. Meredith, you are an inspiration and a brilliant academic. Thank you for making me think in ways I had not done before. Thank you for all you do for me and especially all you do for kids. Rob, your dedication to educational policy and positive change have opened my eyes to many new possibilities. Thank you for encouraging me to think outside of my little box and for reminding to laugh while doing it. Kevin, I cannot begin to thank you for everything you have done for me. Between working at CIRP, taking classes with you, and fulfilling a special job at conferences, you have given me so many opportunities and support these past few years. Thank you for your unwavering encouragement and your willingness to help, at any time of day. Sylvia, you have pushed me and challenged me to be better than I thought I could be and for that I am eternally grateful. Thank you for the opportunity to learn from you and gain important skills in research and in life.

To my CIRP team. Dominique, Ellen, Melissa, Mark, Jared, Silvio, Carmen, Yvonne, and of course, Kevin. You all provided me with a home and a place to belong. I always looked forward to being in the office because we had so many great times and lots of laughs. Thank you for the knowledge and support at every step of the way.

To the HEOC faculty. Linda, Mitch, Cecilia, Sylvia, Rob, Kevin, and Pat. I have been so honored to have learned from some of the best minds and biggest hearts in all of education. Thank you for allowing me to listen to you, learn from, and be part of this amazing division.

To the education staff. Calvin, Amy, and Kim. Thank you for always being there when I needed you and for calming me down when I was freaking out. We all know who really runs this place.

To the alumni. Hannah, Marcela, Nolan, Bryce, and Adriana. You paved the way for me to be here and provided me with the guidance to get through. Whether it was providing me with resources, offering me advice, or listening to me complain, you all provided me with support and will continue to be my role models.

To my classmates, colleagues, and friends. Carrie, Jen, Christina, Jenny Lee, Ana, Ishimoto, Edwin, Cynthia, Dolly, Connie, Katherine, Damani, Krystle, Lavi. Thank you for your

friendship, encouragement, and most of all, memories. I have never laughed as hard as I have with you and I think that is what allowed me to survive this whole process.

To the best cohort ever. Joe, Theresa, Hilary, Mike, and Jason & Ed (as one entity). I tell all the new PhD students that the most important thing to do during your first year is spend time with your cohort because these are the people that will carry you through when times get tough. This statement perfectly reflects our cohort. We have worked hard together, played hard together, and supported each other through this thing that we constantly had to remind ourselves was voluntary. I could not have asked for a better group of practitioners to experience this with and wherever we are, you will always hold a very special place in my heart.

To Alex, my rock, by best friend, my personal cheerleader. You believed in me when I could not believe in myself. You always made me laugh and reminded me not to take life too seriously. Most importantly, you listened to me complain incessantly and continually reminded me that I was a rockstar and that I was loved. Thank you for standing beside me and supporting me through all of this. Love you tons and bunches and always still thinking…

Most importantly, to my family. This accomplishment is as much yours as it is mine. It was you, after all who has had to put up with me while I struggled to cross this finish line. Between the encouragement, laughter, and meals, you have given me the strength to do what I thought I could never do. Thank you for reminding me what a strong, independent, smart woman looks like.

VITA

1997	North Tahoe High School Tahoe City, California
2001	B.A. – Sociology, Minor in Spanish University of California, Santa Barbara
2002	M.Ed. – Education and Teaching University of California, Santa Barbara
2002	Single Subject Teaching Credential in Social Studies BCLAD certificate University of California, Santa Barbara
2002-2004	Social Studies Teacher Santa Monica High School Santa Monica, California
2004-2007	Humanities Teacher Wildwood Secondary School Los Angeles, California
2008-2009	Social Studies Teacher Douglass Middle School Woodland, California
2013	M.S. – Counseling California State University, Long Beach
2013	Pupil Personnel Services Credential Community College Certificate California State University, Long Beach
2013-2017	Research Analyst Cooperative Institutional Research Program University of California, Los Angeles
2014	M.A. – Education University of California, Los Angeles
2015-2017	Teaching Assistant Higher Education and Organizational Change University of California, Los Angeles

SELECTED PUBLICATIONS AND PRESENTATIONS

Hurtado, S., Bates, A. K., Ramirez, J. J., & Stewart, T. J., & Ruiz Alvarado, A. (2014, May). *Closing the gap for first generation, underrepresented minority students.* Paper presented at the Association for Institutional Research Annual Forum, Orlando, FL.

Bates, A. K. (2015, April). *The role of racial background and high school experiences in college development*. Paper presented at the American Educational Research Association Annual Meeting, Chicago, IL.

Bates, A. K. (2015, May). *More money more problems: Impact of financial concern on college adjustment.* Poster presented at the Association for Institutional Research Annual Forum, Denver, CO.

Bates, A. K. (2016). Barriers to College Access: School Contexts. Davis, CA: University of California, Davis. (Guest lecture, *Higher Education Access & Equity*)

Bates, A. K., & Bourke, P. Q. (2016). *Findings from the 2016 administration of the Your First College Year (YFCY) Survey.* Los Angeles: Higher Education Research Institute, UCLA.

Eagan, K., Stolzenberg, E. B., Bates, A. K., Aragon, M. C., Suchard, M. R., & Rios-Aguilar, C. (2016). *The American freshman: National norms fall 2015*. Los Angeles: Higher Education Research Institute, UCLA.

Bates, A. K., Ramirez, J. J. (2016, April). *Status and spaces: First-generation students' academic adjustment by institutional selectivity.* Poster presented at the American Educational Research Association Annual Meeting, Washington, D.C.

Ramirez, J. J., Bates, A. K. (2016, April). *Latina/o student participation in a study abroad program*. Paper presented at the American Educational Research Association Annual Meeting, Washington, D.C.

Zimmerman, H. B., Bates, A. K. (2016, November). *College student government participation: A multilevel analysis.* Paper presented at the Association for the Study of Higher Education Annual Conference, Columbus, OH.

Cabrera, N. L., Bates, A. K., Hernandez, E. (2017, April). *Part of the solution and part of the problem: The college campus ecology of whiteness.* Roundtable discussion at the American Educational Research Association Annual Meeting, San Antonio, TX.

CHAPTER 1 : INTRODUCTION

For decades now, one pressing issue in the national conversation in higher education has been the underrepresentation of racial minority students at selective institutions. While many explanations have been suggested to help us understand why this is the case, one recent explanation has drawn more attention: academic undermatch. Academic undermatch occurs when students choose to attend institutions that are below their level of academic qualification (Roderick, Coca, & Nagaoka, 2011). Undermatch has become a major concern because it is more prevalent amoung racial minority students, and because it has implications for degree completion: students who attend more selective institutions have higher graduation rates and shorter time-to-degree (Bowen & Bok, 1998; Bowen, Chingos, & McPherson, 2009). While researchers have investigated factors that lead students to undermatch, one factor that needs further exploration is the role of high school college counseling. Researchers have demonstrated that high school counseling programs have significant positive influence on students' postsecondary application and enrollment behaviors (Belasco, 2013; Bridgeland & Bruce, 2011b; McDonough, 2005a; Robinson & Roksa, 2016), but have not yet examined their influence on academic undermatch. The goal of this study is twofold: first, to examine the extent of undermatch for a nationally representative sample of students, focusing on differences across race. Second, this study seeks to better understand the relationship between high school counseling programs and prevalence of undermatch for these diverse groups.

Background of the Problem

Education has often been viewed as the primary equalizing mechanism in the United States. A quality education that includes attendance and success in higher education has been seen as not only a benefit to the individual attending college, but also a benefit to society as well (Hagedorn & Tierney, 2002; Tierney et al., 2009). Despite this "American dream" mentality, the educational system can maintain racial hierarchies and foster continued inequality. Specifically, educational institutions play central roles in maintaining social inequality by favoring and privileging those who already have advantages such as coming from families with higher incomes, identifying with the majority race, and having parents who are college educated, to name a few (Bankston & Caldas, 1996; Logan, Minca, & Adar, 2012; McDonough, 1997). While the promise of education may serve as a beacon of hope for equality and the elimination of social stratification, the operationalization of education continues to maintain this unequal structure. For instance, many of the students in the American school system attend schools that are unequal. This inequality takes many forms, including segregation, unequal funding patterns, limited access to college prep curriculum, and a shortage of qualified teachers, to name a few (Yun & Moreno, 2006). This inequality among the P-12 schools leads to unequal opportunities for students, which then limits the access certain students have to higher education. Furthermore, for many students, they attend schools with multiple factors that lead to inequality, which puts them at an even greater disadvantage when it comes to gaining access to higher education (Yun & Moreno, 2006). Specifically, this concentrated disadvantage, combined with college eligibility requirements, create differential opportunities for students to pursue higher education (Yun & Moreno, 2006).

It is not just a matter of gaining access to higher education, but also *where* students attend becomes increasingly important in terms of recreating social inequality (Alon & Tienda, 2005; Roderick et al., 2011). Because more selective institutions tend to have higher retention and completion rates (Bowen & Bok, 1998; Bowen et al., 2009; Roderick, 2006), examining where students attend college will contribute to our understanding of the inequality in college access and completion. Specifically, defining academic undermatch as another form of social reproduction that reinforces the social hierarchy provides us with a specific lens to examine barriers to equal college access in terms of where students enroll in college. Controlling for background and preparation, students attending less selective institutions are less likely to graduate and their time-to-degree tends to be longer at these lower-resourced institutions (Bowen et al., 2009). Therefore, large percentages of students are attending institutions where they are more likely to take longer to graduate, if they graduate at all. While more students are attending college in general, this increase masks persistent discrepancies in equal access to selective institutions because undermatch tends to affect low-income and underrepresented racial groups at higher rates (Bowen et al., 2009; Smith, Hurwitz, Howell, & Pender, 2012). Since this phenomenon impacts these populations of students more often, it is for this reason that academic undermatch serves as another form of social reproduction that maintains social and economic disparities (Roderick et al., 2011; Smith et al., 2012).

Studies have shown that several factors lead to undermatch, including individual characteristics such as racial background, socioeconomic status, parental education, and school contexts such as college-going climate, average academic achievement of school, and the availability of quality college information (Goodwin, 2015; Hurwitz, Pender, Howell, & Smith,

2012; Roderick et al., 2011; Rodriguez, 2013; Smith et al., 2012). However, research has not explored the role of the school counseling program as a contextual factor in this problem. Therefore, this study will focus on school counseling programs, specifically counseling norms and resources, that are hypothesized to influence undermatch among students on a national scale.

Highlighting the school counseling program is important for the study of undermatch because research has demonstrated that school counselors and school counseling programs play one of the most important roles in increasing access for all students and improving college-going rates (Carey & Harrington, 2010a, 2010b; Carrell & Hoekstra, 2010; McDonough, 1997, 2005b; Pham & Keenan, 2011). Through the school counseling program, there is the potential to impact the college choice process for students through tasks such as fostering students' college aspirations, helping students prepare academically for college, and supporting students in the decision-making process (McDonough, 2005a). While school counselors, as individuals, have the potential to impact students in their college choice process, their caseloads are often so high that they diminish counselors' impact. For example, while the American School Counselor Association (ASCA) recommends a student-to-school counselor ratio of 250 to one, the national average is almost double that at 491 to one, with a high caseload average of 941 students (Arizona; American School Counselor Association, 2016). However, school counseling programs have the potential to impact larger numbers of students through the establishment of counseling program norms and resources that allow them to either reinforce or disrupt the social structures. Given the importance of reducing social inequality and the potential influence high quality school counseling programs can have on college access, examining these two together

will not only highlight the negative impact of academic undermatch, but may also provide a way to address this issue through the school counseling program.

Inequity in College Access

In the past forty years, the pathways to college have broadened to include more students than ever before. Students from all different backgrounds have found increasing opportunities to pursue higher education and enroll in colleges and universities nationwide (McDonough, 1997; Swail & Perna, 2002). Specifically, since 1990, the percentage of 25- to 29-year old's who earned a bachelor's degree or higher increased for the American population in general and this pattern holds true for almost all of the major racial groups as well (American Indian/Alaska Native actually decreased in the last few years; Kena et al., 2015). Despite the increase in graduation rates for these groups, the completion gap between White and Asian students and other underrepresented groups of color actually widened (Kena et al., 2015). For instance, since 1990, the college completion gap between White students and Black students widened from 13 to 18 percentage points and the gap between White students and Hispanic students widened from 18 to 26 percentage points (Kena et al., 2015). Therefore, in 2014, 41% of Whites (aged 25 to 29) had attained at least a bachelor's degree, compared to only 22% of Blacks and 15% of Hispanics (Kena et al., 2015). Although Asians still represent the highest percentage of young adults who graduated from college, this number masks discrepancies and inequities among different ethnic groups *within* the larger Asian racial category. For example, in 2000, only 24.4% of Laotian students had earned a bachelor's degree, compared to 45.6% of Chinese students (Teranishi, 2010). If we hope to reduce the levels of social inequality and provide more equal college access to selective institutions, we need to address the disparate completion

percentages for underrepresented racial minority students. This goal is more imperative now than it has ever been given the changing demographics of the United States population. The Asian and Hispanic populations are two of the fastest growing racial groups in the United States and are projected to increase by over 100% in the next 40 years (Colby & Ortman, 2014; Teranishi, 2010). The growth rate for children in this same timeframe reveals a similar pattern where by 2060, 64% of all children under the age of 18 will belong to racial and ethnic minority groups (Colby & Ortman, 2014). With a fast-growing minority youth population who will be participating in higher education in the future, it is important to narrow the college completion gap now if we want to increase the number of college graduates.

Some stakeholders have suggested that one approach to addressing the college completion shortage is to encourage students to attend "appropriately selective" higher education institutions (Alon & Tienda, 2005; Bowen et al., 2009). This may be even more important for underrepresented students of color. Specifically, underrepresented students of color (Black/African American, Latinx, Native American, and some Asian American ethnic groups, such as Vietnamese, Hmong, and Cambodian) often attend institutions with lower selectivity levels than those for which they are qualified (Roderick et al., 2011), referred to as undermatch. Alon and Tienda (2005) found that the college graduation gap between racial minority and White students narrows as the selectivity of the institution increases.

The type of higher education institution an individual attends influences several educational outcomes, including persistence, degree attainment, the likelihood of attending graduate school, and satisfaction with college experiences (Astin, 1993; Baker & Vélez, 1996; Bowen & Bok, 1998; Hossler, Braxton, & Coopersmith, 1989; Pascarella & Terenzini, 1991;

Tinto, 1993). Underrepresented students of color who attend more selective institutions are more likely to not only graduate from college, but do so in a shorter period of time. However, despite the importance of attending selective institutions, many racial minority students are enrolling in less selective colleges, even when they have the academic qualifications to attend more selective schools. For example, in 2010, Black students represented 13% of all college-bound high school seniors, yet were only 8% of the undergraduate population at highly selective research universities. Similarly, Hispanics represented 15% of college-bound seniors, and only 8% of undergraduates were enrolled in selective institutions (Perna & Kurban, 2013). While undermatch in general is a problem, this phenomenon becomes more problematic when it disproportionately impacts racial minority and low-income students, thus defining undermatch as a form of educational inequality.

The Role of the School Counselor

One potential contextual factor that may influence undermatch is the school counseling programs at students' high schools. While research has documented the prevalence of undermatch for underrepresented racial minority students (e.g., Bowen et al., 2009; Dillon & Smith, 2013; Roderick et al., 2008; Smith et al., 2012), less is known about the role of school counseling programs in this process. One study conducted by Goodwin (2015) looked at school counseling dosage on the estimates of undermatch expectations for students in a national sample. While the findings from this study found that counseling dosage did play a role in students' expectations to undermatch, this study relied on metrics related to expectations and not actual application or enrollment patterns of the students. However, the findings from this study

highlight the importance of exploring school counseling programs further to better understand their relationship to undermatch for racial minority students.

Researchers have demonstrated that school counseling programs and school counselors have the potential to greatly impact students' pathways to college. However, school counselors are limited in their ability to impact every student due to structural constraints such as high caseloads, low resources, other responsibilities such as scheduling and discipline, and counseling for social-emotional needs (McClafferty, McDonough, & Nuñez, 2002; McDonough, 2005a). Therefore, with these structural barriers that limit the direct student contact and the direct influence counselors have on students, one way to increase their impact is through the foundation of counseling program norms and resources that focus on college access and choice. School counselors are optimally positioned to create and maintain these norms and resources through the establishment of a college culture and doing so would potentially impact the entire school. Attending a high school with a strong college culture shapes students' participation in the college choice process (Roderick et al., 2008). In a study conducted by Roderick et al. (2008), they found that the most consistent predictor of whether or not students engaged in the college choice process was a strong college culture at the school. Furthermore, having a strong college culture seemed to make a bigger difference for Latinx students compared to other students in the study. It is the school counseling program that establishes and maintains this college culture through the counseling opportunity structure developed through the normative practices and college resources provided to the students (Engberg & Gilbert, 2014).

Even though researchers have demonstrated that school counselors positively impact student's college decision-making processes, education reform efforts and federal mandates

calling for increased college access have neglected to include school counselors in these conversations (Bridgeland & Bruce, 2012; Holcomb-McCoy, Lee, Bryan, & Young, 2011; McDonough, 2005a). In fact, national surveys of school counselors conducted by the College Board reveal that school counselors are ready to assume leadership roles in educational reform related to college and career readiness (Bridgeland & Bruce, 2011a, 2012). Yet, many federal reform efforts, such as Common Core State Standards Initiative, did not actively solicit input from school counselors nor consider their role in the college-going process. Only recently, under Michelle Obama's Reach Higher Initiative was there active inclusion of school counselors as important institutional agents who play a role in increasing college access and influencing the college choice process for students. Despite this recent policy, however, school counselors' voices have been left out of education reform efforts.

Purpose of the Study

While school counselors have the potential to impact the college choice process for students in high school, undermatch continues to plague many racial minority students. The goal is to ultimately increase equitable access to selective institutions for underrepresented students, and exploring the role of school counseling programs in this process will provide information on how to achieve this goal. Specifically, this study will examine the influence of school counseling programs on estimates of academic undermatch for all students, with a special focus on racial minority students. The purpose of this study is twofold: first, to examine the extent of undermatch for all students, specifically underrepresented minority students. Second, this study seeks to better understand the relationship between high school counseling programs and undermatch for underrepresented students of color.

Research Questions

Utilizing national data that includes student characteristics as well as information on the school counseling program, this study seeks to answer the following research questions:

1. What is the extent of academic undermatch for a nationally representative sample of students at the time of application to, admission to, and attendance in higher education?
    - How do rates of academic undermatch vary by racial backgrounds?
2. What is the relative influence of high school counseling programs on academic undermatch in a nationally representative sample?
    - How does the impact of school counseling programs vary by racial backgrounds?

Scope of Study

This study uses nationally representative data from three sources: the High School Longitudinal Study of 2009 (HSLS:09), institutional-level data from the Integrated Postsecondary Education Data System (IPEDS) and Barron's Admissions Competitive Index. The merging of these data sources creates a unique dataset that allows for the identification of undermatch as well as the relative influence of school counseling programs above and beyond other school characteristics such as school control and the percentage of students receiving free or reduced lunch. One benefit of the HSLS:09 is the inclusion of data from school counselors as well, including caseload numbers, time-on-task information, and college counseling objectives of the program. The inclusion of IPEDS data and the Barron's Admissions Competitive Index allows for identification of undermatch for the sample population by providing institutional characteristics of students' college choices for analysis.

The theoretical framework guiding this study brings together Bourdieu's (1977, 1986) social reproduction theory and Giddens' (1979, 1984) theory of structuration. Social reproduction theories have been used in educational studies to explain the inequity in the education system. Bourdieu's (1977, 1986) social reproduction theory helps to identify undermatch as a type of reproduction that maintains the educational hierarchy. His conceptualizations of cultural and social capital and *habitus* help to explain how underrepresented students engage in the college choice process, which ultimately may lead to undermatch. Cultural capital is a symbolic good (such as general knowledge, disposition, and skills) that is transmitted through generations in order to maintain privilege (Bourdieu & Passeron, 1977). Social capital refers to social relationships and connections that will allow students to obtain institutional support (Lin, 2001; Morrow, 1999; Stanton-Salazar & Dornbusch, 1995). *Habitus* reflects the internalization of structured boundaries and inequalities that influences what an individual deems is possible (Horvat, 2001; McDonough, 1997). School counseling programs, as important educational contexts shape students' *habitus*, which influence student decision-making in terms of where to apply and enroll in postsecondary education. Through students' cultural and social capital and the influence of *habitus*, students are electing to apply to and enroll in institutions for which they are overqualified.

Giddens' (1979, 1984) Theory of Structuration helps to explain school counselors' behavior as agents that reinforce or disrupt the social structures. Identifying school counselors as institutional agents highlights the potential of these individuals to provide access to social capital for underrepresented students. However, it is through this role that school counselors may also be reinforcing the social hierarchy by dissuading students from applying to appropriately

selective institutions, thus encouraging undermatch. The synthesis of these theories helps provide insight into this form of social reproduction and the ways in which school counselors, as institutional agents who encourage or discourage students, exercise agency to disrupt the status quo. Taken together, these theories provide a foundation for this inquiry into the various factors that contribute to undermatch, including the role of school counselors and school counseling programs in reinforcing or disrupting this inequality. They provide the lens through which we can better understand the college choice process for racial minority students within educational contexts that ultimately impact their decision-making.

Significance

This study is significant in research, practice, and policy. First, this study adds to the literature related to the college choice process for underrepresented students. While research has demonstrated that the college choice process is complex and multidimensional, especially for racial minority students (Pérez & McDonough, 2008; Freeman, 2005), this study highlights one factor with the potential to influence the college choice process: the school counseling program. Previous research has examined how high school contexts shape the college choice process for underrepresented students of color (Hurwitz et al., 2012; Rodriguez, 2013), yet we still have a limited understanding of how school counseling affects this process. One recent study demonstrated that adding counselors to a counseling staff increased four-year college going rates (Hurwitz & Howell, 2014), yet more research is needed to better understand the connection between counselors and college choice outcomes. This study specifically focuses on the intersection of college choice and school counseling programs to help clarify and better understand this relationship.

In addition, this study adds to the literature on academic undermatch and provides additional evidence on the impact of this phenomenon for underrepresented students of color. Because undermatch impacts policy related to both college access and completion, understanding undermatch on a national scale informs policy initiatives and reform efforts as well. By using a nationally representative sample, this study provides an understanding of the pervasiveness of undermatch nationwide. Additionally, this study illuminates different factors that contribute to academic undermatch for racial minority students, including contextual factors. Studies that empirically examined the pervasiveness of undermatch by using a national sample have not included school counseling programs as contextual predictors (Belasco & Trivette, 2015; Dillon & Smith, 2013; Hurwitz et al., 2012; Smith, Pender, & Howell, 2013). Therefore, this study contributes new evidence to the literature related to the impact of these programs on students' likelihood to undermatch in their college choice process.

Furthermore, previous studies of undermatch (Goodwin, 2015; Hurwitz, Pender, Howell, & Smith, 2012; Roderick et al., 2011; Rodriguez, 2013; Smith et al., 2012) have not included an empirical examination of undermatch at the admissions stage in the college choice process, which has implications for postsecondary institutions and the metrics by which they admit qualified students. If a student undermatches at the admissions stage, then this indicates that this "choice" was not that of the student's but a decision made by the institution. If a highly-qualified student is rejected from an appropriately matched institution, then it is the responsibility of the institution to examine their admission policies and reflect on their decision-making process. This study includes an examination of this step in the process, which is a new and unique perspective to our understanding of academic undermatch.

Additionally, this study sheds light on how school counseling programs, as school contexts, shape and influence students in their postsecondary trajectories. Research has demonstrated that college culture and school contextual norms influence student-decision making related to college (Engberg & Wolniak, 2010; Hill, 2008; McClafferty et al., 2002). Through the findings from this study, we have a better understanding of how school counseling programs influence students in their college choice process and which aspects of the counseling program influence student choice above and beyond individual- and school-level predictors.

Finally, this study bridges the gap between P-12 and higher education by bringing together high school contexts and their influence on higher education enrollment. Greater alignment and findings may suggest that a "college for all" program will not produce desired results for the economy if we do not also send talented students from all backgrounds to the top colleges for which they qualify. Additionally, budget cuts in counseling programs may result in findings that demonstrate extended workloads that impact the ability to adequately advise students in the college choice process. Furthermore, individual and district policies that increase the responsibilities of school counselors to include non-counseling tasks such as scheduling and testing takes away from counselors' abilities to provide quality college counseling.

Subsequent chapters focus on the theories and literature framing the study (Chapter 2), the methodologies employed to respond to and answer the research questions (Chapter 3), results from the undermatch analysis (Chapter 4) and from the HGLM analysis (Chapter 5), and a discussion of the findings, including their implications for research, practice, and policy (Chapter 6).

CHAPTER 2 : THEORETICAL FRAMEWORKS AND REVIEW OF THE LITERATURE

The purpose of this chapter is to present a review of the literature related to academic undermatch and college counseling in secondary education. In particular, the chapter focuses on two theoretical frameworks that guide the study: Bourdieu's theory of social reproduction (Bourdieu, 1986; Bourdieu & Passeron, 1977) and Giddens' theory of structuration (Giddens, 1979, 1984). Within the social reproduction framework, Perna's (2006) Multi-Contexual Student College Choice conceptual model is presented as a guide to structure the development of the statistical model related to college choice factors and pertinent variables. Furthermore, relevant studies related to college choice are reviewed, focusing on various factors that influence educational decisions, including demographics and background characteristics, academic qualifications, and costs of higher education. Since academic undermatch is a unique decision made in the college choice process, this chapter also highlights literature that has specifically examined undermatch in order to understand the context for the study. However, missing from college choice literature and social reproduction frameworks is the role of school counseling programs as important contextual factors in understanding undermatch. Therefore, this chapter also incorporates Giddens (1979, 1984) theory of structuration as a way to better frame and understand this contextual element. Within this theoretical framework, Engberg and Gilbert's (2014) Counseling Opportunity Structure conceptual model is presented to help guide the selection of relevant counseling factors to include in the statistical model. Finally, pertinent studies related to school counseling programs and counselors are reviewed to better understand the role school counselors play in the college choice process.

Social Reproduction

Social reproduction theories have been used in educational studies to explain the inequity in the education system for years. Specifically, the work by Pierre Bourdieu has been frequently used to describe differences in educational access and college choice in many previous studies as well (see McDonough, 1997; Perna & Titus, 2005; Stanton-Salazar, 1997). Bourdieus' most significant contribution to social reproduction theory is the development of the concepts of cultural and social capital (Bourdieu & Passeron, 1977). Cultural capital is a symbolic good that middle and upper class families transmit to their children as a way to maintain their class status and privilege (Bourdieu & Passeron, 1977; McDonough, 1997). Bourdieu and Passeron (1977) define cultural capital as the general knowledge, disposition, and skills that are passed from one generation to the next. Therefore, children from middle and upper class families inherit a cultural capital that is different than the cultural capital that working-class students receive from their families. In turn, schools place more value on the cultural capital of the dominant classes, thus rewarding students from middle and upper class families over students from working class families. Educational systems further legitimate the differential academic outcomes that occur due to different values on cultural capital by making these differences appear to be based on notions of "merit" or "skills," instead of systems of privilege and advantage (Macleod, 1987). It is through this process of valuing the dominant classes that reinforces the status quo and continues to support the social hierarchy that devalues students in the lower classes.

Whereas cultural capital refers to knowledge and skills passed from generation to generation, social capital refers to social relationships and connections that will allow students to obtain institutional support (Lin, 2001; Morrow, 1990; Stanton-Salazar & Dornbusch, 1995).

While Bourdieu conceptualized social capital as certain advantages granted to individuals based on their membership in particular groups (Portes, 1998), the more frequently used definition is that of Coleman (1988). Bourdieu (1986) viewed social capital as the means by which the dominant class maintained its dominant position because those who already belonged to the elite, upper class already had access to the various forms of capital that a group or network possessed. In contrast, Coleman (1988) conceptualized social capital as a vehicle to communicate norms, authority, and expectations that an individual must adopt in order to be successful. For the purposes of this study, Bourdieu's conceptualization is relevant to understanding the ways in which more privileged students have access to networks of information and resources as a result of their membership in elite groups. Students who are not members of these advantaged groups do not have similar access, therefore, the social hierarchy is maintained due to structural barriers and restrictions imposed on the social networks of these disadvantaged groups. On the contrary, Coleman's approach is useful to discuss the importance of school counselors as individuals who can facilitate access to institutional resources and support for underrepresented students. This definition will be discussed in more detail in the following section.

While cultural and social capital influence individuals' decisions, these behaviors must be understood within the confines of the social context within which these decisions occur. The concept of habitus refers to an individual's internalized system of beliefs, perceptions, and experiences about the social world that the individual acquires from his or her immediate environment (Bourdieu & Passeron, 1977; McDonough, 1997). Therefore, an individual's decisions about college are not based on rational analyses, but are reasonable choices about one's own aspirations (Macleod, 1987; McDonough, 1997). Habitus reflects the internalization of

structured boundaries and inequalities that influences what an individual deems is possible (Horvat, 2001; McDonough, 1997). It is habitus that facilitates social reproduction because it fosters internalized beliefs about what one is capable of, based on the interaction between none's cultural capital and the social context. Students with high cultural capital are reinforced by their social context and therefore, have high academic aspirations. In contrast, students with less-valued cultural capital are given messages from their social context about their limited academic abilities, and therefore, make choices that reflect these messages. While Bourdieu was primarily concerned with the role of family in transmitting cultural values and influencing habitus, McDonough (1997) extends this notion of habitus to apply to organizational contexts as well, what she refers to as "organizational habitus" (McDonough, 1997, p. 10). Organizational habitus refers to the impact of class on individual behavior through a mediating organization (McDonough, 1997).

This concept of cultural and social capital is relevant to the study of college choice because it situates the college choice process in students' lived contexts. Students with highly valued cultural capital already have educational expectations passed down to them, not only including the expectation to participate in higher education, but also the types of institutions that students should attend. In fact, DiMaggio (1982) concluded that cultural capital may have the greatest impact on educational outcomes through its influence on the quality of college students choose to attend. For students who lack valued cultural capital, one consequence may be that they lower their educational aspirations or self-select out of certain types of institutions because they are unaware of the cultural norms (Bourdieu & Passeron, 1977; Lamont & Lareau, 1988; Perna, 2006). In terms of social capital, students who do not have relationships and networks that

confer access to institutional resources, such as college knowledge and information, are limited in their ability to make rational decisions about where to apply to and enroll in college. Finally, since habitus is the intersection of personal predispositions and structured inequality in the educational system, students are receiving messages about the "appropriate" choices they should be making in terms of college enrollment. Furthermore, organizational habitus shapes the college choice process by narrowing the range of possible options for students based on their cultural capital (e.g., economic circumstances) and the school context (e.g., structure of school counseling) where they make college decisions (McDonough, 1997; Perna, 2006). Organizational habitus "limits the universe of possible college choices into a smaller range of manageable considerations" (McDonough, 1997, p. 10). It is specifically the organizational habitus that reveals the ways in which schools reproduce social inequalities (McDonough, 1997; Perna, 2006).

Since undermatch is a type of college choice that students engage in when deciding where to enroll, this theory on social reproduction is especially relevant to this study. In essence, undermatch serves as another form of social reproduction that reinforces the social hierarchy within education. Through students' cultural capital and the influence of habitus, students are electing to apply to and enroll in institutions for which they are overqualified. It is as if society is sending messages via the social structure of school contexts to highly-qualified, underrepresented students that they do not belong in the most selective higher education institutions, therefore, they should choose to attend institutions that have lower selectivity levels than which they are qualified. The school and counseling contexts within which students make these pivotal decisions provide organizational habiti that limit their options and encourage them

to select institutions that do not meet their qualifications. This study extends this theory of social reproduction to identify undermatch as a process that reinforces the existing hierarchy by forcing underrepresented students into less selective institutions and maintaining the educational status quo.

Even though Bourdieu's concepts of social reproduction, cultural and social capital, and habitus were focused on class distinctions and the inequality between classes, these concepts can be applied to racial group differences as well. Bourdieu was primarily concerned with class divisions and the ways in which class status reinforced the existing social hierarchy (Bourdieu & Passeron, 1977; Lamont & Lareau, 1988). However, this was within the context of French society, history of class division, and culture. When applied to American society, class divisions tend to be more weakly defined and other indicators of high status (e.g., cultural capital) are more fluid and less stable (Lamont & Lareau, 1988). In fact, scholars have alluded to the fact that in the United States, racial group membership tends to be more salient as an indicator of group differences and educational trajectories (see Bonilla-Silva, 2006; Noguera, 2013; Omi & Winant, 2015). Following this rationale in the American context, application of Bourdieu's social reproduction theory should be adjusted to reflect the social reality of the context within which it is applied. In fact, previous empirical studies in the United States that have employed a Bourdieuian theoretical framework have defined cultural distinctions along racial lines (see Kalmijn & Kraaykamp, 1996; Lareau & Horvat, 1999; Lin, 2001; Perna, 2000; Perna & Titus, 2005). Similarly, for the purposes of this study, notions of cultural and social capital and habitus are being used in conjunction with racial group differences to align with the American social context. Furthermore, research has shown that within the United States, class distinctions also

tend to fall along racial lines as well (see Omi & Winant, 2015; Rodriguez, 2013), which can only strengthen the justification for defining differences by racial groups.

Perna's (2006) Multi-Contextual Student College Choice Model

Using social reproduction theory as a guide, Perna (2006) developed a conceptual model to better understand the college choice process within multiple contextual layers. Previous research on college choice has relied on two separate disciplines to inform the development of conceptual models. Some researchers (Long, 2004; Manski & Wise, 1983) have relied on economic models of human capital investment to examine students' college choices. These models rely on rational thinking where individuals decide to invest in education based on the comparison between benefits and costs (Ellwood & Kane, 2000; Paulsen, 2001). Despite the utility of examining students' decision making through the lens of a human capital framework, economic perspectives do not allow for the consideration of differences in college choice across different demographic groups (Perna, 2006). For example, human capital models do not consider intangible influences on the college choice process, such as access to college information or the broader educational context (DesJardins & Toutkoushian, 2005a).

On the other hand, some researchers have used sociological-cultural approaches to college choice, which highlight the ways in which demographic characteristics influence students' decision making (Terenzini, Cabrera & Bernal, 2001). This approach follows the Bourdieu notions of capital, as outlined previously in the theoretical framework used in this study. Recent research using a socio-cultural framework focuses on the ways that cultural and social capital influence the college choice process. Students who lack the necessary cultural

capital may self-select into lower selectivity institutions because they are unaware of particular cultural norms that indicate the importance of institution type for college enrollment (Bourdieu & Passeron, 1977). Social capital focuses on social networks, where students have access to information and resources that aid them in the college choice process (Stanton-Salazar & Dornbusch, 1995). These sociological approaches are useful frameworks for the study of college choice because they highlight the importance of context in shaping students' perspectives and orientations toward making decisions about college. Despite this advantage, these models, however, do not take into consideration the individual influence in shaping college choice decisions (Manski & Wise, 1983). It is within this context that the multi-contextual college choice model (Perna, 2006) becomes appropriate for this study. This model integrates concepts from both the economic models of human capital and socio-cultural frameworks to examine the college choice process. Therefore, this model, which incorporates constructs from both perspectives, makes the assumption that decisions about college reflect an individual's "situated context" (Perna, 2006, p. 116). The multi-contextual college choice conceptual model posits that the college choice process is shaped by four contextual layers: (1) the individual student (2) school and community context (3) higher education context (4) broader social, economic, and policy context (see Figure 2.1).

Figure 2.1 Perna's (2006) Multi-Contextual Student College Choice Model.

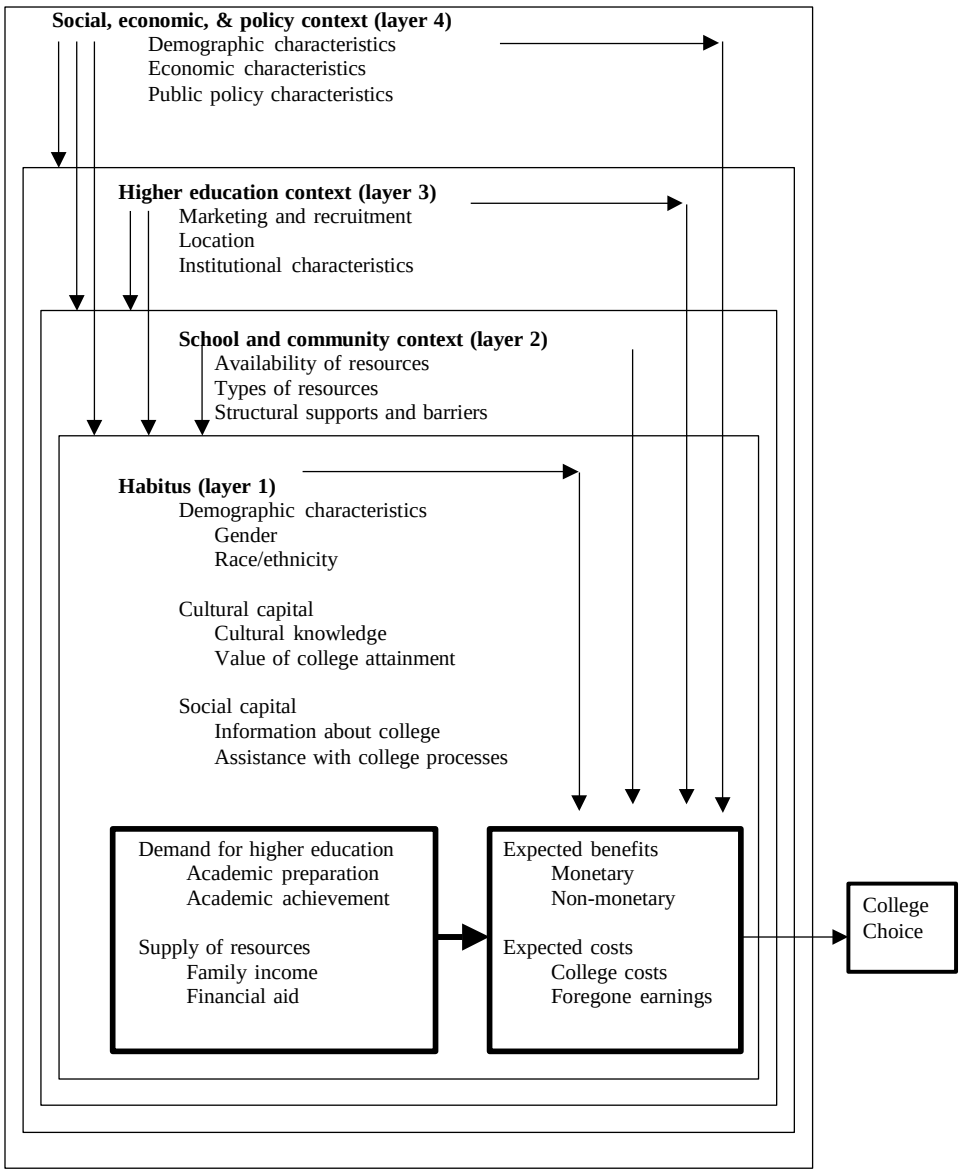


Figure 2.1. From Perna, L. W. (2006). Studying college access and choice: A proposed conceptual model. In J. Smart (Ed.), Higher education: Handbook of theory and research (Vol. 21, pp. 99-157). Netherlands: Springer.

While all of these layers play an important role in the college choice process, this study will focus on the interaction between layers one and two, the individual and school context.

Specifically, using this conceptual model as a framework, this study will highlight the school counseling program as a contextual resource that shapes the college choice process.

At the center of the conceptual model is the human capital investment model, where students weigh and compare expected benefits with expected costs. These costs and benefits are influenced by students' academic preparation and the supply of resources available to students. It also within this first layer where elements of capital come into play and influence students' perceptions about costs and benefits with regard to decisions about college. Specifically, this first layer also involves students' demographic characteristics, cultural capital, and social capital, which make up the students' habitus.

The next layer in the model reflects the school and community context within which students are situated. This layer includes social structures and resources that facilitate or hinder students' college decisions. It is within this layer where the school context is positioned and for the purposes of this study, where the school counseling program exerts its influence on the college choice process. The school counseling program, as a school context, influences college choice through its structures as a program, its emphasis on college-going, and its ability to facilitate relationships between students and counselors (Stanton-Salazar, 1997). Although the other layers of the conceptual model are important to fully understand the college choice process, this study focuses on the interaction between layers one and two. Therefore, this description of the conceptual model only highlights the features of these specific layers.

Previous Studies Related to College Choice

The college choice process. College choice research has found that this process is complex, complicated, and influenced by a variety of factors. This section highlights some of the most important factors that contribute to the college choice process. While the factors are presented as separate sections, it is important to note that these sections are not mutually exclusive and there is significant overlap between categories. For the purposes of this study, the various factors are presented separately to simplify the explanation and review the literature. Furthermore, since the focus of this study is on racial/ethnic differences with regards to undermatch, more emphasis will be placed on this demographic characteristic as it plays a more central role to the analysis.

Since the majority of the literature and models related to college choice use the term "choice," I will be using the same terminology for the purposes of this study. However, it is important to note that the term "choice" implies that students have freedom and autonomy when making decisions about their postsecondary lives. While this is true to some extent for some students, these decisions occur in specific contexts and are not made in isolation of broader social forces. Additionally, the degree of autonomy may be more abundant for some students over others. For many students, deciding which college to attend is not a matter of "choice," but more an actualization of higher education participation given limited options. As Hearn (1991) argued, the higher education system is a stratifying structure that maintains social inequalities. Some ways that the college "choice" process fits into this stratifying structure is through persistent cultural advantages associated with those who already have measures of privilege, prohibitive costs at more elite institutions, and institutional traditions, such as recruiting practices

and legacy admits (i.e. children of alumni). Similar to the cautionary note provided by Plank and Jordan (2001) in their college choice study, it is important to consider the college "choice" process within a broader context that takes into account the "complexities of the phenomenon and specifically, the degree to which broader forces of social stratification work to limit choices for some" (Plank & Jordan, 2001, p. 955). Therefore, while this study refers to the transition to postsecondary education as a "choice," I acknowledge that this term may be inaccurate for some students and may obscure various social realities of this process for many students.

The most well-known and frequently referenced college choice process model is the one developed by Hossler and Gallagher (1987). This model delineates three different stages in the decision-making process related to higher education: predisposition, search, and choice. During the predisposition phase, students cultivate their aspirations or desire to pursue higher education as they develop educational and occupational goals (Hossler & Gallagher, 1987; Perna, 2006; Plank & Jordan, 2001). This stage usually begins during middle school and lasts until sometime during the student's junior year (11th grade) in high school (Hossler & Gallagher, 1987). In the search stage, students engage in activities related to gathering information about postsecondary and higher education, including identifying the set of institutions to which the student might apply (Hossler & Gallagher, 1987; Hossler, Schmit, & Vesper, 1999; Long, 2004; Perna, 2006; Plank & Jordan, 2001). Typically, the search stage begins at some point during the junior year in high school as students really begin to investigate postsecondary options. Finally, in the choice stage, students select and enroll in a particular institution (Hossler & Gallagher, 1987; Perna, 2006; Plank & Jordan, 2001). This final phase in this model usually occurs during the junior and senior years in high school (Hossler & Gallagher, 1987).

Demographics. Various demographic and background characteristics such as race/ethnicity, socioeconomic status (SES), sex, and generational status influence the college choice and decision-making process (McDonough, Nuñez, Ceja, & Solórzano, 2003, 2004). This section reviews the relevant literature related to demographics, with additional emphasis on the role of racial/ethnic group membership.

Racial/ethnic groups. Research on racial/ethnic group distinctions in the past 25 years has shown differences in the college choice processes and outcomes across different racial/ethnic groups (Perna, 2000, 2006). Various studies have demonstrated that the student college choice *process* varies across racial/ethnic groups (Freeman, 1997; Heller, 1997; Hossler et al., 1999; McDonough et al., 2003, 2004; Perna, 2000; Perna & Titus, 2005; Teranishi, Ceja, Antonio, Allen, McDonough, 2004). For instance, changes in tuition and grant opportunities seem to have a larger influence on the enrollment decisions of students of color (Asian, African American, Latinx[1]) than their White peers (Heller, 1997). Furthermore, Asian Americans from different ethnic sub-groups approach the college choice process differently, where Southeast Asian students do not tend to enroll in selective colleges and Chinese and Korean American students choose to attend more selective institutions (Teranishi, 2010; Teranishi et al., 2004). Freeman's (2005) study on African American high school students led her to conclude that accepted models of college choice need to be expanded to include cultural characteristics of the students and families themselves. Her study revealed that school and family characteristics influence the college choice process differently across cultures, where she discovered the nuanced ways that both school and family impact the choice process for African American students. For Latinx

[1] The terms Latina, Latino, Latina/o, and Latinx refer to all groups of Hispanic origin, including, but not limited to people of Mexican, Puerto Rican, Central American, and South American descent.

students, research has found that in comparison to other racial groups, Latinx students were the least likely to engage in an extensive college choice process and least likely to enroll in college immediately following high school completion (Hurtado, Inkelas, Briggs, Rhee, 1997). However, Latinx students tend to rely on family and friends as important resources to inform them about college and support them through the college choice process (Gándara, 1993, 1995; Pérez & McDonough, 2008).

In terms of *outcomes*, some studies have demonstrated that college choice outcomes (e.g., enrollment) are lower for African American students than they are for White students (Hurtado et al., 1997; St. John & Noell, 1989). However, African American students tend to engage in more of the necessary steps to enroll in higher education than their White peers. African American students have higher educational aspirations (Kao & Tienda, 1998), submit a higher number of college applications (Hurtado et al., 1997), enroll in four-year rather than two-year institutions (Plank & Jordan, 2001; Rouse, 1994), and attend higher-cost versus lower costs colleges (Hearn, 1988). Despite these positive college enrollment patterns, actual enrollment rates in general are lower for Black/African American and Latinx students than for White students because they possess less capital that is valued in the college enrollment process and tend to attend high schools with fewer resources to promote college participation (Perna & Titus, 2004). This means that social and cultural capitals are important factors for four-year college enrollment decisions for Black/African American, Latinx, and White students (Perna, 2000). However, the specific expression and combination of these types of capital and enrollment vary by racial/ethnic group (Perna, 2000).

Contextually, the individual college choice process for different racial/ethnic groups is also greatly influenced by P-12 educational environments. Specifically, the pathway to college for many underrepresented students of color is marked by disparities in college preparation, college knowledge, and a college culture in the schools (McDonough, 2005a). These disparities are often revealed both in the formal structure of the school, which includes the resources, and the informal structure that communicates the college culture (Hill, 2008; McDonough, 2005a).

Additionally, recent research on the resegregation of American public schools has revealed that segregation has increased dramatically across the country for youths of color (Kucsera & Orfield, 2014; Orfield, Kucsera, & Siegel-Hawley, 2012; Reardon, Grewal, Kalogrides, & Greenberg, 2012). For example, Latinx students are attending more segregated and impoverished schools than they have before, especially in the Western region of the United States (Orfield et al., 2012). Additionally, even though residential segregation for Black families has declined in recent years, Black youths still attend highly segregated schools, most commonly in the South (Orfield et al., 2012). Moreover, research has shown that school segregation is associated with unequal educational opportunities. Schools with high concentrations of poverty and segregated minority groups tend to have less qualified teachers, high teacher turnover, and less adequate facilities (Orfield et al., 2012). Engaging in the college choice process in contexts and environments that are fraught with low resources, lack of a college culture and inadequate access to college information inhibit the choice process for students of color in these contexts.

Other background factors. Research has demonstrated that a variety of other demographic and background factors play a role in the college choice process. These factors will be included in the statistical models for this study, however, since this study focuses on

racial/ethnic background as the central component, other background characteristics will be covered in less detail in the literature review. The following sections acknowledge the importance of these other contributors to college choice and recognize that other studies may highlight them in more detail.

Research on the relationship between socioeconomic status (SES) and college choice shows that there is a positive relationship. SES is typically measured using a composite of variables including family income, parental education, parental occupation, and indicators of the student's home environment (e.g., number of books, computer, etc.; Perna, 2006). Students who come from higher SES backgrounds tend to apply to four-year rather than two-year institutions (Cabrera & La Nasa, 2000a; Plank & Jordan, 2001), and low-SES and first-generation college students are less likely to apply at all and less likely to enroll and complete as well (Bailey & Dynarski, 2011). Additionally, studies have shown that there is a positive relationship between family income and the number of applications submitted (Hurtado et al., 1997), enrollment in a two- or four-year institution, whether a student enrolls in college and the type of college the student attends (Ellwood & Kane, 2000; Hossler et al., 1999; Kane, 1999, 2003; Perna, 2000). Furthermore, race and SES tend to be related where underrepresented racial minority students are more likely to also come from low-income and first-generation backgrounds than their White and Asian counterparts as well (DeNavas-Walt, Proctor, & Smith, 2007; Howard, 2010; Rothstein, 2004).

Another body of research focuses on high-achieving, low income students specifically. Studies on this particular population have found that most of these students do not even apply to selective colleges, even though they are qualified for admission (Hoxby & Avery, 2013; Hoxby

& Turner, 2013a, 2013b). While many high-achieving, low income students are eligible for and capable of succeeding at selective institutions, their application behavior reflects their low-income status instead of their achievement abilities.

Even though college enrollment rates have been higher for women than men since the 1990s (Buchmann, 2009; Perna, 2006), few studies have been devoted to understanding the differences in the college choice process based on sex (Buchmann, 2009; Perna, 2006). In this smaller body of literature, the findings are somewhat mixed and inconclusive. Some of the studies suggest that females and males are equally likely to enroll in college, (Perna, 2000), but other research suggests that females are more likely to enroll in higher education institutions of varying types and control (Buchmann, 2009; Perna & Titus, 2004, 2005). For instance, females are more likely to attend both two- and four-year institutions than men (Perna & Titus, 2004, 2005). Furthermore, females are more likely than males to enroll in college immediately after completing high school and are more likely to return to college after age 30 (Buchmann, 2009).

Academics. Academic preparation and ability are other important factors that greatly shape the college choice process. Consistently, research shows that academic preparation and achievement are strong, positive predictors of college-related outcomes. These outcomes include: high school graduation rates (Cabrera & La Nasa, 2000a), college entrance examination scores, such as the SAT and ACT (Horn & Kojaku, 2001), college enrollment (Perna, 2000; Perna & Titus, 2004), and attendance at more selective institutions (Horn & Kojaku, 2001). This section highlights some of the key academic indicators that influence the college choice process, specifically focusing on preparation and achievement.

Academic preparation. Research has demonstrated that the quality and intensity of the high school curriculum is one of the most important factors in predicting college enrollment (Adelman, 1999, 2006; Perna, 2000, 2005). In fact, in order to even be eligible to participate in higher education, students must meet certain college qualifications, especially related to course taking patterns (Cabrera & La Nasa, 2000b). Many underrepresented students are academically underprepared to engage in the rigors of college, oftentimes revealed through the fact that many of these students do not take the right classes in high school to make them eligible for college admissions (McDonough & Gildersleeve, 2006; Perna & Kurban, 2013; Tierney et al., 2009). Some studies reveal that high school students who participate in academic or college preparatory curriculum have higher college enrollment rates than students who do not follow this curricular track (*Hobson v. Hansen*, 1967; Hossler et al., 1989; Perna, 2000, 2006; St. John, 1994). Conversely, other studies suggest that the curricular track is an unreliable measure of academic preparation, and there is wide variation in preparation levels among students who follow the college-prep track (Adelman, 1999; Stevenson, Schiller, & Schneider, 1994).

More recently research has relied on a better measure of academic quality and intensity by using the highest level of completed coursework instead of curricular tracks (Adelman, 1999; Choy et al., 2000; Long, Conger, & Iatarola, 2012; Perna, 2006). For instance, since mathematics course sequencing is clearer and more straight forward than other subjects, many researchers rely on the highest level of math completed as a measure of academic quality and intensity (Perna & Titus, 2004, 2005). Furthermore, taking at least one advanced math course in high school has been shown to be associated with a higher probability of enrolling in a four-year college or university (Choy et al., 2000; Horn, 1998; Perna & Titus, 2004, 2005). A clear marker

of academic intensity with regards to highest level of completed coursework includes participation in Advanced Placement (AP) or International Baccalaureate (IB) programs. Taking AP or IB classes in high school are positive indicators of enrollment in higher education (Adelman, 1999; Roderick, Coca, Moeller, & Kelley-Kemple, 2013), yet these courses are not universally offered at all secondary schools and are often only open to a small percentage of students (Roderick et al., 2006).

Academic achievement. As a product of academic preparation, academic achievement is a strong predictor of college enrollment and plays a large role in the college choice process. Typically, academic achievement is measured by high school grades (Ellwood & Kane, 2000; Hossler et al., 1999; Hossler & Stage, 1992) and standardized college entrance test scores such as the SAT and ACT (Ellwood & Kane, 2000; Perna, 2000; Perna & Titus, 2004, 2005; Plank & Jordan, 2001). Some research suggests that students with higher grades in high school tend to consider a larger number of colleges and universities for attendance (Hossler et al., 1999), are more likely to want to attend more selective institutions (Hossler et al., 1999), and are more likely to enroll in a high-cost institution (Hearn, 1988). Consistent across the large body of literature is that high school GPA is one of the strongest predictors of high school graduation (Allensworth & Easton, 2007), college enrollment (Ellwood & Kane, 2000; Perna, 2000; Plank & Jordan, 2001; Rouse, 1994), and college completion (Adelman, 2006; Burton & Ramist, 2001; Geiser & Santelices 2006; Roderick et al., 2006). The other commonly used measure of academic achievement is standardized test scores, such as the SAT and ACT. Research consistently shows that students with higher test scores are more likely to enroll in higher

education (Catsiapis, 1987; Hossler et al., 1989; Plank & Jordan, 2001; St. John & Noell, 1989; St. John, 1994; Rouse, 1994; Kane, 1999; Perna, 2000).

While research has highlighted these various academic measures as important factors in the college choice process, there has also been strong evidence that these opportunities are not equally distributed or available to all students. The populations of students that continue to be underrepresented in higher education are the same students that tend to be academically underprepared for college as well (Perna, 2005). One reason for this is the high school contexts within which students engage in the college choice process. High schools differ in terms of the availability of rigorous courses (Gándara, 2002; Oakes & Guiton, 1995; Perna, 2005; Perna & Kurban, 2013), the procedures used to determine student participation in these courses (Perna, 2005; Perna & Kurban, 2013), and the academic climate of high school learning environments (Perna, 2005). Additionally, high schools vary widely in the extent to which college-related resources within the school are distributed. Some research suggests that access to college resources is more common for students in Advanced Placement, honors, and college preparatory curricular tracks than for students not participating in these academic tracks (González, Stoner, & Jovel, 2003; McDonough, 2005a; Venezia & Kirst, 2005).

Finances. One reason that prevents students from attending colleges for which they may be qualified is financial and the perception that college is financially "out-of-reach" (Bettinger, Long, Oreopoulos, & Sanbonmatsu, 2009b; McDonough, 1997; McDonough & Gildersleeve, 2006; Noeth & Wimberly, 2002; Seftor, Mamun, & Schirm, 2009; Tierney & Venegas, 2009). Available data and previous research has demonstrated that for many students, "money" is an important consideration in the college choice process: both how much their education will cost as

well as how much they will receive in financial aid. Research has shown that students, especially low-income students, are sensitive to tuition costs and the ability to pay plays an important role in students' decision making about college (Avery & Hoxby, 2004; Heller, 1997; Kane, 1999; Long, 2004; Manski & Wise, 1983; Noeth & Wimberly, 2002; St. John, 1994). Studies have demonstrated that there is a significant, negative relationship between tuition increases and enrollment patterns (Cabrera & La Nasa, 2000a; Heller, 1997, 1999; Kane, 1999; Leslie & Brinkman, 1988; McPherson & Schapiro, 1998). This means that as tuition increases, enrollments tend to decrease. Other research suggests that tuition differences and changes may influence the type of college or university in which students enroll (Perna & Titus, 2004).

There is a large body of research that has specifically examined the relationship between student financial aid and college choice. Perna (2010) summarized much of this work in a research synthesis article and came to the following conclusions. First, the effects of student financial aid on college choice vary based on the type of aid. However, consistent across the research is the fact that grant aid positively predicts the likelihood of college enrollment, especially for students from low-income backgrounds (Avery & Hoxby, 2004; Hearn & Holdsworth, 2004; Heller, 1997; Kane, 1999; Mundel, 2008; Perna, 2010; St. John & Wooden, 2006). Secondly, the effects of financial aid on college choice depend on a student's racial background and family income (Avery & Hoxby, 2004; Heller, 1997; Kane, 1999; Mundel, 2008; Noeth & Wimberly, 2002). Specifically, shifts in tuition and financial aid have a larger impact for students from lower-income families than higher-income ones, and for underrepresented students of color (Black/African American and Latinx) than for White students. Finally, contextual forces mediate the effects of financial aid on college choice (Perna, 2010).

Characteristics of high school contexts also impact the effects financial aid will have on students' choices, including information that is available to students regarding financial aid opportunities (Perna, 2008). However, it is important to recognize that financial aid alone is not enough to increase access and this factor should be considered with other circumstances and contexts as well (Perna, 2000).

Undermatch

When examining previous research on undermatch, there are three key studies that explicitly focus on postsecondary undermatch, at a local, state, and national level. The first study was conducted by The Chicago Consortium on School Research (Roderick et al., 2009, 2011) and examined academic undermatch in a local urban setting. This study focused on a 2005 cohort of high-achieving high school seniors attending Chicago Public Schools (CPS). They found that among the students who had the academic qualifications to attend the most selective institutions, only about one-third of them enrolled in these types of institutions (thus resulting in an undermatch rate of nearly 62%). Undermatch rates were highest among Latinx students.

At the state level, Bowen et al. (2009) identified patterns of academic undermatch for students in North Carolina. This study was part of a larger, longitudinal study that documents trends in college enrollment, graduation, and time-to-degree for students in several states. The specific analysis of undermatch focused on the 1999 cohort of students who were eligible to enroll in the most selective public institutions in North Carolina. The findings from this study revealed that 40 percent of these eligible students undermatched and attended less selective institutions.

Finally, at the national level, the study conducted by Smith et al (2013) utilized a national dataset to estimate academic undermatch across the nation. Using the National Education Longitudinal Study of 1988 (NELS) and the Educational Longitudinal Study of 2002 (ELS), this study documented the extent of undermatch on a national level and compared cross-cohort differences in the extent of this undermatch (comparing the 1992 and 2004 cohorts). The results from this study demonstrated that 41 percent of students nationally undermatch and that in general, rates of undermatch have decreased over time. However, the authors caution that this apparent decrease may mask other structural changes in the college choice process, such as the ways that students apply to postsecondary education, the ways in which selective institutions select students for admission, and the increasing emphasis on attending college in general.

Within this body of research, it is important to distinguish between application and enrollment when examining rates of undermatch. Many of these studies found that students were not attending institutions that were commensurate with their qualifications simply because they had not applied to these institutions in the first place (Belasco & Trivette, 2015, Dillon & Smith, 2013; Hoxby & Avery, 2013). For example, in the national study conducted by Belasco and Trivette (2015), they found that more than 60% of students who undermatched by selectivity did not apply to appropriately selective institutions, given their academic qualifications. A similar study conducted by Dillon and Smith (2013) found that 69% of undermatched students did not apply to any colleges with which they were well-matched. Therefore, while undermatch occurs at the enrollment stage in the college choice process, students are also undermatching at the application stage as well. This means that examining undermatch rates at the enrollment stage will not reflect the rates of undermatch at the application stage. Solely investigating the

enrollment patterns underestimates the rate of academic undermatch for students as many of these students have already undermatched in deciding where to apply. Despite the research that has been done on the application and enrollment patterns related to undermatch, one aspect of the college choice process has been neglected in empirical analyses. None of these studies include the admissions stage in their estimation of undermatch. This study seeks to explore this overlooked step and fill a gap in the literature to better understand the ways in which postsecondary institutions contribute to undermatch through their admissions policies and acceptance decisions.

In contrast, while many of these studies focus the bulk of their analysis on the selectivity level of the institutions to which students enroll, it is also important to consider the type of institution as well. Specifically, students who have the academic qualifications to attend a four-year institution, yet enroll in a two-year college or no college are considered to be undermatched (Belasco & Trivette, 2015; Smith et al., 2012). Furthermore, students who possess credentials to attend any postsecondary institution, yet do not enroll at all, also undermatch (Belasco & Trivette, 2015; Smith et al., 2012).

Beyond examining the extent of undermatch among students, studies are also concerned with understanding the student- and contextual-level predictors that contribute to this phenomenon. One of the most common demographic predictors of undermatch is socioeconomic status (SES), where students from lower SES backgrounds undermatch at higher rates (Belasco & Trivette, 2015; Bowen et al., 2009; Dillon & Smith, 2013; Hoxby & Avery, 2013; Roderick et al., 2009, 2011; Rodriguez, 2013; Smith et al., 2013). In fact, one study found that lower-SES students not only undermatch at higher rates than their higher-SES peers, but that these rates

represent substantial levels of undermatch where students are attending institutions that are at least two levels below where they are qualified to attend (Smith et al., 2013). Parental education was also a consistent predictor of academic undermatch for students where parents with higher levels of education were correlated with decreased likelihood of undermatch (Bowen et al., 2009; Goodwin, 2015; Roderick et al., 2011; Rodriguez, 2013; Smith et al., 2102).

In terms of race, however, there were mixed results regarding which racial groups were more likely to undermatch. A few of the studies found that White students were more likely to undermatch than students of color (Belasco & Trivette, 2015; Smith et al., 2012), yet other studies found that Black/African American and Latinx students actually undermatched at higher rates than White students (Bowen et al., 2009; Goodwin, 2015; Roderick et al., 2011). The one consistency across all studies with regards to race was that Asians were the least likely to undermatch in their college choice process (Belasco & Trivette, 2015; Bowen et al., 2009; Roderick et al., 2011; Rodriguez, 2013; Smith et al., 2013). To complicate the issue further, Rodriguez (2013) separated undermatch into two distinct steps: application and enrollment, which led to additional mixed findings regarding the role of racial background. In this study, at the application step, White students undermatched at far higher rates than any other racial group (33 percent compared to 20 percent as the next highest group). However, at the enrollment step, Asians and Whites had the highest undermatch rates (29 percent and 32 percent respectively). Furthermore, Rodriguez points out that simply looking at aggregate undermatch rates masks differences based on student qualifications and which institutions students had access to. For instance, at both the application and enrollment stages, among the highest achieving students who were qualified to apply to and enroll in the "Most Selective" and "Highly Selective"

institutions, Black students actually had the highest undermatch rates (40 percent at application, 64 percent at enrollment who were qualified for "Most Selective" and 56 percent at application, 65 percent at enrollment for "Highly Selective).

With regards to contextual-level predictors of undermatch, studies have focused on school-level characteristics in contributing to the likelihood of undermatch (Belasco & Trivette, 2015; Dillon & Smith, 2013; Hoxby & Avery, 2013; Hurwitz et al., 2012; Rodriguez, 2013). Some of the school-level predictors included the location of the high school, where some studies found that schools that were in rural or suburban settings had a higher proportion of students who undermatched (Belasco & Trivette, 2015; Hoxby & Avery, 2013). However, the study conducted by Hurwitz et al. (2012) found that urban settings were more likely to produce higher undermatch rates. One important predictor that is relevant to this study is the inclusion of a college-going climate at the high school. These studies (Belasco & Trivette, 2015; Roderick et al., 2011; Rodriguez, 2013) defined a college-going climate through the percentage of students who were engaging in the steps to apply to and enroll in college (e.g., taking college preparatory classes, taking the SAT/ACT, graduates attending 4-year colleges). Findings indicated that students who attended high schools with a higher college-going climate and culture were less likely to undermatch in their college choice decisions. Despite the various measures of contextual predictors on academic undermatch, none of these studies explicitly examine the school counseling program as an important contextual influence. While some of them (Belasco & Trivette, 2015; Rodriguez, 2013) incorporated aspects of school counseling (e.g., visited a counselor: yes or no) into their definitions of a college-going culture, they did not directly investigate the program as a whole in terms of its correlation to rates of undermatch. This

current study will fill this gap in the literature by explicitly highlighting the school counseling program as a contextual predictor to better understand its influence on the rates of academic undermatch for all students, with a specific focus on underrepresented students of color.

Beyond individual- and contextual-level predictors of undermatch, the literature also examines the causes of this phenomenon as well. While the potential causes of undermatch are extensive and may be associated with innumerable factors, research points to three main sources that lead to academic undermatch: financial constraints, information asymmetries, and the college application process. In terms of financial constraints, research highlights tuition and financial aid as important financial considerations that lead to academic undermatch. Many students, especially students from lower socioeconomic backgrounds, do not choose to attend more selective institutions in part because of the relatively high tuition (Avery & Hoxby, 2004; Dillon & Smith, 2013; Hurwitz et al., 2012; Monks, 2009; Smith et al., 2012). Furthermore, many underrepresented students are unaware of financial aid opportunities or do not take the appropriate steps to apply for and receive financial aid for postsecondary education (King, 2004; Smith et al., 2012). These missed opportunities are compounded by the fact that the Free Application for Federal Student Aid (FAFSA) form requires an average of ten hours to complete (Dynarski & Scott-Clayton, 2006, 2007; Smith et al., 2012). While research has shown that receiving assistance to complete and submit the FAFSA does improve student outcomes, this disproportionately burdens students from low-income backgrounds as this is an additional expense (Bettinger, Long, Oreopoulos, & Sanbonmatsu, 2009a; Dynarski & Scott-Clayton, 2006, 2007; Smith et al., 2012). These financial constraints dissuade many underrepresented students

from applying to and enrolling in more selective institutions, regardless of their eligibility and qualifications to do so.

Another source of academic undermatch that has been highlighted by the literature is the knowledge and support gap on how to navigate the college application process. This information asymmetry refers to the fact that some students receive more information about the college choice process than others and students who lack this information are more likely to undermatch in their decision (Bowen et al., 2009; Dillon & Smith, 2013; Smith et al., 2012; Venegas, 2006). This includes a geographical bias in the recruitment efforts by colleges, where students in certain geographic areas, including rural locations, do not receive information from colleges that may be a good match (Hill & Winston, 2010; Hoxby & Avery, 2013). Information asymmetries also include knowledge provided to students within a school setting as well, where some students receive information on more selective colleges and others do not learn of these opportunities (Smith et al., 2012). These within-school information gaps may be a reflection of the information that school staff have about postsecondary education, staff preferences for certain types of colleges, or their availability to provide such information and resources to students (Smith et al., 2012). These information asymmetries may be a significant source of undermatch as underrepresented students are not aware of different postsecondary educational opportunities or are not provided with accurate information in order to make an informed decision.

Finally, the literature focuses on the college application process itself as a potential source of academic undermatch. Applying to more selective colleges requires more effort, time and resources due to the additional application requirements and deadlines (Roderick et al., 2009; Smith et al., 2012). For many underrepresented students, this additional burden dissuades

them from seeking these types of institutions for their application decisions (Roderick et al., 2009; Smith et al., 2012). Furthermore, many underrepresented students are less likely to even engage in the necessary steps that require planning and effort to apply to these more selective schools, which includes even filling out a college application in their senior year of high school (Avery & Kane, 2004; Howell & Smith, 2011; Smith et al., 2012). Finally, the research has shown that the more colleges a student applies to, the greater the likelihood that he/she will be accepted to a match school (Smith et al., 2012). However, for many underrepresented students, they are not even applying to schools that would be a match, and the undermatch occurs even at the application stage in the college choice process (Hoxby & Avery, 2013; Hoxby & Turner, 2013a, 2013b; Smith et al., 2012). This discrepancy and variation among students in the college application process is a potential source of undermatch as many underrepresented students are not even applying to schools that would be a match initially.

To remedy this application behavior where students do not even apply to selective colleges, some research has suggested policy solutions. Hoxby and Turner (2013a, 2013b) conducted a randomized controlled trial to evaluate interventions that provided students with application fee waivers and information on the application process, which cost around $6 per student. Their findings indicate that this cost-effective intervention did increase application and admittance rates for high-achieving, low-income students. Moreover, even though school counselors have multiple responsibilities and high caseloads (ASCA, 2016; Bridgeland & Bruce, 2011b; Corwin, Venegas, Oliverez, & Colyar, 2004; Hugo, 2004; McDonough, 2005a; Paisley & McMahon, 2001; Perna et al., 2008; NACAC, 2008), the intervention put forth by Hoxby and Turner may serve as a supplement, but cannot replace the individual attention, personal

relationships, and customizable information that school counselors and other institutional agents provide (Hill, 2008; Plank & Jordan, 2001). Therefore, while interventions such as those purported by Hoxby and Turner may encourage a few students to apply to match colleges, these solutions will not help everyone and offer limited potential to impact the systemic inequality that already permeates the educational structure.

One of the only studies that explicitly examines the relationship between undermatch and school counseling is the work by Goodwin (2015). This study employed a mixed methods approach to understand how college counseling dosage in high school is related to academic undermatch and how structural constraints influence school counselors' efforts to provide college counseling services. Using data from the High School Longitudinal Study of 2009 (HSLS:09), Goodwin used hierarchical linear modeling of student postsecondary expectations and time allocated to college counseling to determine the effect of dosage on match expectations. Additionally, Goodwin conducted semi-structured interviews with practicing school counselors to identify counselors' beliefs and attitudes regarding their responsibilities around college counseling. Findings from this study revealed that a number of student-level factors played a role in students' match expectations, and these factors were similar to what has been found in previous research as well. Furthermore, this study also found that college counseling dosage does impact students' expectations if counseling is provided on an individual, relational level, such as student interactions with a counselor or hiring a private counselor. However, broader contextual efforts that were not directly linked to individual students (e.g., overall percentage of hours spent on college counseling in general) did not have the same effect. Qualitative findings highlight the fact that many counselors feel frustrated in their efforts to adequately provide

college counseling services. Despite the new knowledge that this study contributes to our understanding of the relationship between undermatch and school counseling, there are a number of limitations that arise. Because data indicating students' academic eligibility (e.g., GPA, SAT/ACT) and enrollment decisions (e.g., where students enrolled in college) were not available at the time this study was conducted, undermatch was defined as students' *expectations* of academic match, not actual estimates of undermatch. Furthermore, college counseling was limited to dosage in the quantitative analysis, and did not take into consideration the counseling program as a contextual influence at the school level. Given these limitations, this current study will advance the knowledge put forth by Goodwin (2015) by using a more robust definition of undermatch that has been used in previous studies (Bowen et al., 2009; Roderick et al., 2009; Smith et al., 2012) including data that were unavailable previously. Additionally, this current study incorporates the school counseling program as a contextual component, which includes additional factors beyond just dosage, such as counseling norms (e.g., primary goal of the counseling program, counselor beliefs about students, average caseloads) and counseling resources (e.g., financial aid support, college application help, connections with colleges). The inclusion of additional school counseling program characteristics will allow for a more in-depth examination of the influence of school counseling programs on academic undermatch, including which components play a larger role.

Based on the undermatch literature and in line with social reproduction theory, undermatch can be defined as a form of social reproduction that seeks to maintain the educational status and perpetuate inequality in college access through the college choice process. Perna's (2006) conceptual model provides a useful structure to understand the intersection

between social reproduction theory and undermatch as a college choice outcome. Despite the utility of this model and its guidance for this study, it does not take into account the specific role of school counseling programs in undermatch. While Perna includes the school context broadly in layer two of the model, there is no direct focus on school counseling programs specifically or how counselors influence the college choice process. Furthermore, while Bourdieu's theory of reproduction is useful in identifying undermatch as a form of social reproduction, this study also focuses on school counselors and school counseling programs as key factors with the potential to disrupt this hierarchy. To better understand the ways in which this disruption may occur, this study also draws on the work by Anthony Giddens' Theory of Structuration (1979, 1984).

Theory of Structuration

The Theory of Structuration relies on the assumption that there is an interrelationship between social structures and human agency. This theory illustrates the ways that people incorporate social structures into their everyday practice and actions (Giddens, 1984). The central premise of this theory is through their behaviors, people create social structures and these structures then shape people's actions (Hays, 1994; Giddens, 1984). Through everyday practices, the choices people make serve to create and recreate structures continuously, thus either reinforcing or disrupting these structures (Hays, 1994; Giddens, 1984). This means that agency and structure are interconnected components of the same thing (Giddens, 1984). This process of creating and reinforcing social structures through everyday practices is referred to as the process of structuration (Giddens, 1979). Therefore, structuration is an action that happens through the interplay between human behavior and social structures. To better understand the logic of this Theory of Structuration, it is important to define agency and social structures.

Agency involves the interaction of habit, imagination, and judgment that lead to actions that occur in a continuous process (Emirbayer & Misch, 1998). These actions then reproduce and transform social structures. Agency refers to the ability to engage in action involving choices among alternative options (Hays, 1994; Giddens, 1984). However, when thinking about choices, it is important to remember that choice does not necessarily imply intention (choices can be unconscious and have unintended consequences) and that these choices are shaped by the social contexts and social structures within which they are made (Hays, 1994; Giddens, 1984). These social structures provide meaning to and sanction conduct for behavior, thus guiding action (Emirbayer & Misch, 1998; Giddens, 1984). This iterative process between agency and structure is the core of the Theory of Structuration. Therefore, agency is relational, reflexive, and iterative as it is embedded in the very structures it seeks to transform (Emirbayer & Misch, 1998). In this way, the different forms of agency can be viewed as a continuum, with structural reproduction (e.g., recreating social inequalities) on one end, and structural transformation (e.g., infusing social justice into institutions) on the other end (Hays, 1994; Peet, 2006).

Social structures refer to the patterns of life that exist in the collective as rules and resources that guide human behavior. These structures have two aspects that help them bind social institutions together: a) to relate shared meaning and b) to sanction social conduct (Giddens, 1984). Social structures are central to an understanding of the Theory of Structuration because they are instrumental in providing a framework to guide human action as well as being changed by human action (Giddens, 1984; Peet, 2006). While structure can often be thought of as a constraint on behavior, social structures in this theory both constrain and enable agency simultaneously (Giddens, 1984). Although structures can limit the field of possibilities, they also

provide people with shared meaning and ways of thinking that shift people to transformative agents rather than upholders of rules that reinforce unequal social structures (Emirbayer & Misch, 1998; Peet, 2006).

When bringing together these two constructs, agency and structure, the interrelational dynamic between the two becomes clearer. People engage in action and behavior every day; therefore, structures are in a process of constant readjustment (Hays, 1994). People influence structures at the same time that structures influence people, therefore "the choices made by agents serve to create and recreate structures continuously" (Hays, 1994, p. 62).

In this study, the Theory of Structuration is being used to examine the ways in which school counselors, through the school counseling program, reinforce or disrupt the social structures that contribute to undermatch as a form of social reproduction. As school counselors engage in their daily activities, they are making decisions that will impact the social hierarchy, even if these decisions are not intentional. School counselors are engaged in a relational, iterative interaction between their daily behavior and numerous social structures that provide context to their actions. For instance, as a school counselor makes choices about which colleges to recommend to an underrepresented student, the counselor may subconsciously limit the field of options for this student based on norms that communicate that this type of student should not attend more prestigious institutions. This decision is not only influenced by the larger social structure that communicates this message, but the actions of the counselor then reinforce this structure by reproducing the same inequality. This continuous relationship between action and structure provides a theoretical lens through which this study seeks to examine the factors that contribute to undermatch. Since school counselors have agency and negotiate multiple social

structures, this study attempts to better understand the ways in which school counselor behaviors either reinforce or disrupt undermatch as a structure of social reproduction.

Through the daily actions of school counselors, their choices will either reinforce or disrupt the structure of social reproduction. One theoretical concept that provides a framework to understand the potential for reinforcement or disruption of these structures is the conceptual framework of institutional agents by Stanton-Salazar (1997, 2011). Institutional agents are those individuals who have the capacity to communicate and transmit or arrange for the transmission of institutional resources and opportunities (Stanton-Salazar, 1997, 2011; Stanton-Salazar & Dornbusch, 1995). For students, these resources can include information about colleges and financial aid as well as assistance and support with college admissions and educational decision-making (Stanton-Salazar, 1997). In general, institutional agents can be teachers, counselors, clergy, community leaders, and even peers (Stanton-Salazar, 1997; Stanton-Salazar & Dornbusch, 1995). The relationships with institutional agents provide students with access to valuable information, resources, and opportunities that may otherwise be inaccessible to them without the connections to institutional agents (Stanton-Salazar & Dornbusch, 1995).

The importance of connections to institutional agents is framed in terms of social capital, and Stanton-Salazar (1997, 2011) drew upon the Bourdieuian definition of this concept. Within the institutional agents framework, social capital refers to the "resources and key forms of social support embedded in one's network or associations, and accessible through direct or indirect ties with institutional agents" (Stanton-Salazar, 2011, p. 1067). The operationalization of social capital in this way provides a way to look at how students gain access to important resources and information through relationships with institutional agents within various settings, especially

schools. For many students, institutional agents include family members, but for many underrepresented students, these individuals tend to be outside of the family, which demonstrates the reliance on school personnel, such as school counselors, to serve as guides in their educational endeavors (Stanton-Salazar, 1997; Stanton-Salazar & Dornbusch, 1995). It is important to note, however, that underrepresented students often do not seek help from school personnel because of a general distrust and social distance from those they perceive as representing the dominant group's interests (Stanton-Salazar, 1997; Stanton-Salazar & Dornbusch, 1995).

This concept is especially relevant to this study because school counselors may serve as institutional agents for underrepresented students in school settings. School counselors have the potential to act on behalf of their students to directly transmit or negotiate the transmission of valued information such as college knowledge, college application support, and financial aid information. As staff members in the school, counselors use their status, authority, and knowledge to secure these various types of institutional supports on behalf of their students. However, in this role, school counselors may also serve as "gate-keeping agents" (Stanton-Salazar, 2011, p. 1077) whose actions may reflect an adherence to the social structures and stratification systems that exist within the school system. As gatekeepers, school counselors may unconsciously be providing different services to students who are privileged with more cultural capital, thus engaging in the social reproduction that Bourdieu characterizes in his theory. Parallel to Giddens' notion of agency, school counselors interact with these social structures to fulfill roles as institutional agents with the potential to reinforce or disrupt the social hierarchy in the process. As school counselors engage in the iterative negotiation process with social

structures, there is the potential, however, to disrupt this social stratification as counselors make decisions to use their role as institutional agents to provide underrepresented students with access to increased social capital.

Engberg and Gilbert's (2014) Counseling Opportunity Structure

Based on McDonough's (1997) conceptualization of organizational habitus, which comes from the theory of social reproduction, Engberg and Gilbert (2014) conceptualized a counseling opportunity structure that influences the college choice process. This model posits that norms and resources together create a counseling opportunity structure, which is situated within the high school organizational habitus (see Figure 2.2). The organizational habitus, including the counseling opportunity structure, then shapes the college going culture.

Figure 2.2 Engberg and Gilbert's (2014) Counseling Opportunity Structure Model.

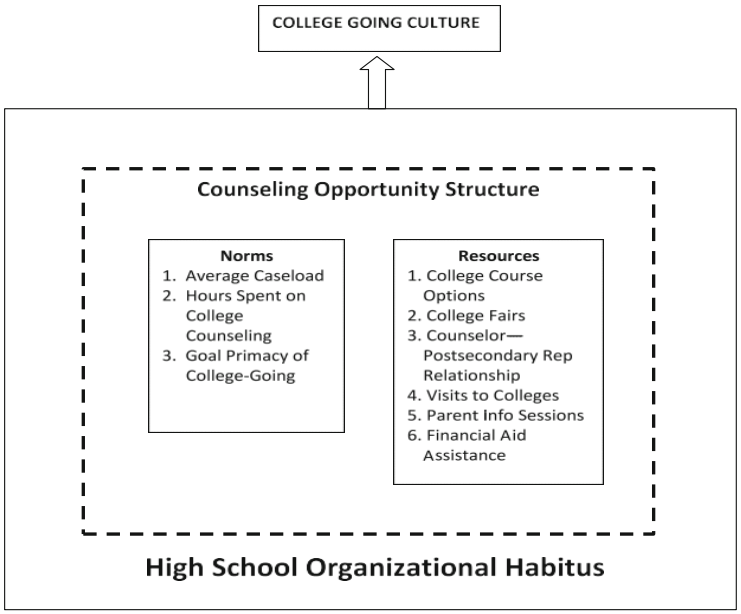


Figure 2.2. From Engberg, M. E., &; Gilbert, A. J. (2014). The counseling opportunity structure: Examining correlates of four-year college going rates. Research in Higher Education, 55(3), 219-244.

While the researchers acknowledge that that concept of organizational habitus is difficult to define and operationalize, they rely on previous studies (Perna & Titus, 2005; Engberg & Wolniak, 2010) that have investigated the relationship between normative and structural contexts, counseling resources, and college attainment. Similar to Perna's (2006) multi-contextual model, the counseling opportunity structure has a foundation in the importance of contexts and environments in shaping college counseling programs as well as counselors' ability to develop and implement these programs.

Within this conceptual framework, Engberg and Gilbert (2014) postulate that there are two dimensions that comprise the counseling opportunity structure: norms and resources. The norms around college counseling include considerations related to the structures that shape counselors' ability to provide college counseling services to students. These norms and structures include counselor caseloads, the priority given to college counseling, and the hours spent on college counseling. The resource dimension includes various assets and sources of knowledge that school counselors use to provide college counseling services to students. These include academic support, parental outreach, relationships with colleges and universities, college visits, and financial aid assistance.

The role of the counseling opportunity structure in this conceptual model is one that not only influences the school context, but is also influenced by it as well, similar to Giddens (1979, 1984) theory of structuration. While the norms and resources of the counseling department contribute to the larger college-going culture of the high school, external forces also shape the counseling opportunity structure as well. For instance, a counseling opportunity structure that

allows counselors to provide ample college preparation and services may lead to a strong college-going culture within the larger school. However, the counseling program itself may be restrained by district policy environments that restrict resources, thus limiting the ability of the school counseling program to be as effective as it could be with additional resources.

This particular conceptual framework is especially relevant to this study because of its explicit focus on school counselors and the role of school counseling programs in the college choice process. This model provides a structure that highlights the key components in a school counseling program that have been shown to influence students' college decisions. Furthermore, this framework utilizes the same dataset that will be used in this current study, thus ensuring that the model components are replicable within the data.

Previous Studies Related to School Counseling

Responsibilities and Structures. "Professional school counselors serve a vital role in maximizing student success" (Stone & Dahir, 2006, p. 16). In terms of access to institutions of higher education, school counselors play one of the most important roles for increasing access for all students (McDonough, 2005a). However, responsibilities and structures shape what counseling programs and counselors are able to provide and do for their students.

Role ambiguity. Throughout the history of school counseling, the emphasis placed on college counseling has been shaped by many forces. One major influence has been the evolution of other responsibilities and roles of the school counselor (Boswell & Carr, 1988; Hugo, 2004; McDonough, 2005a; Paisley & McMahon, 2001). According to the American School Counseling Association (ASCA, 2016), the role of the school counselor is to "help all students in

the areas of academic achievement, personal/social development and career development, ensuring today's students become the productive, well-adjusted adults of tomorrow" (p. 8). This definition provides the foundation upon which the responsibilities of a school counselor are defined. However, the specific task of supporting college enrollment or increasing college access is not explicitly demarcated. This is not to imply that the profession does not prioritize the importance of increasing college access, it means that it is merely not stated directly in the definition. One potential reason for this omission is the dominance of other roles that school counselors are expected to prioritize (McDonough, 2005a, 2005b; Perna et al., 2008). With the wide array of expected duties for school counselors, college counseling and increasing access to postsecondary enrollment tends to become less of a daily priority. For instance, school counselors are also responsible for psychological development, therapeutic counseling, student scheduling, testing, classroom guidance, partnership-building, crisis management, and family interventions, to name a few (ASCA, 2005; Bridgeland & Bruce, 2011b; Corwin et al., 2004; Hugo, 2004; McDonough, 2005a; Paisley & McMahon, 2001; Perna et al., 2008; NACAC, 2008). This multitude of responsibilities and tasks expected of school counselors, has resulted in confusion over the appropriate role of counseling in general, and reduced capacity and ability to fulfill college counseling expectations for students (McDonough, 2005a). In general, schools are not using school counselors as effectively or efficiently as is necessary in order to ensure that students graduate from high school prepared for college and careers.

Caseloads. Another challenge within the profession is the counselor-to-student ratio that has become the reality across the nation. Despite the recommendation by ASCA that the maximum counselor-to-student ratio not exceed 1:250, the 2014 national average is 1:491, with a

high caseload average of 941 students (Arizona; American School Counselor Association, 2016). Ratios such as these make the job of college access and individual attention much more difficult. Furthermore, there are some high schools in large, urban school districts that have very few counselors or no counselors to provide services to students, let alone be able to provide college counseling (McDonough, 2005a). Research has shown that lower counselor-to-student ratios are associated with increased college attendance and earlier planning for postsecondary education (McDonough, 1997; Pham & Keenan, 2011). While school counselors want to provide quality services and believe that a central component of their mission is to prepare students for graduation, college, and careers, high caseloads are preventing them from being able to fulfill this goal (Bridgeland & Bruce, 2011a). For instance, in a multi-state study, Perna and colleagues (2008) found that the counselor to student ratios exceeded the ASCA ratio recommendation and most stakeholders (teachers, students, parents) indicated that the support offered by counselors was inadequate to meet the needs of the students. Although increasing college enrollments may be a priority in the minds of the individual school counselors, the demands of the job combined with large caseloads make this intention a difficult reality to successfully enact (Paisley & McMahon, 2001).

Time on task. While ASCA recommends that counselors should spend 70% of their time in providing direct services to students, research has demonstrated that this benchmark is not being reached (ASCA, 2016; McDonough, 2005a). For instance, school counselors reported that they only spent 25% percent of their time counseling students, and only 13% in issues related to college guidance (Moles, 1991). Another study reported that 57% of all public high schools had school counselors that spent less than 20% of their time on college counseling (Parsad,

Alexander, Farris Hudson, & Greene, 2003). Using these two figures above, this means that the average school counselor spends around 38 minutes per year on each student providing college counseling (McDonough, 2005a). The majority of counselors' time is spent on non-counseling tasks such as discipline, testing, and scheduling (Lombana, 1985; McDonough, 1997, 2005a; McDonough, Ventresca, & Outcalt, 2000; NACAC, 2010; Wilson & Rossman, 1993).

Training. Historically, counseling education programs and pre-service training have not included college counseling as a necessary area to build knowledge and skills (Bridgeland & Bruce, 2011a, 2012; Hossler et al., 1999; McDonough, 2005a, 2005b; Savitz-Romer, 2012a, 2012b). Typically, coursework in counseling education programs includes: counseling techniques, counseling theories, human growth and development, group counseling, career development, crisis intervention, coordination of services, and legal and ethical issues (Bridgeland & Bruce, 2011c). In fact, fewer than five states nationwide require coursework in college counseling as a component of their certification (Savitz-Romer, 2012a) and graduate coursework rarely, if ever, includes training in college counseling (McDonough, 2005a). Professional organizations (e.g., ASCA, CACREP) have worked to improve and revise counseling education curriculum, yet many of these programs continue to focus on clinical counseling with minimal instruction on how to provide these services in a school setting (Bridgeland & Bruce, 2011c; Coker & Schrader, 2004).

When asked about their confidence in their counseling education training, only a small minority of school counselors feel well trained for their jobs and believe that their training prepared them well for the daily demands and responsibilities (Bridgeland & Bruce, 2011a, 2012; Hart Research Associates, 2012; Savitz-Romer, 2012b). School counselors have expressed

readiness to be leaders in the college and career readiness movement, where the goal is for all students to graduate high school ready for college and/or ready for careers (Bridgeland & Bruce, 2012). However, both counselors lament that their preservice and in-service training is not aligned with these goals in mind (Bridgeland & Bruce, 2012). Furthermore, there is no nationally recognized uniform training or curriculum to prepare school counselors to provide college counseling services (Savitz-Romer, 2012a). While ASCA provides guidelines for practice, they are a professional organization whose role is advisory, not compulsory. There is no common set of professional competencies to define, coordinate, or improved the work of school counselors, especially with regards to college counseling (Savitz-Romer, 2012a).

College counseling. Despite the challenges and constraints that accompany the school counseling profession, research has shown that school counselors do make an impact on college access and the college choice process (Gándara & Bial, 2001; Hawkins, 2003; King, 1996; McDonough, 2005a, 2005b; Plank & Jordan, 2001; Venezia & Kirst, 2005). If school counselors were able to take an active role in supporting students and their families earlier in the educational pipeline to prepare for college, as opposed to simply disseminating information, this is likely to increase students' opportunities to enroll in a four-year college (Hutchinson & Reagan, 1989; Hossler et al., 1999; McDonough, 1997, 1999, 2005a, Plank & Jordan, 2001; Powell, 1996; Rowe, 1989). Research has shown that the frequency of meeting with a school counselor is correlated with a student's likelihood of enrolling in postsecondary education (Bridgeland & Bruce, 2011b; McDonough, 2005a). When counselors are able to provide direct services to students on a consistent basis, they can be effective in increasing students' aspirations, motivations, knowledge of financial aid opportunities, and academic success (ASCA, 2005;

McDonough, 1997, 2005a, 2005b; Stone & Dahir, 2006). In fact, some research suggests that school counselors play a more important role in shaping students' college decisions, especially in the choice of college to attend, than merely encouraging aspirations (Hossler et al., 1999).

While school counselors provide a myriad of services to their students related to college, some are more common and available than others. Assistance with the college application process is among the most powerful ways that school counselors can impact postsecondary enrollment (Bridgeland & Bruce, 2011b). Research has shown that students need more than just good information they find on the internet and from their peers to complete the college application process (Avery & Kane, 2004). Schools that offer direct assistance and hands-on services see higher rates of college enrollment than schools who simply distribute information on the college application process (Hill, 2008; Plank & Jordan, 2001).

Another typical and important college counseling service that school counselors provide is financial aid advice and planning. High-quality financial counseling is correlated with students' perceptions that they have adequate knowledge about college and financial aid (Bridgeland & Bruce, 2011b). For instance, research has shown that increases in the amount of financial aid information provided by counselors positively correlated with students' likelihood of applying to postsecondary education (Bettinger et al., 2009a, 2009b; Cabrera & La Nasa, 2001; McDonough, 2005a). Similar to the college application process, providing financial aid information alone is not enough to increase the likelihood of college enrollment, and targeted guidance related to financial aid is also a necessary component (Bettinger et al., 2009b).

Another common responsibility and service that school counselors provide is the creation and maintenance of a college-going culture. School counselors not only have a direct impact on

students, but they are also instrumental in implementing the school's normative expectations for students' college goals and how to prepare for them. A college-going culture requires that students have access to information about postsecondary opportunities and support structures that allow them to plan appropriately for higher education (Farmer-Hinton & McCullough, 2008). Additionally, counselors emphasize college in their counseling relationships and all counselors play the role of college counselors. (McClafferty, McDonough, & Nuñez, 2002). In order for school counselors to establish a college culture where attending college is the norm, students need consistent support and information from the beginning to start and follow through on the college planning and choice processes (Bridgeland & Bruce, 2011b). School counselors construct a worldview for students that delimits the universe of possible college choices into a smaller, more manageable range of options, based on counselor knowledge and experience (McDonough, 2005a).

Finally, school counselors also establish relationships and partnerships with postsecondary education institutions. Traditional means of communication between secondary and postsecondary schools include college fairs, hosted college visits, tours, information sessions, and information distribution (Bridgeland & Bruce, 2011b). However, research has shown that students who participate in activities and programs that connect them with postsecondary institutions still need additional support to encourage enrollment, success and persistence (Bridgeland & Bruce, 2011b). School counselors and school counseling programs are in an ideal position to enact this.

Even though the research has demonstrated that school counselors can and do have a positive impact on the college choice process, there has also been the argument that college

counseling should not be part of the school counselor's responsibilities because it was not guidance, but more persuasion and gatekeeping (Rosenbaum, Miller, & Krei, 1996; Tibby, 1995). This argument critiqued counselors as gatekeepers who subjectively determined which students were "college material" and discouraged students whom they thought were "unworthy" (Kitsuse & Cicourel, 1963; Rosenbaum, 1976).

Access to college counseling. Even though research has shown that the school counselor can be an important component to school improvement and individual student success (McDonough, 2005a; Perna et al., 2008; Stone & Dahir, 2006), there continue to be constraints on school counselors and school counseling programs that prevent them from providing equal access to college counseling for all students. For instance, certain student populations have greater access to not only school counselors in general, but to college counseling services in particular (Auwarter & Aruguete, 2008; Savitz-Romer, 2008). In addition, historically, school counseling as a profession has been left out of school improvement agendas (Stone & Dahir, 2006), thus limiting their ability to effect policy on a large scale.

Student populations. Even though the research demonstrates the effectiveness of school counselors on student access to higher education, there is a large disparity between availability of counseling resources for different populations of students. Competent school counselors tend not to be readily available in urban, low SES schools that serve mostly racial minority students, which in part explains the underrepresentation of these populations in higher education (Bridgeland & Bruce, 2011b; McDonough, 1997, 2005a, 2005b; Paul, 2002; Perna et al., 2008; Plank & Jordan, 2001; Stone & Dahir, 2006). Research has shown that the quality, consistency, and accessibility of school counseling programs, and college counseling specifically, varies, with

more privileged (e.g., higher SES) students receiving better services (Auwarter & Aruguete, 2008; Savitz-Romer, 2008). Furthermore, schools that serve more privileged students also tend to have counselors that spend more time focused on college counseling (McDonough, 2005a).

This fact is more devastating when it becomes clear that these are the populations of students who need the counseling and college access services the most. The potential impact of school counseling programs may be the greatest for the student populations with the greatest needs (e.g., underrepresented racial minority, females, students from low-SES backgrounds; Bridgeland & Bruce, 2011b). Research suggests that underrepresented racial minority students (Black/African American and Latinx) are significantly more likely to be influenced by their high school counselors when it comes to developing and enacting college plans (Lee & Ekstrom, 1987; Plank & Jordan, 2001). However, students of color may express reluctance to see school counselors because of a perception that they are incompetent or hostile (Gándara & Bial, 2001), have reputations for placing students of color in non-college track courses (Atkinson, Jennings, and Livingston, 1990), and historically have been barriers to educational aspirations (Lareau & Horvat, 1999). For students from low-income backgrounds, school counselors are at the center of issues relating to access to postsecondary opportunities, financial aid, post-college debt, and the ability of these students to enroll in and pay for higher education (Bridgeland & Bruce, 2011b; Pathways to College Network, 2010).

Additionally, students repeatedly report dissatisfaction with their school counselors and with the school counseling programs. For instance, one study found that students listed the school counselor as the least helpful adult in college and career planning support (Gibbons, Borders, Wiles, Stephan, & Davis, 2006). Overall, students indicate that they feel uninformed

and underprepared to manage the college preparation and college choice processes, and they want and need more support to navigate these processes (Bridgeland & Bruce, 2011b; Johnson & Rochkind, 2009, 2010).

Federal, state, and district policy. Despite this critical role that school counselors play, historically, school counseling as a profession has been left out of school improvement agendas (Stone & Dahir, 2006). In fact, the state of counseling has not been an important issue on any major policy agendas at the federal level (McDonough, 2005a). The primary federal legislation on education (the Elementary and Secondary Education Act, No Child Left Behind Act of 2001) is largely silent on the topic of school counselors and school counseling programs (No Child Left Behind Act of 2001, 2002). These pieces of legislation authorize the U.S. Department of Education to offer grants to elementary and secondary counseling programs, yet in 2010, this funding accounted for a mere .04% of the funding appropriated to elementary and secondary school programs in fiscal year 2010 (U.S. Department of Education, 2011, 2014). Recently, an increased emphasis on college access and affordability from the White House has the potential to raise awareness of the importance of counselors in the education reform agenda (Bridgeland & Bruce, 2011c).

At the state level, many states have passed legislation that mandates and regulates the certification, funding, and practices of school counseling programs, which are held accountable by the state department of education (ASCA, 2010). Some examples of the ways that states have regulated school counseling programs include: mandating comprehensive school counseling programs, minimum counselor-to-student ratios, and requiring or eliminating counseling programs for different grade levels (ASCA, 2010).

In addition, the content of school counseling programs is largely shaped by district and school-level policies (McDonough, 2005a; Perna et al., 2008). For example, local school districts have the authority to designate a school counselor specifically for college counseling, thus making this a priority for the counseling program. Strong district and school leadership are necessary to the equitable implementation of quality school counseling programs across schools (Lapan & Harrington, 2010). At the school level, the expectations that principals have for school counselors often differ from the expectations that school counselors have for themselves. For instance, many school principals have redirected counselors' efforts to include additional administrative duties such as yard duty, scheduling, and testing as they see these as important responsibilities that fall under the purview of school counselors (Cole, 1991; Hugo, 2004; McDonough, 2005a). Additionally, counselors' inability to empirically demonstrate their effectiveness has led to them being the targets of budget cuts or being left out of hiring decisions at the school and district levels (Corwin et al., 2004; Hugo, 2004; McDonough, 2005a).

While research on undermatch has drawn from the literature on college choice and the various factors that contribute to this process, scholars have yet to empirically examine the extent to which school counseling programs contribute, if at all, to this phenomenon. We need a much better understanding of the college choice process for various student populations, including the impact of school personnel on student decision-making. However, the examination of undermatch specifically is still in its infancy and has yet to incorporate this same level of analysis with regards to school personnel. This study intends to fill that literature gap by empirically analyzing undermatch for a nationally representative sample and exploring the ways in which school counseling programs influence students' educational choices.

Synthesis

Bourdieu's (Bourdieu, 1986; Bourdieu & Passeron, 1977) theory on social reproduction helps to identify undermatch as a type of reproduction that maintains the educational hierarchy. His conceptualizations of cultural and social capital, combined with the usage of habitus help to explain how underrepresented students engage in the college choice process, which ultimately may lead to undermatch. Within this theoretical framework, Perna (2006) developed the Multi-Contextual Student College Choice Model to explain the various layers that students interact with when making their college decisions, including undermatch. While social reproduction helps to frame and explain undermatch as a college choice phenomenon, it does not take into consideration the high school counseling context within which these decisions occur, nor the influence and agency of school counselors in advising students in their college decisions. Therefore, this study also incorporates Giddens' Theory of Structuration (Giddens, 1979, 1984), which helps to explain school counselors' behavior and actions as reinforcing or disrupting the social structures. Identifying school counselors as institutional agents highlights the potential of these individuals to provide access to social capital for underrepresented students. However, it is through this role that school counselors may also be reinforcing the social hierarchy by dissuading them from appropriately selective institutions, thus encouraging undermatch.

The synthesis of these theories and conceptual models helps provide insight into undermatch as a form of social reproduction and the ways in which school counselors, as institutional agents who encourage or discourage students, exercise agency to disrupt the status quo. Taken together, these theories provide a foundation for this inquiry into the various factors that contribute to undermatch, including the role of school counselors and school counseling

programs in reinforcing or disrupting this inequality. They provide the lens through which we can better understand the college choice process for racial minority students within educational contexts that ultimately impact their decision-making.

Using both Perna's (2006) and Engberg and Gilbert's (2014) models as they pertain to this study, the adapted conceptual framework is shown in Figure 2.3.

Figure 2.3 Adapted Empirical Model

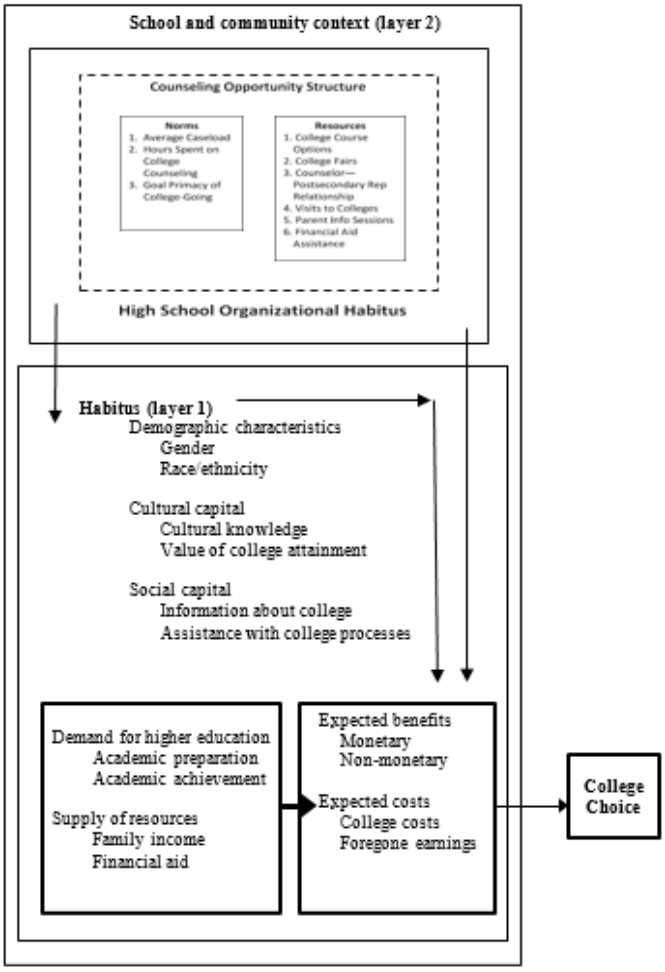


Figure 2.3. Combining Perna's (2006) Multi-Contextual Student College Choice Model and Engberg and Gilbert's (2014) Counseling Opportunity Structure

CHAPTER 3 : METHODOLOGY

The purpose of the study is to examine the extent of undermatch between ability and college choice for different racial/ethnic groups and to gauge the influence of school counseling programs on selection. The first analytical phase of the study will focus on identifying undermatch for students in the sample at three stages of the college choice process, the time of applying to, being admitted to, and subsequent enrollment in higher education. The first analytical phase will establish undermatch for individual students in the sample, then compare the rates of undermatch across racial groups at the time of application, admission, and enrollment in higher education. The second analytical phase of the study will focus on assessing the influence of the school counseling programs on the likelihood of undermatch for these students. Similar to the first phase, this second analytical phase will compare the relative influence of school counseling programs for different racial groups at the time of applying to, being admitted to, and subsequent enrollment in higher education.

This chapter describes the methods used to address the research questions for the study. The chapter begins by reiterating the research questions and providing hypotheses and rationales related to each question. The next section details the research design, including a description of the data, analytic sample, variables, and analytic techniques used for each research question. The chapter concludes with a section on the limitations of the data and the research design.

Research Questions and Associated Hypotheses

This section provides hypotheses and their corresponding rationales for each research question in the study.

Question 1: What is the extent of academic undermatch for a nationally representative sample of students at the time of application to, admission to, and attendance in higher education?

- **How do rates of academic undermatch vary by racial background?**

Hypothesis 1a: There will be relatively high rates of undermatch across the national sample at the time of application to, admission to, and enrollment in higher education. Similar to other studies that have examined the prevalence of academic undermatch for students entering into postsecondary education (Bowen et al., 2009; Roderick et al., 2009, 2011; Rodriguez, 2013; Smith et al., 2013), this study will find similar rates of undermatch across the nation, with almost half of the applicants undermatching. At the application stage, these rates will be higher than they will be at the enrollment stage.

Rationale 1a: Research conducted at the district (Roderick et al., 2009, 2011), state (Bowen et al., 2009), and national levels (Smith et al., 2013) have found the extent of undermatch in their respective samples to be between 40% and 62%. Using the research literature as a benchmark, this study is hypothesized to find similar rates of undermatch for the national sample. These higher rates of undermatch reflect the education system in the United States where the larger system seeks to maintain the status quo. Those who have cultural capital and determine which forms of capital are valued in the educational system have a vested interest in ensuring that educational stratification continues. Therefore, since undermatch serves as a form of social reproduction that reinforces the social hierarchy, the rates of undermatch will be high.

Furthermore, most of the academic undermatch occurs at the application stage, where students are not even *applying* to appropriately selective schools initially (Belasco & Trivette, 2015; Dillon & Smith, 2013; Hoxby & Avery, 2013). Despite the fact that students have academic qualifications to attend more selective institutions, many are not submitting

applications to these colleges, which establishes undermatch at the application stage. For example, studies have found that almost 70% of students who undermatch by selectivity did so at the application stage simply by not applying to colleges with which they were academically matched (Belasco & Trivette, 2015, Dillon & Smith, 2013). Therefore, while the overall extent of academic undermatch is predicted to be around 50%, most of this will occur at the application stage in the college choice process.

Hypothesis 1b: The students who already have social and cultural capital that is valued by the education system will have lower rates of undermatch compared to their peers whose capital does not have as much worth in this same system. In terms of racial/ethnic backgrounds, underrepresented minority students (Black/African American, Latinx) have cultural capital that is less valued in the contemporary education system, therefore, they will have higher rates of academic undermatch. At the application step in the college choice process, I will examine two other institutions to which students applied (besides the institution they are currently attending) to determine whether or not students undermatched at the application stage. I expect that underrepresented minority students (Black/African American, Latinx) will have higher rates of undermatch than their represented peers (White and Asian). Similarly, at the admissions step, I will use the admission status of these two other institutions to determine if undermatch occurred at this stage. Even though the admissions step is out of the control of the student, I expect similar results to the application stage, with underrepresented minority students having higher rates of undermatch than their represented peers.

Undermatch at the enrollment step is conditional on students applying and being admitted to institutions in their qualification level. Even though students may apply and be admitted to

institutions that match their qualifications, enrolling in college will sometimes result in higher levels of undermatch across the board. For undermatch at the enrollment step, I will examine the institution where the students are currently enrolled and compare that selectivity level to the one for which the student is academically qualified to attend. I expect that, similar to the application stage, underrepresented minority students will have higher rates of undermatch and White and Asian ethnic students will undermatch in their enrollment at lower rates.

Rationale 1b: When it comes to racial/ethnic background, the research has revealed that there have been mixed results. While some studies found that Whites were more likely to undermatch (Belasco & Trivette, 2015; Smith et al., 2012), other studies found that underrepresented minority students (Black/African American, Latinx, American Indian/Alaska Native) were more likely to undermatch (Bowen et al., 2009; Goodwin, 2015). However, these other studies focused on income as the primary determinant of academic undermatch, which may lead to the variance in rates of undermatch by racial/ethnic background. The variation in the way that the researchers operationalized income may contribute to different outcomes and results. While research has shown that within the United States, SES distinctions also tend to overlap with racial divisions, these concepts are not the same (see Omi & Winant, 2015; Rodriguez, 2013). Therefore, I expect that rates of academic undermatch will fall along racial lines where students with more educationally recognized cultural capital will have lower rates of undermatch.

Furthermore, many studies have defined undermatch based on academic skills, which is determined by "typical" academic measures in high school: GPA, ACT or SAT, and AP/IB coursework. However, many students who demonstrate high academic skills based on these metrics also tend to be the students with higher social and cultural capital valued by the

education system. Research has demonstrated that many underrepresented students attend secondary schools with limited resources, less access to a rigorous high school curriculum, and fewer opportunities to enroll in AP coursework that would help establish an academic profile that demonstrates their "ability" to succeed in postsecondary education (Adelman, 2006; The College Board, 2008; Rodriguez, 2013; Whang Sayson, 2015). This is another reason that I expect rates of undermatch to fall along racial lines, since the way in which ability is determined will disadvantage underrepresented students in favor of students who have more opportunities to demonstrate their "abilities" according to these "standard," "objective" measures. Furthermore, even though high-achieving underrepresented students (based on these typical metrics) will have the demonstrated skills, I still expect them to have higher rates of undermatch compared to their high-achieving White and Asian peers. This has less to do with their skills and more to do with the concepts of cultural and social capital where the education system still privileges students who already have an advantage related to these social constructs.

Question 2: What is the relative influence of high school counseling programs on academic undermatch in a nationally representative sample?

- **How does the impact of school counseling programs vary by racial background?**

Hypothesis 2a: School counseling programs will account for some of the variance in academic undermatch in this nationally representative sample. For schools that have strong school counseling programs that highlight college counseling, I expect that they will have lower levels of academic undermatch compared to other schools that have weaker programs with less focus on college counseling. I expect that differences in programs will contribute to some of the variance in rates of academic undermatch.

Rationale 2a: Because school counselors are optimally positioned to establish and maintain a college culture and college advising through their counseling programs, they have the potential to impact the college choice process for students. Therefore, students who attend schools with strong school counseling programs will have the opportunities to engage in the choice process with more college knowledge and have the support of institutional agents to facilitate educated decision-making for college choices. Furthermore, school counselors may serve to disrupt the social reproduction created by academic undermatch through their programs by providing college counseling services to inform students in the college choice process. On the other hand, school counselors may serve to reinforce the social reproduction of academic undermatch through their programs by not providing adequate services to be institutional agents in the choice process. Given these opposite ends of the continuum, school counseling programs have the potential to influence the college choice process, including the prevalence of academic undermatch for students across the nation.

Hypothesis 2b: School counseling programs will have a greater potential impact on students from underrepresented minority (Black/African American, Latinx) backgrounds than on White and Asian students. This means that school counseling programs will have greater predictive power for Black/African American and Latinx students than their White and Asian peers.

Rationale 2b: Since underrepresented minority students tend to be concentrated in more under-resourced schools with higher student caseloads for school counselors (McDonough, 2005a, 2005b), they are less likely to meet with their counselor to discuss college. Furthermore, these students tend to have less access to quality school counseling programs as well (McDonough, 2005a, 2005b). However, research has also shown that for underrepresented minority students

who do meet with their school counselors, the impact of this interaction will be stronger on undermatch due to the importance of these institutional agents (Lee & Ekstrom, 1987; Plank & Jordan, 2001). For underrepresented racial minority students, institutional agents outside of the family are important sources of social capital that provide information and networks to support student choices regarding college (Pérez & McDonough, 2008; Stanton-Salazar, 2011). Therefore, for racial minority students, school counseling programs will have a greater potential impact on their likelihood to undermatch.

Research Design

The research design will consist of two components: the identification of undermatch for students in the sample as an outcome of college choice, and the extent to which school-wide counseling programs correlate with these undermatch rates. Three national datasets were used with several analytical techniques in order to adequately answer the research questions guiding the study. The following section provides detailed information regarding the data source, sample, dependent and independent measures, and the analyses used to address the research questions.

Data Source

This study will use data from three national sources: the High School Longitudinal Study of 2009 (HSLS:09), institutional-level data from the Integrated Postsecondary Education Data System (IPEDS) and Barron's Admissions Competitive Index. The HSLS:09 is administered by the National Center for Education Statistics (NCES), and overseen by the Federal Government and is a longitudinal study that follows students from ninth grade through postsecondary and early work years. Data collection began in 2009, when students were in the ninth grade and the first-follow up occurred in the spring 2012, when students were in the eleventh grade. There was

also an update and transcript report in 2013, which collected information on students' status shortly after high school, including postsecondary enrollment. The HSLS:09 dataset includes information gathered from a variety of sources (students, parents, counselors, administrators' surveys) with the purpose of exploring secondary to postsecondary transition plans and the evolution of those plans for a national sample of students (Ingels et al, 2013).

HSLS:09 uses a complex stratified, two-stage random sample design, selecting schools in the first stage and students randomly sampled from the schools in the second stage (Ingels et al, 2013). In 2009, for the base-year, there were 940 of 1,890 eligible schools that participated and 25,210 study-eligible students, with 21,440 students actually participating. Additionally, for all of the schools in the sample, school administrators and lead school counselors were contacted to complete questionnaires as well to provide contextual information on the student sample and describe the school environment. The math and science teachers of each sample student were also asked to complete a subject-specific questionnaire to gather information about classroom context, school climate, and classroom practices, however, these data will not be used in this current study. Finally, home life and background context were requested from one parent or guardian for each study-eligible student as well. In the first follow-up in 2012, all base-year, study-eligible students (25,210) were included in the sample, yet some students were deemed ineligible by the first follow-up (20 students). Contrary to previous NCES studies (i.e., Education Longitudinal Study of 2002: ELS), the HSLS:09 was not freshened to include a later-cohort representative sample (Ingels et al, 2013). This means that while the base year is a nationally representative sample of 9th grade students, subsequent data collections may be less

representative due to study attrition. Of the 25,180 eligible students for the first follow-up data collection, 20,590 participated.

The 2013 update and high school transcript data collected information on students' status regarding high school completion, postsecondary application and enrollment, financial aid applications and offers, and employment (Ingels et al, 2015). The sample for this data collection point consists of the study-eligible students from the base-year. Taking into consideration students who were available for all three collection points, the final sample of students for this study included 25,170 eligible students, of which 15,860 participated.

Counselor data were only collected at the base-year and first follow-up collection points. At the base year, one school counselor (preferably the head school counselor) was asked to complete the HSLS:09 survey for each school, on behalf of the counseling staff. Of the 940 eligible schools, 850 counselors completed the survey at the school level. When matched to student responses, this resulted in 22,790 students who also have available counselor data at the base-year collection point. At the first follow-up, less than ten schools were no longer eligible there were 940 schools eligible, where 930 school counselors completed survey data for their school. This resulted in 20,600 students who had matched counselor data for this collection point. See Table 3.1 for participation rates at each data collection point.

Table 3.1 *HSLS:09 Component Participation Rates*

Summary of HSLS:09 Component Participation Rates and Proposed Sample for Study

Survey Component	Eligible	Participated	Weighted Participation Rate (%)	Unweighted Participation Rate (%)
Base-year school sample	1,890	940	55.5	50.0
Base-year counselor sample	940	850	91.3	90.3
Base-year counselor sample (matched to students)	25,210	22,790	90.2	90.4
Base-year student sample	25,210	21,440	85.7	85.1
First follow-up school sample	940	900	†	96.3
First follow-up counselor sample	940	930	†	98.5
First follow-up counselor sample (matched to students)	20,860	20,600	98.6	98.8
First follow-up student sample	25,180	20,590	82.0	81.8
Update student sample	25,170	18,560	73.1	73.7
Base year, First follow-up, and Update student sample	25,170	15,860	62.5	63.0

† Not applicable. School sample is not representative of population.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09) Base Year; U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. High School Longitudinal Study of 2009 (HSLS:09) First Follow-up; U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09) 2013 Update and High School Transcript Study, Restricted-use Data File and Control System Data.

For the purposes of this study, I used the restricted-use data file from NCES to conduct all analyses, and in order to merge identifying information regarding selected postsecondary choices for individual students. Demographic and background characteristics were pulled from the base-year survey, while information regarding student high school experiences came from the first follow-up and the update. Parent information was pulled from the base-year parent survey, with a few items related to the perception of counseling from the administrator coming from the base-year administrator survey as well. Since one counselor completed the counseling survey for the entire school, the counselor information is contextual data, therefore, counselor data were used as school-level data, and not analyzed at the student level. These data were pulled from the base-year and first follow-up collection points.

I merged postsecondary institutional data using the Integrated Postsecondary Education Data System (IPEDS) 2013 Institution Characteristics Survey File and Barron's 2014 Admissions Competitive Index. In order to determine the selectivity level of postsecondary institutions, merging data from IPEDS and Barron's Admissions Competitive Index provided information on the institutions that students applied to, were admitted to, and attended after high school (see description below). Similar to previous studies (Bowen et al., 2009; Roderick et al., 2011; Rodriguez, 2013; Smith et al., 2012), I used a modified version of Barron's Competitiveness Index that combines selectivity levels into fewer categories. See Table 3.2 for distribution of institutions and students in the sample. The merging of these three data sources created a unique dataset that allowed for the identification of undermatch as well as the role of school counseling programs in these estimates.

Table 3.2 *Distribution of Institutions and Students in Sample*

Distribution of Institutions and Student Enrollment using 2014 Barron's Competitiveness Index

Selectivity[a]	Institutions in Barron's (2014)	Institutions in Analytical Sample	Student Enrollment in Analytic Sample[b]
Total	1470	1460	7920
Most/Highly Competitive	190	190	1700
Very Competitive	310	310	2300
Competitive	640	640	3180
Less/Noncompetitive	250	250	670

Notes: (a) Institutions with unknown selectivity and the "Special" category were omitted; (b) Distribution represents modified Index; (c) Sample is unweighted
Sources: HSLS:09; Barron's Competitiveness Index (2014)

Barron's Admissions Competitiveness Index

Barron's Admissions Competitiveness Index includes "4-year colleges that grant bachelor's degrees and admit freshmen with no previous college experience" (Schmitt, 2015, p. 3). Institutions are grouped together based on the "College Admissions Selector Ratings" (referred to as Selector criteria) to form the admissions competitiveness index. Based on these Selector criteria, Barron's organizes the colleges into seven competitiveness categories: (1) Most Competitive, (2) Highly Competitive, (3) Very Competitive, (4) Competitive, (5) Less Competitive, (6) Noncompetitive, and (7) Special. The Selector criteria used to evaluate the competitiveness of college admissions include a) the SAT/ACT scores of students who were accepted to the institution in the previous year, b) the grade point average (GPA) required for admission, c) class rank required for admission, and d) percentage of applicants accepted the previous year (Schmitt, 2015). An additional criterion ("plus" symbol +) is included to add nuance to the three competitive categories (Highly Competitive, Very Competitive, Competitive) to indicate institutions within these categories with slightly higher admissions requirements (Schmitt, 2015).

For the purposes of this study, I modified the 2014 iteration of Barron's Index into four categories by combining categories with fewer institutions (Table 3.3). This is a similar process as has been done in other studies on undermatch (Belasco & Trivette, 2015; Bowen et al., 2009; Roderick et al., 2011; Rodriguez, 2013; Smith et al., 2012). This modification resulted in the following four categories: (1) Most/Highly Competitive, (2) Very Competitive, (3) Competitive, (4) Less/Noncompetitive. The latter category (Special) was omitted from analyses.

Table 3.3 *Modified Barron's Competitiveness Index*

Description of Modified Barron's Competitiveness Index (2014) Selectivity Categories

Categories	Level	GPA	Class Rank	Median SAT	Median ACT	Acceptance Rate
Most/Highly Competitive	4	B to A	Top 10 to 35%	620 to 800	27 +	Less than 50%
Very Competitive	3	B- or above	Top 35 to 50%	573 to 619	24 to 26	50 to 75%
Competitive	2	C to B-	Top 50 to 65%	500 to 572	21 to 23	75 to 85%
Less/Noncompetitive	1	Below C	Bottom 35%	Below 500	Below 21	Top 98%

Notes: "Special" is not included

Sources: HSLS:09; Barron's Competitiveness Index (2014)

Sample

Given the complexity of the HSLS:09 sample design, analytic weights were used to "accommodate analyses specific to each round of the study (base year or first follow-up) plus analyses to evaluate change across a 2- to 3-year time period" (Ingels, et al., 2013, p. 99). These weighting estimates were generated by NCES to compensate for unequal probabilities of schools and/or students being selected for the sample as well as to adjust for the fact that not all schools and students selected actually participated in the study (Ingels, et al., 2013). The analytic weight that was used for school-level data (e.g., school counseling program) was W1SCHOOL, which is a school-level analytic weight to produce population estimates for U.S. schools who provide instruction to 9^{th} and 11^{th} grade students (Ingels, et al., 2011). For the student sample, I used the panel weight W3W1W2STU, which accounts for nonresponse of schools in the base-year, nonresponse among students in the base-year, first follow-up, and update data collection points. Additionally, to account for the large sample size, I computed a normalized weight by dividing the panel weight by its mean (W3W1W2STU / mean of W3W1W2STU). General descriptive

statistics analyzed in this study are based on these norm weighted data in order to provide a general overview of the sample as a representative summary of students across the nation.

In addition, NCES includes weights to correct for standard error calculations in a complex sample design. Because the HSLS:09 does not employ a simple random sample, and instead utilizes a complex sampling design, different subgroups have different probabilities of being selected to be in the sample (Ingels et al., 2011). Therefore, it is necessary to use more complex methods of variance estimation and standard errors. For the purposes of this project, I used a Taylor series linearization technique, which is an add-on to SPSS, to correct for the variance and standard errors.

Student sample. All three collection points (base-year, first follow-up, and update) have information relevant to the college choice process. The sample of students was therefore limited to those who were present at all three collection points and had complete data on the variables of interest. Students who were not taking postsecondary classes were excluded from the analytic sample because of the absence of application and enrollment data. Table 3.4 shows the minimum and maximum values, means and standard deviations for all of the variables included in the HGLM models predicting undermatch at application, admission, and attendance. The final analytic sample included 12,940 students from 940 high schools across the nation. In terms of Human Capital predictors, the analytical sample as a whole is in the middle in terms of SES, meaning that on average, students come from the third (20%) and fourth (24%) quintiles in the breakdown of their SES. Furthermore, the students have higher expectations for how they are going to fund their college education, and on average, the actual cost of tuition for the institutions students are attending is just over $20,000 ($20,770). Additionally, cost of

attendance, job placement and graduate school are all important considerations for selecting a college, as indicated by the means of these variables. The demographics and background characteristics of the analytical sample indicate that there are more females than males (53% and 47% respectively) and includes 5% Asian, 12% Black/African American, 20% Hispanic, and 8% multiracial students who identify with more than one race.

Table 3.4 *Description of Student-Level Variables*

Description of Student-Level Variables in HGLM Models (weighted n=12,940 students)

Description	Min	Max	Mean	SD
Student-Level Predictors of Undermatch				
Human Capital: Supply of Resources				
SES† Lowest Quintile (ref: Highest Quintile)	0.0	1.0	0.10	0.30
SES† Second Quintile (ref: Highest Quintile)	0.0	1.0	0.12	0.33
SES† Third Quintile (ref: Highest Quintile)	0.0	1.0	0.20	0.40
SES† Fourth Quintile (ref: Highest Quintile)	0.0	1.0	0.24	0.43
Anticipated Funding	-0.9	1.8	0.51	0.67
Human Capital: Expected Benefits & Costs				
Importance of cost of attendance when choosing college	1.0	4.0	3.44	0.78
Importance of job placement when choosing college	1.0	4.0	3.33	0.87
Importance of graduate school placement when choosing college	1.0	4.0	3.24	0.91
Importance of particular program when choose college	1.0	4.0	3.47	0.79
Teen thinks studying in high school rarely pays off later with good job	1.0	4.0	2.94	0.92
Cost of current college before financial aid for 2013-2014 school year (divided by $1,000)	0.0	800.0	20.77	19.91
Estimated cost of tuition/mandatory fees for college (factor)	-0.5	36.4	-0.01	0.76
Habitus: Demographics & Background Characteristics				
Sex	1.0	2.0	1.53	0.50
Racial Background: Asian	0.0	1.0	0.05	0.21
Racial Background: Black/African American	0.0	1.0	0.12	0.33
Racial Background: Hispanic	0.0	1.0	0.20	0.40
Racial Background: More Than One Race	0.0	1.0	0.08	0.26
First language 9th grader learned to speak is English, Spanish, or other	1.0	5.0	1.35	0.88

Social Capital: Sources of Information about College				
Count of college preparation activities	0.0	6.0	2.95	1.37
Has met with high school counselor about college admissions in 2012-2013 year	1.0	3.0	1.29	0.57
Has met with high school counselor about financial aid in 2012-2013 year	1.0	3.0	1.50	0.60
Count of having ever participated in a college access program	0.0	5.0	0.20	0.51
Social Capital: Networks				
How many friends plan to attend 2-year community college	0.0	5.0	2.17	1.76
How many friends plan to attend 4-year college	0.0	5.0	3.02	1.19
Person who has had most influence on thinking about education after HS	1.0	6.0	4.11	1.52
Count of people student talked to about going to college	0.0	4.0	2.19	1.21
9th grader talked to school counselor about going to college	0.0	1.0	0.18	0.39
How often discussed applying to college/other schools after high school	1.0	4.0	3.30	0.95
Cultural Capital: Value of College Attainment				
How far in school teenager would like to go	1.0	8.0	6.14	1.28
How far in school parents would like teenager to go	1.0	8.0	6.71	1.43
What students think parents think is most important: continue education	0.0	1.0	0.93	0.25
Importance of academic quality when choosing college	1.0	4.0	3.55	0.79
Cultural Capital: Cultural Knowledge				
Count of cultural capital activities	0.0	8.0	1.75	2.47

† function of a) highest education among parents/guardians, b) education level of other parent/guardian, c) highest occupation prestige score among parent/guardians, d) occupation prestige score of other parent/guardian, e) family income

Source: HSLS:09 restricted data

With regard to social capital, very few students in the analytical sample participated in college access programs (e.g., GEAR UP, Upward Bound) and on average, students engaged in three activities (out of six listed in the count variable) to prepare them for college (i.e., taken a college tour, enrolled in an SAT prep class). Students have a little more than half of their friends

who are planning to attend a four-year college, as indicated by a mean of 3.02 for this item. Furthermore, about half of their friends are planning on enrolling in community college, with a mean of 2 for this item. In ninth grade, only 18% of the students talked to their school counselor about going to college, yet most of them discussed this trajectory with their parents, having done so three to four times on average.

With cultural capital and the value of college attainment, students have high educational expectations for themselves, where on average, they aspire to earn at least a Master's degree. Their parents have slightly higher expectations for them, with a mean of 6.71 for this item (student mean for this item is 6.14). Furthermore, the vast majority of the students in the sample believe that their parents think it is most important for the student to continue his/her education after high school, with 93% holding this belief. Finally, on average, students only participated in two to three cultural capital activities in the last year, such as visiting a library or attending a play or concert.

Institutional sample. The institutional sample for this study includes the high schools that students attended. While postsecondary institutions are included in the analysis, these data are reported at the student level, which means that colleges and universities are described in terms of the students who attend them, not at the institutional level. Information regarding the high schools is reported at the school-level. The *weighted* HSLS:09 analytic high school sample represents over 23,000 schools nationwide that serve 9^{th} and 11^{th} grade students. The analytical school sample includes mostly public, regular schools in urban areas (See Table 3.5). On average, the schools have just over one-third (36.92%) of their population who receives free- or reduced-price lunch and nearly three-quarters (70.43%) are White. The 11.78 mean for percent

of student body enrolled in Advance Placement courses indicates that the average percentage of students taking these classes is fairly small. Additionally, the average percent of seniors who went on to Bachelor's-granting institutions is about 50% (49.52%).

Table 3.5 Description of School-Level Variables

Description of School-Level Variables in HGLM Models (weighted n=940 high schools)

Description	Min	Max	Mean	SD
School-Level Predictors of Undermatch				
School Characteristics (Covariates)				
Control	1.0	3.0	1.40	0.77
School locale (urbanicity)	1.0	4.0	2.75	1.20
School type: Regular school	0.0	1.0	0.88	0.32
School Population (Covariates)				
% of student body receiving free or reduced-price lunch	0.0	100.0	36.92	26.17
% of student body enrolled in Advanced Placement courses	0.0	100.0	11.78	13.89
% White students	0.0	100.0	70.43	29.98
% of 08-09 seniors who went to 4-year Bachelor's-granting institution	0.0	100.0	49.52	26.12
Counseling Norms				
Average caseload for school's counselors	1.0	17.0	5.94	3.10
% hours spent on college readiness/selection/apply	1.0	5.0	3.27	0.96
School has counselor designated for college selection	0.0	1.0	0.41	0.49
School has counselor designated for college applications	0.0	1.0	0.46	0.49
Primary goal of counseling program: college prep.	0.0	1.0	0.53	0.50
Composite score of counselor expectations	-16.2	1.2	-0.02	1.05
Counseling Resources				
Count of college information support activities	0.0	5.0	4.68	0.73
Count of financial aid support activities	0.0	8.0	6.60	1.83
Count of college entrance exam support activities	0.0	4.0	3.78	0.56
School organizes student visits to colleges	0.0	1.0	0.67	0.46
School assists students with finding financial aid for college	0.0	1.0	0.92	0.25
School consults with postsecondary reps about requirement/qualifications	0.0	1.0	0.92	0.26

† function of a) highest education among parents/guardians, b) education level of other parent/guardian, c) highest occupation prestige score among parent/guardians, d) occupation prestige score of other parent/guardian, e) family income

Source: HSLS:09 restricted data

School counseling program sample. Because this study highlights the school counseling program as an important contextual factor in the college choice process, it is important to describe these programs as well. The descriptions provided in this section are at the school-level since one school counselor or one administrator provided information regarding the school counseling program at their school (See Table 3.5). For the school counseling programs, the average caseload across the analytical sample is 250 students per counselor (where the caseload ranges from 4 to 1,325 students), which meets the recommendation put forth by ASCA (American School Counselor Association, 2016). However, despite these relatively low average caseloads, counselors are only spending between 11%-20% of their time focused on college preparation such as readiness, selection, and application. This percentage is reflective of other studies that have found that counselors spend less than 20% of their time focused on college counseling (Parsad et al., 2003). While over 50% (53%) indicate that their primary goal in the counseling program is college preparation, the majority of the programs do not have a counselor designated for college selections or applications. Among the schools in the sample, they offer an average of five activities related to college information (e.g., college fairs, college information sessions), nearly seven (out of eight possible) activities having to do with financial aid (e.g., FAFSA reminders, FAFSA completion assistance) and four different activities related to exam support (e.g., information on exam dates, exam preparation). While the vast majority of the schools assist students with finding financial aid (92%) and consult with postsecondary representatives (92%), only two-thirds (67%) of them organize visits to colleges.

Dependent Variable

The three outcomes of interest for the HGLM analysis are the likelihood of undermatch at the application step, likelihood of undermatch at the admissions step, and likelihood of undermatch at the attendance step in the college choice process. These are dichotomous variables (yes/no), which require the use of HGLM. For the application phase, I focused on the two institutions where students reported that they had applied to and were their top choices, besides the institution they were currently attending. The admissions step focused on where students were admitted, based on the admission status of the two other applications students submitted and the institution they were currently attending. The enrollment step included the institution where the students are currently attending, as of November 1, 2013. A detailed explanation of the undermatch identification process is provided in below.

Human capital: Academic preparation and achievement. Since Perna's (2006) conceptual model centers the human capital investment model, it is important to include measures related to these concepts as well. Specifically, research has shown that the quality and intensity of academic work in high school along with high academic achievement are two of the most important predictors of college enrollment (Adelman, 2006; Perna, 2000, 2004a; Perna & Titus, 2004; Plank & Jordan, 2001). Following previous studies on academic undermatch (Roderick et al., 2011; Rodriguez, 2013), academic preparation was operationalized through the use of variables related to the highest level of math taken and the number of credits earned in either advanced placement (AP) or international baccalaureate (IB) courses. In terms of academic achievement, I included overall grade point average (GPA) and the composite score for

the Scholastic Aptitude Test (SAT). The composite score is the sum of the critical reading and math scores, which is standardized in terms of the SAT

The dependent variable for the HGLM analysis is a binary outcome, indicating the likelihood of undermatch. If the students applied to, were admitted to, or enrolled in an institution with a selectivity that is below the selectivity to which he/she is qualified, then they are defined to be "academically undermatched" (undermatch =1, not undermatched =0). This is the same process to construct undermatch as has been done in previous studies (Roderick et al., 2011; Smith et al., 2013). This outcome served as the dependent variable in the HGLM models to isolate the unique effects of the high school (school counseling program) that predict undermatch.

Identification of undermatch. In order to answer research question one regarding the extent of undermatch, I identified which students in the analytic sample were undermatched at the application, admission, and attendance phases, then compared those rates across racial backgrounds. To identify undermatch, I determined the selectivity levels of the institutions to which students applied, were admitted, and enrolled and compared that to the institutions they would likely have gained admission, using academic measures typically considered for admission: GPA, standardized test scores, and AP/IB course taking patterns (Bowen et al., 2009; Roderick et al., 2011; Smith et al., 2012). While there are other important academic qualifications that might predict a student's probability of being admitted, these measures represent the central predictors of admission to college (Smith et al., 2012).

Merging IPEDS and Barron's Admissions Competitive Index (Barron's) into the HSLS:09 dataset allowed me to assign selectivity levels to the institutions reported in the data. I

used a modified version of this index, which excludes the category "Special" (Schmitt, 2015) and combines some levels together (Most and Highly Competitive; Less and Noncompetitive). The use of a modified Barron's index is similar to the analysis that has been used in previous undermatch studies (Bowen et al., 2009; Roderick et al., 2008; Rodriguez, 2013; Smith et al., 2012; see previous section describing the modified index). Using institutions' IPEDS identification code and merging Barron's allowed me to create groups of institutions by their Barron's selectivity levels.

In operationalizing undermatch, I followed a process similar to the one that has been done in previous studies on undermatch (Bowen et al., 2009; Roderick et al., 2008; Rodriguez, 2013; Smith et al., 2012). I first determined the highest academic selectivity level to which a student has *access*, given his/her academic credentials, then compared that to the selectivity levels of the college where the student (a) applies, (b) is admitted, and (c) attends. It is important to distinguish between institutions to which students have *access* and institutions to which they actually apply, are admitted, and attend. This is a significant differentiation because given a student's qualifications, he/she may not be eligible, therefore not have access, to colleges in higher selectivity groups. Rather than "penalize" students for not applying to the most selective institution available, I considered the institutions to which students have access, based on their academic qualifications. The literature has defined access based on student academic qualifications, specifically SAT/ACT scores, GPA, number of AP/IB credits, and the highest level of math completed (Belasco & Trivette, 2015; Rodriguez, 2013; Smith et al., 2012). For example, if a student does not have the academic qualifications to attend a Most/Highly Competitive (the highest selectivity level) institution (e.g., lower SAT/ACT scores, lower GPA,

fewer AP/IB credits, lower level math classes), then he/she does not have *access* to this selectivity level.

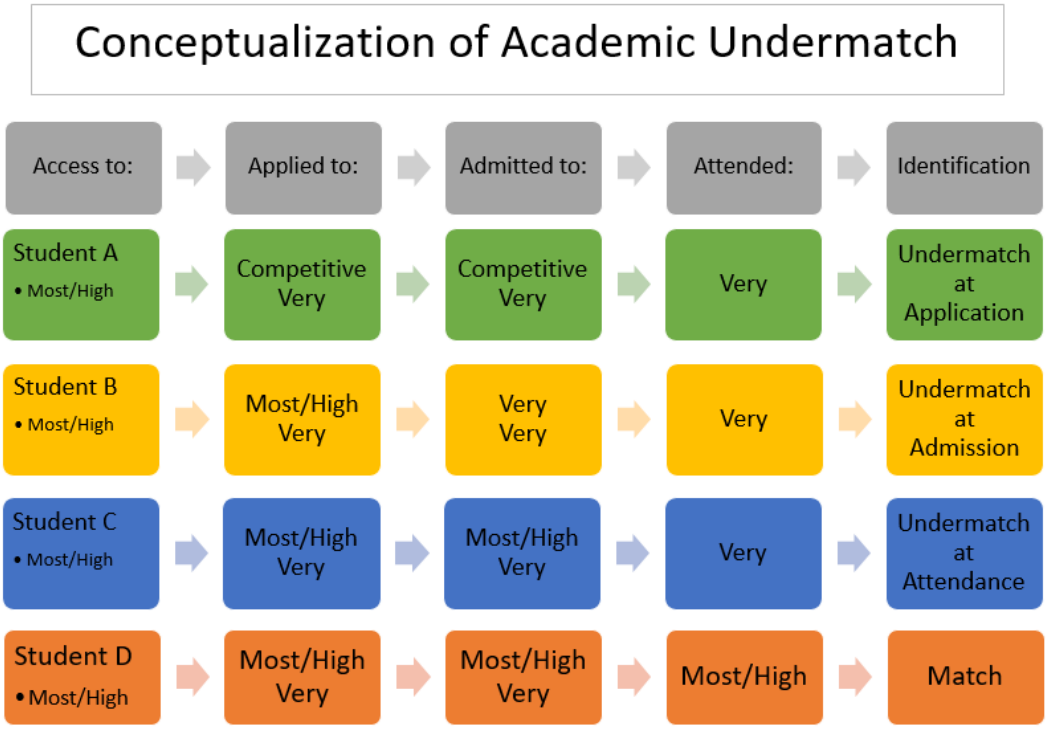
To determine the selectivity level to which a student has access, I used information from students in the sample on their self-reported application and admissions offers. In order to prevent placing more weight on students who applied or were accepted more than once to a specific selectivity level, I aggregated the applications so that each student is only counted as one observation, as has been done in previous studies on undermatch (e.g., Bowen et al., 2009; Rodriguez, 2013; Smith et al., 2012). For example, if a student applied to two Most/Highly Competitive institutions and was admitted by one, I defined that as the student applying to and being admitted by a Most/Highly Competitive college, even if he/she was rejected by the other institution. Similarly, if a student applied to one Most/Highly Competitive and one Competitive institution and gained admission to the Most/Highly Competitive one, he/she would be defined as having access to the Most/Highly Competitive one (see Figure 3.1). The student questionnaire for the third data collection point asked students about two other schools they "most seriously considered" for application and/or enrollment. The follow-up question asked students about the status of their application to these institutions (accepted, wait-listed, rejected). Using this information for the sample, I constructed four separate dependent variables for logistic regression models. For instance, using the admit statuses of students in the sample who applied to a Most/Highly Competitive institution, I created a binary variable (e.g. yes: likely to gain admission, no: not likely to gain admission) that served as the outcome measure for a logistic regression model to determine the Most/Highly Competitive access group. Following this same procedure for the other selectivity levels, I created four access groups: Most/Highly Competitive,

Very Competitive, Competitive, Less/Noncompetitive. Following foundational studies on undermatch (Bowen et al., 2009; Smith et al., 2012), I set a probability threshold of 90 percent. This means that, for example, if a student had an estimated 90 percent or greater chance of being admitted to a Most/Highly Competitive institution (based on their academic qualifications), then he/she had access to a Most/Highly Competitive institution. However, if the student has a probability below 90 percent of gaining admission to a Most/Highly Competitive institution, but over 90 percent chance of being admitted to a Very Competitive institution, they he/she had access to a Very Competitive institution. The student did not necessarily have to apply to each selectivity level because I relied on the student's academic qualifications (see above) and the parameter estimates from the dependent variables in the logistic regression models to determine the probability of gaining admission. Students who do not have the academic qualifications to attend any of the four selectivity levels were identified as having the academic qualifications for two-year institutions. It is important to examine the application phase of the college choice process to determine undermatch since the majority of undermatch occurs when students do not even apply to appropriately matched schools in the first place (Hoxby & Avery, 2013; Hoxby & Turner, 2013a, 2013b; Smith et al., 2012).

Finally, in order to determine if the student did undermatch, I compared the student access groups to the institutions to which they initially *applied*. If a student's access grouping is higher than the selectivity level of the institution to which he/she applied, then the student was identified as "academically undermatched." For example, if a student is in Access Group 1, meaning he/she had the academic qualifications and 90% or more probability of gaining access to the Most/Highly Competitive selectivity level, yet only applied to Very Competitive

institutions, then he/she would be academically undermatched at the application stage (Student A in Figure 3.1). The same comparative process was repeated for the admission and attendance stages of the college choice process as well. For example, if a student is in Access Group 1, meaning he/she had the academic qualifications and 90% or more probability of gaining access to the Most/Highly Competitive selectivity level, applied to colleges in the Most/Highly Competitive and Very Competitive selectivity levels, was admitted to Most/Highly Competitive institutions, but enrolled in a Very Competitive institution, he/she would be academically undermatched at the attendance stage (Student C in Figure 3.1). It is important to note that if a student undermatches at the application stage, he/she will also undermatch at the admission stage and attendance stages since attendance will only occur with institutions to which a student actually applies and is admitted (Student A in Figure 3.1).

Figure 3.1 *Conceptualization of Undermatch*



I also included a third, intermediate stage in between application and enrollment to better understand external factors that contribute to undermatch. I examined the admissions stage for evidence of undermatch since there are occasions where qualified students are not admitted by institutions that would be a good academic fit (Hoxby & Avery, 2013). In this case, I compared the student's access group to the institution(s) that admitted, waitlisted, or rejected him/her. For instance, if a student is in Access Group 1, meaning he/she had the academic qualifications and 90% or more probability of gaining access to the Most/Highly Competitive selectivity level, yet was not admitted to an institution within this selectivity level, this student would still be considered undermatched. However, this undermatch occurs outside of the student's control and is a result of institutional decision-making instead of individual choice. At this stage, the student would be undermatched at the admissions stage in the college process (Student B).

From this identification, I created three new dichotomous variables (e.g., 0=No, 1=Yes) indicating whether or not the student is academically undermatched at (a) the application stage, (b) the admission stage, or (c) the enrollment stage. This process compared students' access grouping to the institutions to which they applied as well as the institutions to which they were admitted and attended.

Independent Variables

Student-level. Because of the nested nature of the data and in accordance with the conceptual model, there are two sets of independent variables that will be used in this study: student-level variables (L1) and school-level variables (L2). Student-level variables will be selected using the conceptual model by Perna (2006) and school-level variables will be selected using Engberg and Gilbert's (2014) conceptual model (detailed below). According to the Perna

model, individual-level variables include demographic and background characteristics as well as measures of human, cultural, and social capital. The previous section described the variables used in this study, including the range, means, and standard deviations (see Table 3.4 and Table 3.5) For a description of coding for these variables, see Appendix B.

Human capital: Supply of resources. According to human capital theory, students consider their financial resources when making decisions about the benefits and costs of participating in postsecondary education (Becker, 1962). To include this element in the proposed model for this study, I included a variable (X1SESQ5), that is a composite variable that divides the socioeconomic status variable (X1SES) into quintiles. The X1SES variable was constructed from five variables obtained from the parent/guardian questionnaire in the base-year data collection: a) highest education among parent/guardians in a two-parent family or the education of the sole parent/guardian, b) education level of the other parent/guardian in a two-parent family, c) highest occupation prestige score among parent/guardians in a two-parent family or of the sole parent/guardian, d) highest occupation prestige score of the other parent/guardian in a two-parent family, e) family income (Ingels et al., 2011). Additionally, to capture the notion of students' perceptions of their supply of resources, I included a derived factor variable (ANTICIPATE_FUND). I derived this factor from four separate variables that attempted to measure the different ways students anticipated that they would pay for college, including scholarships/grants, federal/state loans, private loans in family member's name, and private loans in the student's name. For details on the factor loadings, see Appendix C. This factor variable sought to measure students' anticipation of having funding to pay for college.

Human capital: Benefits and costs. The human capital investment model posits college choice in terms of weighing expected benefits and costs in the decision-making process. To operationalize concepts related to perceived benefits, I included variables that measured students' opinions on the importance of choosing a college based on job placement (S3JOBPLC), graduate school placement (S3GRADSCHPLC), availability of a particular program (S3OFFERSFIELD), and cost of attendance (S3COSTATTEND) as characteristics of a particular institution. Additionally, there is one question on the survey that measures students' belief in the importance of studying in terms of being able to get a good job (S2PAYOFF), which reveals students' thoughts about the benefit of education. To capture students' perceptions on the cost elements in the decision-making process, I included a derived factor variable (EST_COLL_COSTS) that attempted to capture students' estimations of the costs of college. Specifically, the factor was comprised of three separate variables that asked the student to estimate the cost of tuition and mandatory fees at public, in-state 2-year colleges; public in-state 4-year colleges, and private, 4-year colleges as well. The focus on student *perceptions* of potential benefits and costs are important to understand their decision-making process because under the human capital investment model, students must weigh their options in terms of these anticipated benefits and costs when making a decision. Finally, I included the total cost of the institution the student has selected to enroll in (S3CLGCOST) as an important consideration in their decision-making process. This variable is the cost to the family before financial aid and includes tuition, fees, and miscellaneous expenses.

Habitus: Demographic and background characteristics. Drawing from prior research, studies have shown that the college choice process is different for students based on varying

demographic characteristics (see Hurtado et al., 1997; Perna & Titus, 2005; Stage & Hossler, 1989). Additionally, previous research on academic undermatch reveals that demographic characteristics, such as race/ethnicity, socioeconomic status, and English language background (Bowen et al., 2009; Roderick et al., 2011; Smith et al., 2012) are important considerations as well. Therefore, for this study, I included sex (X1SEX), racial background (X1RACE), and first language spoken (S1LANG1ST) as demographic predictors in the model.

Since a central focus of this study is to examine the extent of undermatch for different racial groups, the variables containing racial background identification will be important components in the analyses. These variables are only available through the restricted-use data file from NCES. Racial background variables include Hispanic/Latinx White, Black/African American, Asian, Native Hawaiian/Pacific Islander, and American Indian/Alaska Native. Because of the small sample sizes for Native Hawaiian/Pacific Islander (unweighted n=80) and American Indian/Alaska Native (unweighted n=120), I did not include these racial groups in the analyses for this project.

Social capital: Sources of information about college. Students' access to information about college and the assistance they receive with college processes are expected to shape the college choice development (see McDonough, 1997; Perna & Titus, 2005). To capture students' access to college information, I included variables related to their exposure to college, which was a count variable of the various "activities" students participated in to prepare them for college (see Appendix D for information on the variables in each count measure). These "activities" included whether or not students: took a tour of a college campus (S2CLGTOUR), took a college class (S2CLGCLASS), read college guides or searched the internet for college options

(S2CLGSEARCH), talked with a college counselor about options after high school (S2TALKHSCNSL), talked with a private college counselor (S2TALKCLGCNSL), or took a course to prepare for college entrance exams, such as the SAT (S2CLGEXAMPREP). Additionally, to measure students' interaction with others in the college choice process, I included measures of whether or not they met with their school counselor about college admissions (S3CNSLCLG) or financial aid (S3CNSLAID). To control for students who have participated in a pre-college outreach program, I also included a count variable that asks students if they had ever participated in the following programs: GEARUP (S2EVERGEARUP), Upward Bound (S2EVERUPWARD), MESA (S2EVERMESA), AVID (S2EVERAVID), or Talent Search (S2EVERTALENT).

Social capital: Networks. Beyond students' access to information about college and the college choice process, another important aspect of social capital, according to Perna's (2006) conceptual framework and based on Bourdieu's (1986) theory is that of social networks. Therefore, I attempted to measure social capital through the networks that students have access to, focusing specifically on peers, parents, and other institutional agents. I chose to focus on peer effects since studies have demonstrated that peer effects can influence students' decisions to not only attend higher education, but may also influence raise student expectations as well (González et al., 2003; Hossler et al., 1999; McDonough, 1997; Perna & Titus, 2005). Furthermore, since research has shown that parental interactions and influence can serve as an important form of social capital (see Coleman, 1988; Perna & Titus, 2005) parent/family networks were also included in the analyses. In terms of peer networks, I included variables related to friends' educational aspirations and intentions. Specifically, I included two questions that ask students

how many of their friends plan to attend 2-year community college (S2FR2YPUB) and how many friends plan to attend 4-year college (S2FRY4Y). For parent/family networks, a measure of how often parents have discussed college plans with the students (P2DISCCLGAPP) was included. Finally, to capture other social network sources, I also included variables that related to other people students talked to about college and who they believe has the most influence on their decision-making process. Specifically, I created a count variable to count the different sources of support that students have when talking to others about college. This measure includes whether or not students talked to the following people: mother (S1MOMTALKCLG), father (S1DADTALKCLG), friends (S1FRNDTLKCLG), and teacher (S1TCHTALKCLG). I separated the measure related specifically to whether or not students talked to school counselors (S1CNSLTLKCLG) in order to isolate the specific effects of this variable in the model, since the primary focus of this project is on school counseling. Finally, to capture the biggest influence on the college choice process, I included a measure that asks students to identify the person who has the most influence on their thinking about education after high school (S2CLGINFLU).

Cultural capital: Value of college attainment. Operationalizing and measuring cultural capital is a challenge, given the nuanced nature of this theoretical concept. In order to better understand the college choice process for students and the ways that the cultural capital of their families influence that process, it is important to acknowledge that the level of their parents' education may shape what students know regarding this process (Bowen et al., 2009; Smith et al., 2012). Additionally, parental expectations and the extent to which students value their own educational attainment have an influence on the college choice process, specifically related to which institutions to consider for application and enrollment (Engberg & Wolniak, 2010; Perna

& Titus, 2005). Therefore, for the purposes of this study, I used variables that attempted to capture these notions within the data. This included measures related to how far in school the student aspires (S2EDUASP) and how far the parents would like the student to go (P2EDUASP). In addition, I also included a variable that asks students what they believe their parents think is most important for them to do following their high school graduation (S2MOSTIMP2013) as a way to understand student perception on the familial importance of education and the value of college attainment. Finally, there is a measure that asks students about the importance of academic quality when choosing a college (S3REPUTATION) to determine students' beliefs in academic quality.

Cultural capital: Cultural knowledge. Similar to the cultural capital related to the value of college attainment, operationalizing cultural knowledge is also a challenge. Previous studies have employed proxy measures for cultural knowledge that try to capture certain behaviors that are valued by the dominant culture (McDonough, 1997; Rodriguez, 2013). Following this lead, I created a count variable that tallies the number of activities that a student has participated in that are valued by the dominant culture. These measures include whether or not parents have done the following activities with their teenager: visited a science-related destination (P2MUSEUM), worked on a computer (P2COMPUTER), worked on a science fair project (P2SCIPROJ), discussed STEM program or article (P2STEMDISC), visited a library (P2LIBRARY), attended a play, concert or live show (P2SHOW), went to an art museum or exhibit (P2ARTEXHIBIT).

School-level. School-level variables in this study refer primarily to the school counseling program at the high school where students attend but also includes key characteristics of the high school. Since this study seeks to highlight the school counseling contexts and their impact over

and above other individual or school level characteristics all of the theoretical concepts and school-level measures will include aspects of the school counseling program related to college information and knowledge. As an important context within which students engage in the college choice process, the school counseling program serves as a school-level resource that facilitates or impedes student college choice (McDonough, 1997; Perna, 2006). I focus on school counseling programs as a school-level contextual predictor because only the head school counselor provided information about the school counseling program for each school. This constraint on the data collection procedure prevents me from making connections between individual students and their individual counselors. Furthermore, since the counselor survey collected information regarding the entire program at the school level, thinking about this type of data as a school-level contextual predictor is more appropriate. The school counseling program variables, as school-level variables, will be selected according to the Engberg and Gilbert model (2014). These measures include variables related to the school counseling program in terms of counseling norms and counseling resources as well as school-level covariates such as school characteristics and school population. I conducted factor analysis (detailed below) to identify constructs that align with Engberg and Gilbert's (2014) conceptual model in order to reduce the number of Level 2 variables in the HGLM analysis.

School characteristics and population. To better isolate the effects of the counseling program variables, I included several school-level characteristics as covariates. Many of these variables have been used in previous studies and empirically linked to the college choice process (see Engberg & Wolniak, 2010). In terms of school characteristics, I included measures for school control (X1CONTROL), location (X1LOCALE), and school type (A1SCHTYPE). To

control for characteristics of the student population at the school level, I included measures that attempted to capture facets of the student body, including the percent of students: receiving free or reduced lunch (A1FREELUNCH), enrolled in AP courses (A1AP), who identify as White (A1WHITESTU), and the percent of seniors who went to a 4-year Bachelor's-granting institution (A14YRDEGREE).

Counseling norms. To capture the normative dimension of the counseling program, I included measures related to the structure of the counseling program as well as the prioritization placed on college counseling. Previous studies investigating school counseling programs have used counselor job responsibilities and caseload data to refer to the structure of counseling programs (Engberg & Gilbert, 2014; Goodwin, 2015; Hurwitz & Howell, 2014; Perna et al., 2008). In accordance with this literature and following the counseling conceptual framework, I include the average student caseload for school counselors (C2CASELOAD), the hours spent on college preparation (C2HRSCOLLEGE), whether or not there is a counselor specifically designated for college selection (C2SELECTCLG) and college applications (C2CLGAPP). In addition, I included a variable that captures the primary goal of the counseling program (C1GOAL) and a composite score of counselor expectations related to students and their ability to go to college.

Counseling resources. The availability of school counseling resources related to college is an important component of the college choice process for students (Avery, 2010; Bryan, Moore-Thomas, Day-Vines, & Holcomb-McCoy, 2011). In terms of the types of resources available to students, researchers have commented that it is not only the quantity of the information students receive, but the quality of this information as well (Corwin et al., 2004;

McDonough, 1997). For the purposes of this study, I included measures that attempted to capture the types of college services the school counseling programs provide to students. For this, I created a count variable that tallied the number of college information and support activities that the school offers. Within this count variable is whether or not the school counseling program: holds or participates in college fairs (C2CLGFAIR), conducts college information sessions (C2INFOSESSN), helps students complete college applications (C2CLGAPPS), provides access to information on college (C2CLGINFO), and helps students identify which colleges to apply to (C2CLGSELECT).

Additionally, I included support activities the counseling program provides related to financial aid. This count variable includes measures on whether or not the school counseling program: holds meetings on the FAFSA process (C2AIDPROCESS), assists in FAFSA completion (C2AIDFAFSA), provides computer access to complete the FAFSA (C2AIDCOMPUTER), sends reminders of FAFSA deadlines (C2AIDDEADLINE), assists in the completion of non-FAFSA financial aid applications (C2AIDOTHAPP), offers meetings on sources of financial aid (C2AIDSOURCE), offers individual counseling to identify financial aid (C2AIDCNSL), and provides flyers or pamphlets on financial aid (C2AIDFLYER).

Another important component of counseling resources is the extent to which programs support students in their entrance exams, such as the SAT and ACT. Given this responsibility, I created a count variable to tally the number of college entrance exam support activities provided at the school level. The individual variables in this count variable include whether or not school counseling programs provide: information on dates and locations of college entrance exams (C2CLGEXAMINFO), assistance with entrance exam registration (C2CLGEXAMREG),

assistance with college entrance exam fees (C2CLGEXAMFEE), and provides help with entrance exam preparation (C2CLGEXAMPREP).

Finally, there are three measures included in counseling resources that examine the relationship between the high school counseling program and postsecondary institutions. Having connections between P-12 schools and local colleges and universities contribute to a college culture, which has been shown to increase college access and enrollment for students (Jarsky, McDonough, & Nunez, 2009). Therefore, to capture this element, I included whether or not the school organizes student visits to colleges (C1VISITCLG), assists with finding financial aid (C1FINANCEAID), and consults with postsecondary representatives about admissions (C1POSTSECREQ).

Analysis

I conducted several statistical analyses in order to answer the research questions guiding the study. I first ran a series of descriptive analyses to describe the final analytic sample for multilevel modeling and to better understand the application, admission, and attendance patterns for students in the sample. I then ran four separate logistic regression models predicting the likelihood of enrollment in institutions with varying selectivity levels. This process allowed me to identify undermatch in the sample and construct the dependent variables. Finally, I conducted the primary analysis using hierarchical generalized linear modeling (HGLM) to understand the predictive power of school counseling programs as school-level effects on the likelihood of undermatch. The following sections provide a detailed description of the analyses that were used in the study.

Missing data. Missing values analysis revealed that many of the variables had small percentages of missing data. The SAT composite score had 46% missing cases, therefore results related to this measure should be interpreted with caution. Before imputing missing values, cases with missing data for the outcome variables or demographic characteristics (e.g., sex, race) were deleted from the sample. For all other continuous variables in the study, the expectation-maximization (EM) algorithm was used to preserve the greatest number of participants in the analytic sample. The EM algorithm uses maximum likelihood (ML) estimates to replace missing values and is a more robust technique than less accurate missing values replacement, such as mean replacement or listwise deletion (McLachlan & Krishnan, 1997).

Descriptive analysis. After examining correlations and collinearity diagnostics among the independent variables, variables with a Pearson's correlation of .40 or greater were examined. Additionally, I conducted an exploratory factor analysis to identify latent constructs in the proposed model and in order to reduce the number of independent variables in the final models. Exploratory factor analysis identifies clusters of variables that correlate highly with one another in an attempt to reduce the number of variables to a smaller number of factors (Agresti & Finlay, 2008; Field, 2013; Russell, 2002). In order to maximize the strength of each unique factor, I used principle axis factoring with orthogonal rotation (Field, 2013; Russell, 2002). In order to be included in multilevel analysis, variables within the factor must have had a factor loading of at least .40 or higher (DeVellis, 2003). Furthermore, all factors should have had a minimum Cronbach's alpha of .65 in order to ensure internal reliability (DeVellis, 2003).

For the purpose of this study, I relied on the conceptual models by Perna (2006) and Engberg and Gilbert (2014) to guide the factor construction. From Perna's Multicontextual

Student College Choice Model, the categories that guided the construction of student-level factors included: "human capital: academic preparation" "human capital: academic achievement," "human capital: resources," "human capital: benefits and costs," "habitus: demographic characteristics," "social capital: sources of college information," "social capital: networks," "cultural capital: value of college," and "cultural capital: cultural knowledge." Despite the numerous categories offered by Perna's conceptual model, only two factors met the criteria (see above) to become factors in the final models (see Appendix C). One factor, referred to as "estimated college costs" (alpha=.80) fit in the human capital framework, within the expected benefits and costs of category and brought together measures related to estimated college costs from the student's perspective. Another factor, referred to as "anticipated funding" (alpha=.72) also emerged under the human capital framework, within the supply of resources category. This factor captured students anticipated funding to pay for college through various sources of financial support.

For the school-level factors, I used Engberg and Gilbert's (2014) Counseling Opportunity Structure Model, including counseling norms and counseling resources. The latent constructs include "availability of resources," "types of resources," and "structural supports and barriers." While no factors formed based on the specific criteria, I did use the composite score for counseling norms developed by NCES (X1COUPERCOU). This variable is a scale of the school counselor's perceptions of the counseling program's expectations for students, where higher values represent more positive assessments of the expectations (Ingels et al., 2011). This composite variable was derived through principal components factor analysis and standardized to a mean of 0 and standard deviation of 1 (Ingels et al., 2011).

Additional descriptive statistics were employed to provide a general description of the analytic sample used in the study. I conducted statistical analyses such as analysis of variance (ANOVA) and a Dunnett's T3 post-hoc tests to compare undermatch rates for the different racial groups, using the norm weighted national sample. I also ran descriptive statistics to describe the sample used for the multilevel models. This included examining the means, standard deviations, and frequencies for each of the independent and dependent variables. Furthermore, to address research question one regarding the extent of undermatch, especially with regards to differences in racial backgrounds, I conducted a crosstabulation analysis (contingency tables) with application, admission, and attendance undermatch by the various racial groups. This allowed me to examine undermatch percentages for each racial group in order to report nationally representative rates for each group.

The identification of undermatch and analytical process was described in an earlier section (Dependent Variable) in order to identify and create the dependent variable for the central analysis of this study. Subsequent multivariate analyses determined the predictors of undermatch at all three stages, as described in the next section.

Hierarchical Generalized Linear Modeling (HGLM). In order to answer research question two regarding the extent to which school counseling programs influence the prediction of academic undermatch over and above individual level predictors, it is necessary to examine the high school contextual effects as well, thus rendering the need for hierarchical linear modeling. Since the outcome of interest for this study is dichotomous, likelihood of undermatch at application, admission, and attendance, the specific HLM technique used was hierarchical generalized linear modeling (HGLM), with students at Level 1 and school counseling programs

at Level 2. HGLM is used with binary outcomes and employs a Bernoulli sampling model and logit link (Raudenbush & Bryk, 2002). The dependent variables for the HGLM analysis comes from the analysis conducted in the first part of the study, using the dichotomous variables created from the identification of academic undermatch for each student.

This method is appropriate for this study because it allowed me to examine individual and contextual effects simultaneously in nested data (Raudenbush & Bryk, 2002). The data for this study provide the ideal structure for this type of analysis where students are "nested" in schools with one counseling program per school. Furthermore, the structure of the college choice conceptual framework lends itself to nesting as well, with the inclusion of various layers that contribute to the college choice process (Perna, 2006). In addition, one advantage of HLM (including HGLM) is that it allowed me to examine the individual (level 1) predictors simultaneously with the school-level contextual (level 2) predictors that contribute to estimates of undermatch (a dichotomous outcome). Examining both of these levels together allowed me to better determine which aspects of the school counseling program work and for which students. Another advantage of HLM is that this technique uses maximum likelihood techniques instead of ordinary least squares, which lead to more robust and consistent estimates when there are unequal groups in the sample (Hox, 2010; Raudenbush & Bryk, 2002). Finally, for use with multilevel data, HLM or HGLM is a preferred analytical technique over single-level analysis because forcing multilevel data into a single level ignores the clustered nature of the data and can lead to downwardly biased standard errors and an increased probability of making a Type I error (e.g., the belief that a parameter is statistically significant when it is not; Raudenbush & Bryk, 2002). This is particularly important when assessing school effects. Therefore, HLM techniques

were the most appropriate for the analysis in this study as it accounted for the varying factors, at multiple levels, that contribute to the likelihood of undermatch for underrepresented students of color.

The use of HLM techniques also involves considerations of centering and weighting of variables in order to produce interpretable estimates. All continuous independent variables were centered at their grand means, which allows for a more meaningful interpretation of the intercept, where the intercept is the expected outcome for an individual who is "average" in the population with regards to the specific variable (Hox, 2010; Raudenbush & Bryk, 2002). Dichotomous variables were not centered.

In order to understand the predictive power of student-level and school-level predictors, I conducted the analysis in blocks. First, I conducted a fully unconditional model without any predictors at either level in order to gauge the magnitude of variation between high schools with regard to the likelihood of undermatch. The HGLM level-1 sampling model is Bernoulli and uses a logit link function represented in Equation 1:

$$\eta_{ij} = \text{Log}\left[\frac{\varphi_{ij}}{1-\varphi_{ij}}\right] = \beta_{0j} \quad (1)$$

η_{ij} represents the log odds, or likelihood, of student i at high school j undermatching at the time of application. The Level 2 model is specified as:

$$\beta_{0j} = \gamma_{00} + u_{0j} \qquad u_{0j} \sim N(0,\tau_{00}) \quad (2)$$

where the high school average on the outcome (undermatch at application), β_{0j}, is a function of the average log odds of undermatch at application across all high schools, γ_{00}, and u_{0j} is a random effect unique to each high school.

In general, hierarchical linear modeling techniques require the researcher to consider the extent to which the outcome measure varies across the Level 2 unit of analysis (Raudenbush & Bryk, 2002). Using the covariance estimates from the unconditional model, I calculated the Intra-Class Correlation (ICC) to estimate the variance between groups. The ICC allowed me to determine the extent to which students' likelihood of undermatch varies across high schools, or in this case, across school counseling programs. Even though models with dichotomous outcomes reduce the accuracy of the ICC prediction because Level 1 variance is heteroscedastic, I still produced the ICC as it can still contribute to our understanding of the variance between counseling programs. For HGLM, the ICC is estimated by the formula:

$$ICC = \frac{var(\mu_{0j})}{\left(var(\mu_{0j}) + \frac{\pi^2}{s}\right)} \quad (3)$$

Secondly, I added blocks of independent variables to the Level 1 only model, following the structure provided by Perna's (2006) conceptual model. The blocks were added in the following order: human capital variables, habitus variables, social capital measures, and cultural capital measures. Finally, I ran a model that includes both Level 1 and Level 2 predictors in order to review the effects of school-level predictors over and above student-level variables. Similar to the Level 1 process, I added Level 2 predictors in blocks, according to Engberg and Gilbert's (2014) conceptual model, in the following order: high school covariates, counseling norms, and counseling resources.

Finally, to better understand the rates of undermatch for different racial groups within different school counseling contexts, I added cross-level interaction effects between explanatory variables from different levels (L1 and L2) that may interact to produce an effect on the outcome (Hox, 2010; Raudenbush & Bryk, 2002). In this case, I examined the interaction between various

counseling contexts and racial background (X1RACE_ASIAN, X1RACE_HISPANIC, X1RACE_BLACK, X1RACE_MORE_THAN_ONE) to determine if different contexts affect racial/ethnic groups differently in terms of predicting undermatch. One interaction that I examined was the impact of counselor caseloads (C2CASELOAD) on students from different racial/ethnic backgrounds. Since many schools in urban school districts have few counselors and increased caseloads (McDonough, 2005a) and there are higher concentrations of underrepresented students of color attending these types of secondary schools (McDonough, 2005a; Orfield et al., 2012), this was an important interaction to examine for this study. Additionally, another important interaction for examination was the primary goal of the school counseling program (C1GOAL1) and its differential influence on students from different racial/ethnic backgrounds. Counselors are tasked with multiple responsibilities, yet prioritizing college counseling has been connected to an increase in postsecondary planning and college enrollment (Hutchinson & Reagan, 1989; Hossler et al., 1999; McDonough, 1997, 1999, 2005a, Plank & Jordan, 2001; Powell, 1996; Rowe, 1989). However, despite research that has demonstrated that underrepresented minority students benefit the most from quality college counseling (Bridgeland & Bruce, 2011b; Lee & Ekstrom, 1987; Plank & Jordan, 2001), these tend to be the populations of students who do not have access to these types of services. It is for this reason that including an interaction term between these measures was an important element to this study. Finally, I included an interaction term related to the hours counselors spend on providing services specifically related to college preparation and application (C2HRSCOLLEGE). Research has shown that many underrepresented students attend schools where school administrators and leaders have other responsibilities besides college preparation,

such as school discipline, academic achievement, and school safety (Bridgeland & Bruce, 2011c; McDonough, 1997, 2005a, 2005b; Paul, 2002; Perna et al., 2008; Plank & Jordan, 2001; Stone & Dahir, 2006). When these other obligations take up large percentages of counselors' time, there is less time available to focus on college access and the college choice process. Therefore, this interaction term examined the extent to which time spent focused on college readiness and choice impacts rates of undermatch differently for students from different racial/ethnic groups.

The following model specifications represent the final multilevel model that was used in the study. Equation 4 represents the student-level model:

$$\eta_{ij} = \beta_{0j} + \beta_{1j}(\text{human capital: resources})_{ij} + \beta_{2j}*(\text{human capital: benefits and costs})_{ij} + \beta_{3j}*(\text{habitus: demographic characteristics})_{ij} + \beta_{4j}*(\text{social capital: sources of information})_{ij} + \beta_{5j}*(\text{social capital: networks})_{ij} + \beta_{6j}*(\text{cultural capital: value of college})_{ij} + \beta_{7j}*(\text{cultural capital: cultural knowledge})_{ij} \quad (4)$$

and Equation 5 is the school-level model:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{school characteristics})_j + \gamma_{02}(\text{school population})_j + \gamma_{03}(\text{counseling norms})_j + \gamma_{04}(\text{counseling resources})_j + \gamma_{05}(\text{caseload*race})_j + \gamma_{06}(\text{counseling goal*race})_j + \gamma_{07}(\text{hours on college prep*race})_j + u_{0j} \quad (5)$$

$$\beta_{\rho j} = \gamma_{\rho 0}, \text{ where } \rho=1 \text{ to n student level variables}$$

These models represent likelihood of undermatch at the application step, and this process was repeated for the admission and enrollment outcomes as well.

Limitations

There are a number of limitations to this study that will be addressed in this section. First, the study relies on the use of secondary data. These data were collected with distinct purposes

that were separate from the purpose of this study. While this study uses Perna's (2006) college choice multilevel model and Engberg and Gilbert's (2014) counseling opportunity structure as frameworks and fits variables from the dataset to this purpose, the data were not initially collected with this goal. This means that the variables in the dataset are not direct measures of the theoretical concepts in the frameworks. Previous research has mentioned this limitation of using quantitative analyses to describe complex constructs, especially related to concepts of social and cultural capital (see Dika & Singh, 2002; Perna, 2000; Perna & Titus, 2005). While I was able to use previous research to identify proxies to approximate some of these complex constructs, these variables may not capture the full complexity of the theoretical concept as posited in the frameworks. For instance, cultural capital is a complex theoretical construct and operationalizing this concept using the variables in the HSLS:09 dataset is somewhat limiting.

Secondly, the college choice process is complex and is influenced by many different factors, most of which are not directly addressed through this study. This study focuses primarily on academic eligibility and assumes that students are making choices based on their presumptive qualifications. However, previous research has shown that multiple factors play a role in the college choice process (see Cabrera & La Nasa, 2000a; Perna & Kurban, 2013). For example, while this study controls for factors such as school characteristics, it does not directly examine the relationships between these factors and the likelihood of academic undermatch. Additionally, on a systemic level, there are real, structural constraints that impact students' decision-making as well. Even with stellar academic qualifications, many students are still faced with systemic barriers that restrict their choices to institutions. For example, many students from disadvantaged backgrounds (e.g., low-income, racial minority, first-generation) have to contend

with privilege that favors certain types of students over others. These advantages experienced by particular groups of students (e.g., affluent, White, continuing generation) provide them with additional assets that will impact their college-choice process as well. However, this study does not directly examine the systemic inequities in education or the college admissions procedures. This study employs a more simplistic approach to capture the most important academic requirements that postsecondary institutions rely on when making admissions decisions (Smith et al., 2012).

Similar to the college choice process, the estimation of undermatch poses several limitations as well. Most importantly, undermatch is an *estimation* of college choice behaviors and not an actual observation. The undermatch estimate is based on assumptions of application and enrollment behaviors that are most likely to occur given a student's academic qualifications, however, this estimate makes numerous assumptions about the college admissions process. For instance, estimates of undermatch do not take into consideration institutional capacity to enroll all students who are qualified to attend. Additionally, grouping institutions into categories based on selectivity levels also assumes that institutions within each category are homogenous. However, the admissions process will be different at each institution and admittance rates will vary widely at each institution as well. This means that a student may be admitted to one institution and be rejected from another institution within the same selectivity category. Furthermore, estimates of undermatch only take into consideration academic qualifications such as GPA, ACT/SAT, and AP course taking patterns, but more selective institutions often require additional eligibility criteria, such as a personal statement, letter of recommendation, and extracurricular participation. Relying on a single indicator to determine application and

enrollment probabilities may not take into consideration all of the steps in the complex college choice process. Moreover, special consideration should be taken when examining undermatch with Historically Black Colleges and Universities (HBCUs). While it may appear that a more-qualified student undermatches in their decision to enroll in an HBCU, this decision may be influenced by student desires to experience the unique environment that HBCUs have to offer (Bowen et al., 2009). While the selectivity may be lower than the one for which a student is qualified, attendance at an HBCU may reflect a decision-making process that is influenced by more than selectivity levels. Finally, the notion of undermatch as a college-choice concept makes the assumption that there is a relationship between institutional selectivity and institutional quality (Rodriguez, 2013). However, this is not always the case, especially when defining quality solely on one indicator such as selectivity. Assessing postsecondary institutions solely on this one indicator does not take into consideration the complexity of higher education and the multiple ways they serve students.

Finally, the inclusion of school counseling programs as school-level contexts does not account for the individual variation that occurs amongst school counselors as individual service providers. Because the data in this study used randomly selected individual students, then surveyed the head counselor at each student's high school, this does not necessarily mean that the counselor who completed the survey was the student's counselor. It is possible that the counselor who provided information for the survey has never interacted with or advised the student, therefore, any inferences made about the impact of a specific counselor on student experiences should be made with caution. Additionally, since only one counselor completed the survey for each school, the responses provided represent the perspective of one individual and

not the entire counseling department. While one counselor may provide his/her perspective on the school counseling program, a different counselor at the same school may have different opinions and provide different responses. This means that the data may *not be* representative of high school counselors or high schools across the nation, but the only other national survey of high school counselors (NACAC: Counseling Trends Survey) is not a representative sample either (Clinedinst, Koranteng, & Nicola, 2015). Furthermore, there are no other school-level data available in the dataset to verify or confirm counselor' views regarding the school counseling context. Finally, responses provided about the school counseling program focus on the services provided to students at the school-level. However, the data do not allow for further exploration regarding the quality of these services or the equity in distribution that they are provided to students.

The following chapters present the results from the identification of undermatch and HGLM analyses examining the predictive power of school counseling programs over and above individual predictors on rates of academic undermatch. The final chapter concludes with a discussion of these results as well as their implications for research, practice, and policy.

CHAPTER 4 : FINDINGS ON RATES OF UNDERMATCH

This chapter presents the findings from the statistical analyses on academic undermatch across the nation at the application, admission, and attendance stages of the college choice process, with additional investigation into the different rates of undermatch by racial background of the student. Four separate logistic regression models were conducted to determine the institutions to which students had access to, which represented the four selectivity levels: Most/Highly Competitive, Very Competitive, Competitive, Less/Noncompetitive. Students were identified as being undermatched at the application, admission, and/or attendance stages based on the parameters established by these logistic regressions. Once students were categorized as undermatched or not, I created a series of contingency tables (cross-tabulations) to examine these undermatch patterns across racial background. Through the data presented in these tables, I address Research Question One regarding extent of undermatch and variation by racial group.

Descriptive Results

This section presents descriptive findings from the analyses on the student- and school-level samples as well as the combined sample with both levels of data. The section begins with information about the high school contexts, including cross-tabulations of specific high school characteristics by student racial backgrounds. The descriptive results section concludes with findings that summarize and discuss where students actually applied, were admitted, and ultimately enrolled, both by national sample and by racial group.

High School Contexts

This study focuses on the secondary school context as a potentially important factor in the college choice process for students. As such, it is necessary to first examine these contexts for the analytical sample, focusing on how these contexts differ across racial background. This context is important because it not only establishes the environments within which undermatch may occur, but it also provides key information on the counseling programs at each high school. Since the counseling program is the primary context of interest, descriptions of the program and how they vary for students from different racial backgrounds is relevant to the overall analysis. Schools in the analytical sample represent 22,443 high schools nationwide. When the normalized weight is applied to represent actual numbers in the sample, this results in 940 secondary schools. This section will provide findings from cross-tabulations between secondary school characteristics, including counseling programs and students' racial background.

High school covariates. The characteristics of the high schools within which the school counseling programs are located present important environmental factors that will shape the structure of the counseling program itself. Furthermore, research on secondary schools (Gándara, 2002; Hill, 2008; McDonough, 2005a; Oakes & Guiton, 1995; Orfield et al., 2012; Perna, 2005; Perna & Kurban, 2013; Venezia & Kirst, 2005) has shown that various school-level characteristics are important factors for student in the college choice process. For the analytical sample of schools in this study, I examined characteristics of the school itself as well as the school population. See Table 4.1 for a summary of the analytical school sample.

Table 4.1 *Summary of Secondary Schools, by Race*

Summary of Secondary Schools, by Race (n=12,360 students; n=940 schools)

	Percent of					
	Asian	Black/African-American	Hispanic	More than one Race	White	Total
Total students in sample*	1310	1240	1780	1010	7030	12360
Percent in population	10.6	10.0	14.4	8.2	56.9	100.0
School Characteristics (Covariates)						
Control: Public	91.9	94.8	94.8	92.7	87.4	90.4
School locale (urbanicity): City	51.6	41.9	48.2	37.7	22.0	32.3
School type: Regular school, not charter or magnet	85.4	78.7	84.3	84.5	95.3	89.8
School Population (Covariates)						
75%+ of student body receiving free or reduced-price lunch	6.9	22.0	15.8	6.8	1.2	7.4
25%+ of student body enrolled in Advanced Placement courses	30.5	21.9	30.4	23.0	22.1	24.2
75%+ White students	19.6	11.6	10.9	31.4	62.6	41.6
75%+ of 08-09 seniors went to 4-year Bachelor's-granting institution	19.3	13.9	13.0	17.6	19.3	17.2
Counseling Norms						
Average caseload for school's counselors is 500+	25.1	10.2	24.2	11.6	8.1	12.7

50%+ hours spent on college readiness/selection/apply	4.4	7.6	5.9	6.7	6.8	6.6
School has counselor designated for college selection	33.3	43.0	41.9	34.9	35.4	37.5
School has counselor designated for college applications	33.4	44.5	41.4	37.8	38.4	39.5
Primary goal of counseling program: college prep.	64.1	49.2	47.0	56.8	56.2	53.9
Counseling staff has higher than average expectations for students	56.0	47.1	49.9	53.0	55.5	53.2
Counseling Resources						
There are 5 college information support activities	75.2	85.5	84.2	84.2	82.8	83.2
There are 8 financial aid support activities	44.2	57.9	57.5	47.5	38.1	45.4
There are 4 college entrance exam support activities	74.4	89.9	79.0	83.6	83.4	82.9
School organizes student visits to colleges	66.4	77.9	77.0	69.8	63.9	68.8
School assists students with finding financial aid for college	94.3	97.4	98.5	96.7	94.5	95.8
School consults with postsecondary reps about requirement/qualifications	98.5	92.9	96.6	93.6	96	95.7

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

Source: HSLS:09 restricted data

The vast majority of the schools in the sample are public schools, with 90.4% of the national sample being public. Across race, only White students attend public schools in lower percentages than the national sample, with only 87.4% of them reporting attendance at a public school. Similar to school control, the vast majority of students attend regular school, not charter, magnet, or alternative. Nationally, 89.8% of students are enrolled in regular school, with higher percentages of White students attending this type of school (95.3%). Finally, in terms of characteristics of the school itself, the locale of the secondary school varies across racial background, with only about one-third (32.3%) of the national sample attending high schools in urban settings. While around one-half of Asian students (51.6%) and Hispanic students (48.2%) attend schools in urban settings, less than one-quarter (22%) of White students attend schools in these settings.

With regards to the student populations that attend schools in the analytical school sample, there is wide variety as well. Nationally, 7.4% of the analytical sample of schools have student populations where 75% or more of the students receive free or reduced lunch subsidies. For these types of schools, where at least three-quarters of the student body receives these subsidies, one in five Black/African American students (22%) attend these institutions. Since the percentage of students receiving free or reduced lunch subsidies is often used as a proxy for school resources and levels of poverty (see Lubienski & Lubienski, 2006; Planty et al., 2008), this means that Black/African American students are attending lower-resourced schools at three-times the rate of the national percent. In contrast, far fewer White (1.2%) students attend similarly low-resourced high schools.

Since students with Advanced Placement (AP) courses and test scores often haven an edge in selective college admissions (Schmitt, 2015), examining the rate at which the student

body enrolls in these types of classes is important to understand opportunities for students and how that may differ by school context and racial background. Nationally, 24.2% of the schools in the analytic sample have at least one-quarter of the student body enrolled in AP classes. However, among Asian and Hispanic students, more of them attend schools with this characteristic than the national average, with 30.5% of Asian and 30.4% of Hispanic students enrolled in these schools. In contrast, only 21.9% of Black/African American students in the sample attend schools where more than one-quarter of the students are taking AP courses. This means that for Black/African American students, a lower percentage of them are meeting the requirements for selective college admissions.

Finally, one aspect of examining the college-going culture is the percentage of students who graduate and enroll in college right after high school (González, Stoner, & Jovel, 2003; Hossler, Schmit, and Vesper, 1999; Perna and Titus, 2005). For the national sample, 17.2% of the schools had 75% or more of their students attend four-year, Bachelor's granting institutions after high school. But for students from different racial backgrounds, their attendance at similar schools varied across the sample. Above the national rate, Asian (19.3%), White (19.3%), and multiracial (17.6%) students attended these types of schools where at least three-quarters of the student body went on to four-year colleges. However, only 13.9% of Black/African American and 13% of Hispanic students attended high schools with this high percentage of college enrollees. This means that for these populations of students, the percentage of their peers who continue their postsecondary education immediately after high school at four-year institutions is lower, thus making it more difficult to have the peer support to aspire to and follow-through with higher education enrollment.

Counseling norms. Before examining the relative impact of counseling programs on undermatch, it is first important to understand what the counseling program looks like and how it differs across racial groups. Highlighting the norms of counseling programs across the country provides a broad picture of general characteristics of these programs and reveals the types of programs to which particular racial groups have access. While the American School Counseling Association (ASCA) recommends a student-to-counselor ratio of 250 to one (American School Counselor Association, 2016), 12.7% of the school counseling programs nationally report average caseloads of 500 or more students. When examining the percentages for different racial groups, many students attend similar schools with ratios that are at least double the recommendation. At the high end of the spectrum, around one-quarter of all Hispanic and Asian students attend schools with average counselor caseloads that exceed 500 students (24.2% and 25.1% respectively). White students have the lowest percentage (8.1%) of attendance at schools with average caseloads above 500 students. This means that Hispanic and Asian students are more than three times as likely to attend schools with high counselor caseloads (more than 500) than White students.

An opposite pattern emerges with the percentages of students who attend schools where school counselors spend more than 50% of their work time on college readiness, selection or application. Nationally, only 6.6% of high school counselors report that they spend more than 50% of their time on college preparation. For Asian students, only 4.4% have school counselors that spend more than half their time on college preparation. This means that for Asian students their school counselors focus on other issues and spend less time preparing students for college or helping them select and apply for postsecondary education.

Similar to the time spent on college readiness is whether or not a school has a counselor designated for college selection or for college application. In the national sample for this study, nearly two-fifths of students attend schools that indicated that they had these designated counselors: 37.5% for college selection and 39.5% for college applications. At the low end of the percentages are Asian students, where only one-third (33.3%) attend schools with designated counselors for college selection and one-third (33.4%) for college applications.

Following the counseling norms for the high school is the primary goal of the counseling program itself. These percentages highlight the schools that prioritize preparation for postsecondary schooling as the primary goal of the counseling program above other goals such as personal development, work preparation, or achievement in high school. Nationally, over half (53.9%) of all students attend schools that report that their primary goal is college preparation. For Asian students, this percentage is much higher, with nearly two-thirds (64.1%) of these students attending schools with this primary focus. However, less than half of all Black/African American and Hispanic students attend schools with a central focus on postsecondary preparation (49.2% and 47% respectively).

Finally, another counseling norm in the school program is the extent to which counselors have high expectations for their students. Based on the NCES-developed factor, this measure is a scale of counselors' perceptions on counselors' expectations, beliefs about student abilities, and dedication to all students. Higher values represent a more positive assessment of counselor expectations. For example, a school with a higher value means that the counselors at that school think that in general, the school counseling staff have high expectations for students. For the national sample, over half (53.2%) of all students attend schools have more positive (higher than average) assessment of the counseling program's expectations for students. While almost all of

the racial groups are close to this national average, a higher percentage of Asian students (56%) attend schools where the counseling program has higher expectations for the students. It is also important to note which groups have lower than average percentages of students who attend these types of schools. Fewer Hispanic (49.9%) and Black/African American (47.1%) students attend schools with positive counselor expectations. This means that the majority of these populations of students are enrolled in high schools where a head counselor believes that the counselors there have lower expectations for their student' success.

Counseling resources. School level differences also emerge when examining the counseling resources available to students. In terms of the number of college information activities available, nationally, 83.2% of students attend high schools where there are five different types of activities offered, including whether or not the school hosts college fairs, holds college information sessions, helps with college applications, provides access to college information, and helps with college selection. However, only three-quarters (75.2%) of Asian students attend schools with this many services and activities offered related to college information. Furthermore, with the number of activities offered related to college entrance exam support, 82.9% of students attend schools across the nation that offer at least four different types of services: information on date/location of exams, assistance with exam registration, fees, and preparation. Similar to college information activities, Asian students attend schools with this number of services at lower rates, with only 74.4%. Fewer percentages of Hispanic students also attend schools with these exam preparation services as well, with 79%, which is lower than the national average. With regard to financial aid support activities, nationally, 45.4% of students attend schools that provide eight separate types of services, which include: sending FAFSA reminders, assisting with FAFSA completion, providing computer access for FAFSA

completion, hosting meetings on the FAFSA process, assisting with non-FAFSA financial aid applications, holding meetings on sources of financial aid, offering individual financial aid counseling, and providing pamphlets on financial aid opportunities. While the national average is slightly less than half the students attending schools, only 38.1% of White students attend schools with this number of services available for financial aid.

In summary, not all students attend the same types of schools with the same characteristics and resources. Many historically underrepresented students (Black/African American, Hispanic) attend schools that tend to have higher percentages of students receiving free or reduced lunch subsidies, lower college going rates, and fewer counseling services and resources. This wide variety in secondary school contexts influences the structures, norms, and resources of the school counseling programs within the school as well. Without beginning the examination of undermatch or the extent of influence from school counseling programs, these descriptive findings already indicate that students are not engaging in the college choice process in equitable educational environments. Given the variation among schools in the sample, some students have access to more opportunities simply based upon the high school they attend. This context is an important consideration when further examining more complex analyses relating to undermatch and college choice.

Application, Admission and Attendance Patterns

Before examining rates of undermatch for the sample and across racial backgrounds, it is first necessary to understand where students actually submitted applications, where they were admitted, and where they ultimately decided to enroll. Examining the rates for each of these steps in the college choice process provides an important snapshot of the national rates as well as differences across racial groups as well. Furthermore, understanding these actual rates will

provide context to better understand the rates of undermatch in the next section as actual rates of application, admission, and attendance will have direct impact on the percentage of students who undermatch at these time points.

Application. I aggregated student applications so that each student is only counted as one observation. Each observation represents the application to the most selective institution to which a student applied. Students who submitted applications to four-year institutions in this sample represent 1,801,453 students nationwide. When the normalized weight is applied to represent actual numbers in the sample, this results in 8,350 students who submitted applications to four-year colleges and universities. Since undermatch relies on the selectivity level of the institution, I categorized these applications by level of selectivity based on the modified version of Barron's Competitiveness Index (four categories) that was described in Chapter Three. Table 4.2 displays percentages of students who submitted applications to each selectivity level, disaggregated by racial group and including the national total.

Table 4.2 *Summary of Application for Norm Weighted National Sample, by Racial Group*

*Summary of Application for Norm Weighted National Sample, by Racial Group (n=8,350)**

	Asian (n=470)	Black/African-American (n=1040)	Hispanic (n=1300)	More than one Race (n=600)	White (n=4940)	Nationally (n=8350)
Most/Highly Competitive	52.4	19.0	32.2	29.0	32.2	31.5
Very Competitive	24.3	28.4	27.1	33.4	33.4	31.3
Competitive	21.6	42.7	32.6	34.2	30.3	32.0
Less/Noncompetitive	1.7	9.9	8.1	3.4	4.0	5.2

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

Admit rates: Most/Highly Competitive - up to 50%; Very Competitive - 50 - 75%; Competitive - 75 -85%; Less/Noncompetitive - Top 98%

Source: HSLS:09 restricted data

Nationally, the sample is divided fairly evenly between the Most/Highly Competitive, Very Competitive, and Competitive institutions. This means that the vast majority of students nationwide submit applications to the top three selectivity levels. Only 5.2% of students submit applications to Less/Noncompetitive institutions. Looking at rates across different racial groups reveals different application patterns for different groups at four-year colleges.

According to the 2014 iteration of the Barron's Admissions Competitive Index, the Most/Highly Competitive selectivity level has an admit rate of fewer than half of all applicants (Schmitt, 2015). Within this selectivity level, not all racial groups are applying to these institutions at the same rate. Asian students represent the group with the highest rate of applications for this level, with 52.4% of Asian students submitting their college applications to these institutions. There is a 20.2-percentage point gap between Asian students and White and Hispanic students (both at 32.2%), which are the groups with the next highest percentage. They These groups are followed by multiracial students (29%) and Black/African American students (19%). These rates demonstrate that Asian students are submitting applications to Most/Highly Competitive institutions at more than 1.5 times the national rate (31.5%.

For the Very Competitive selectivity level, the admit rate is 50 to 75% of all applicants (Schmitt, 2015). Within this sample, 31.3% of students submit applications to institutions in this category. Some of the racial groups have similar rates of application as the national sample, with the same percentage of multiracial and White (33.4% each) students submitting their applications here. All the other racial groups submit applications at lower than the national rate for this selectivity level with 28.4% of Black/African American students, 27.1% of Hispanic students, and 24.3% of Asian students choosing to apply to these institutions.

While the deviation between percentage points for each group is smaller, there continues to be variation in the rates of application for Competitive institutions as well. The admit rate for institutions in this selectivity level is 75 to 85%, where at least three-quarters of all applicants are admitted for enrollment (Schmitt, 2015). Black/African American students apply to institutions in this category at the highest rates (42.7%) compared to other groups. Hispanic students (32.6%) and White students (30.3%) have application rates similar to the national rate at 32%. However, only 21.6% of Asian students choose to apply to schools in this selectivity level, which is below the national rate of application.

Finally, even though the admit rate for institutions in the Less/Noncompetitive level is wide open with almost all students being admitted (Schmitt, 2015), few students choose to apply. Even within this category, though, we still see some racial group differences. The group with the highest percentage of students who apply to schools in this level are Black/African American students (9.9%) and Hispanic students (8.1%). These two groups apply to institutions in the Less/Noncompetitive level at higher rates than the national value. In contrast, three groups seek admission to colleges in this category at lower rates than the national percent: White students (4%), multiracial students (3.4%), and Asian students (1.7%).

Looking across the national rate and the various rates of application for each racial group, some trends and patterns become apparent. Asian students tend to submit applications to more selective institutions than any other group in the sample. In contrast, the majority of Black/African American students apply to less selective institutions. White students and multiracial students have similar application rates that mirror the national sample at all selectivity levels. While Hispanic students are similar to the national sample as well, they are overrepresented in applications to Less/Noncompetitive institutions. These application rates

determine differential probabilities for admission for racial/ethnic groups at particular types of colleges.

Admission. Admission to four-year institutions is contingent on students' application rates. Therefore, the sample size for those who were admitted is slightly smaller. The acceptances for each student were aggregated so that each student is only counted as one observation. I selected the most selective institutions to which a student was admitted as the one observation. The students who were admitted to a four-year, baccalaureate-granting institution represent 1,606,575 students across the nation and 7,450 students within the analytical sample. Admission rates for students in this sample are presented in Table 4.3.

Table 4.3 *Summary of Admission for Norm Weighted National Sample, by Racial Group*

*Summary of Admission for Norm Weighted National Sample, by Racial Group (n=7,450)**

	Asian (n=410)	Black/African -American (n=800)	Hispanic (n=1100)	More than one Race (n=540)	White (n=4590)	Nationally (n=7450)
Most/Highly Competitive	44.7	11.3	27.5	21.4	26.7	25.8
Very Competitive	27.4	25.2	22.4	29.4	34.5	31.0
Competitive	24.3	50.0	39.5	42.4	33.9	36.5
Less/Noncompetitive	3.6	13.5	10.6	6.8	4.9	6.7

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

Admit rates: Most/Highly Competitive - up to 50%; Very Competitive - 50 - 75%; Competitive - 75 -85%; Less/Noncompetitive - Top 98%

Source: HSLS:09 restricted data

Similar to the application rates, nationally, the students are somewhat even distributed among the top three selectivity levels. Fewer students were admitted to the Most/Highly Competitive level than applied, but more students were accepted to the institutions in the Competitive selectivity level. While the majority of students were admitted to the top three

levels, there are still 6.7% of the students who were admitted to Less/Noncompetitive institutions as well.

Examining admissions rates to institutions in the Most/Highly Competitive selectivity level, the pattern across race follows the application patterns as well. This makes intuitive sense and is a logical conclusion given that students cannot be admitted to institutions to which they do not apply. The racial group with the highest acceptance rate to this selectivity level are Asian students, with 44.7% of them indicating that they were admitted to an institution in this category. Then, there is a 17-percentage point gap between this group and the group with the next highest rate of acceptance, which is the Hispanic group of students, who have 27.5% admission rate. White students are the only other racial group who have an admission rate (26.7%) above the national rate, which follows their application patterns. Below the national admission percentage are multiracial students (21.4%) and Black/African American students (11.3%). These numbers also make logical sense, given the similar application pattern.

For Very Competitive institutions, just below one-third (31%) of the sample is being admitted to colleges in this category. The only racial group that is being admitted at higher rates than this national rate are White students (34.5%). Multiracial students are virtually on par with the national numbers with 29.4% of students being admitted to Very Competitive institutions. The other racial groups are not being accepted to these colleges at the same rates as the nation or White or multiracial students. Asian students report admission rates of 27.4%, while Black/African American students are accepted at a rate of 25.2%, and 22.4% of Hispanic students are accepted to Very Competitive institutions.

Admission to the Competitive institutions for the national sample is 36.5% of students who applied to four-year colleges. For Black/African American students, half (50%) of their

acceptances occurred at institutions within this category. Multiracial students (42.4%) and Hispanic students (39.5%) also had large proportions of their acceptances come from colleges in this selectivity level. However, for White students (33.9%) and Asian students (24.3%), their admission rates were below the national average for this institutional category.

Finally, even though few students reported applying to Less/Noncompetitive institutions, larger proportions of them report being accepted to these types of schools. This may be due to the fact that applications were aggregated to represent the *highest* selectivity level, thus reducing the number of Less/Noncompetitive applications. While the national rate of admission for this category is 6.7%, Black/African American and Hispanic students have rates higher than the national percentage, with 13.5% and 10.6% respectively. Multiracial students have the same rate of acceptance as the national rate (6.8%), but White students (4.9%) and Asian students (3.6%), are being admitted at lower rates than the other groups and the national rate.

Taking into consideration these admission rates for all the different racial groups, there are some interesting patterns that emerge. Even though Asian students have similar acceptance rates to Very Competitive institutions as other racial groups in the sample, this is largely due to the fact that a large proportion of Asian students are admitted to colleges in the highest selectivity level compared to Black/African American, and Hispanic groups, whose largest proportion of acceptances is to Competitive institutions. Finally, more Black/African American students are being accepted into institutions in the lowest level of selectivity than the highest, which is the opposite for every other racial group and the national percentage.

Attendance. Similar to the relationship between admission and application, the number of students who attend higher education institutions in the sample is contingent upon whether or not they applied and were accepted. This leads to a slightly smaller sample size than the

application and admissions samples. While the application and admissions steps included multiple applications and acceptances, which were aggregated to represent one per student, there is only one institution to which a student attends. Therefore, the enrollment rates for this sample represent 1,416,479 students across the nation and 6,570 students in the normed sample. See Table 4.4 for rates of attendance by racial group and the national rate.

Table 4.4 *Summary of Attendance for Norm Weighted Sample, by Racial Group*

*Summary of Attendance† for Norm Weighted National Sample, by Racial Group (n=6,570)**

	Asian (n=380)	Black/African-American (n=700)	Hispanic (n=920)	More than one Race (n=460)	White (n=4110)	Nationally (n=6570)
Most/Highly Competitive	38.7	5.9	20.8	14.8	19.5	19.0
Very Competitive	30.9	18.8	22.3	21.5	30.7	27.6
Competitive	24.6	58.1	41.5	49.4	41.9	43.1
Less/Noncompetitive	5.9	17.2	15.4	14.3	7.9	10.3

† This sample does not include information on two-year enrollment by institutional identifier. Therefore, unable to determine two-year enrollment within the four-year sample.

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

Admit rates: Most/Highly Competitive - up to 50%; Very Competitive - 50 - 75%; Competitive - 75 -85%; Less/Noncompetitive - Top 98%

Source: HSLS:09 restricted data

Nationally, among students who attended four-year institutions, they attended Competitive institutions at the highest rate with 43.1% of them indicating that they were enrolled in these types of institutions. The fewest percentage of students are attending Less/Noncompetitive institutions (10.3%), which is similar to the rates of application and admission for this selectivity level. Just over one-quarter (27.6%) of students in the national sample are attending Very Competitive institutions, and just below one-fifth (19%) are enrolled at Most/Highly Competitive institutions. Although application rates are roughly evenly distributed, it is clear that the majority of students attend less selective institutions.

Attendance rates for Most/Highly Competitive institutions is dependent on the number of students who applied to and were admitted to these institutions as well. Similar to the application and admission rates, Asians have the highest attendance rate among all the racial groups, with 38.7% of these students choosing to enroll in these types of institutions. Despite the somewhat lower admission rate, 20.8% of Hispanic students attend these highly selective institutions. White students nearly match the national sample with 19.5% reporting that they are enrolled in the Most/Highly Competitive institutions. Multiracial students are just below the national rate with 14.8% of these students attending these colleges as well. Similar to the application and admission rates, Black/African American students attend these institutions at the lowest rates (5.9%).

For Very Competitive institutions, only White and Asian students have higher rates than the national percentage. Nearly one-third of White students (30.7%) and nearly one-third of Asian students (30.9%) attend Very Competitive institutions. Hispanic and multiracial students attend Very Competitive schools at roughly the same rate, with 22.3% and 21.5% respectively. Even though more than one-quarter of Black/African American students were admitted to institutions in this selectivity level, fewer than one-fifth actually attend (18.8%).

With the exception of Asian students, attendance rates for Competitive institutions have the highest percentages among the other selectivity levels. More than half of Black/African American (58.1%) students enrolled in colleges within this level of selectivity. While the other racial groups have high percentages of attendance for schools in this category, there is at least an 8-percentage point gap between these two groups and multiracial students, which is the group with the next highest percentage (49.4%). White and Hispanic students also enroll in schools in this selectivity level at high rates, with 41.9% of White students and 41.5% of Hispanic students

reporting attendance at Competitive institutions. Only Asian students attend colleges in this category at much lower rates, with 24.6% of them indicating they are enrolled in these institutions.

Finally, there is a separate sample of students who are attending two-year institutions as well. Since two-year schools tend to be open access with no substantial application or admissions process, only information regarding enrollment is available. Among all students in the larger analytical sample (n=12,840) who are taking postsecondary classes, Hispanic students attend community colleges at much higher rates than most other racial groups in the sample, with over two-fifths (41.6%) of them enrolled in these institutions. Black/African American and multiracial students also attend two-year colleges at rates above the national percentage (37.3% and 35.6%, respectively), while White students are just slightly below this average in their attendance pattern (30.9%). Finally, Asian (26.8%) students elect to go to community colleges at much lower rates, where around one-quarter of them enroll in these schools. Overall, many students in the analytical sample attend two-year community colleges as their postsecondary educational choice.

When examining patterns across racial groups and selectivity levels for attendance patterns, similar trends arise as did with application and admissions data. Larger percentages of Asian students attend Most/Highly Competitive institutions than any other racial group. All of the other racial groups tend be concentrated in the two selectivity levels that represent the least competitive institutions. In fact, for Black/African Americans students, more of them enroll in Less/Noncompetitive schools than they do in Most/Highly Competitive institutions. This trend is the opposite for Asian, Hispanic, multiracial, and White students. For Black/African American students, the majority of them attend Competitive schools and have rates below the national

percentages in all other selectivity levels. Moreover, these attendance patterns are different for students who choose the community college pathway, with a higher percentage of Hispanic students enrolling in two-year colleges.

In summary, before examining rates of undermatch at different stages in the college choice process, it is important to establish a context of actual rates of application, admission, and attendance. For these three steps, Asian students apply to, are admitted to, and attend the Most/Highly Competitive institutions at much higher rates than the other racial groups and the national percentage. On the opposite end of the spectrum, Black/African American students apply to, are admitted to, and attend Less/Noncompetitive institutions at much higher rates. This large percentage point gap between these two groups reveals the inequity in the opportunity structure in education, where certain racial groups tend to access more selective institutions at much higher rates than other racial groups.

Rates of Undermatch

This section presents findings from the analyses on identifying rates of undermatch for the national sample as well as for the individual racial groups. The section begins with a presentation of results from the ANOVA and post-hoc analyses examining the differences between groups. This is followed by a discussion of access and the identification of access groups for students in the sample. The section concludes with a presentation of findings on rates of undermatch at the application, admission, and attendance stages of the college choice process. These results include both national rates and patterns of undermatch across race.

Mean Differences Across Racial Groups

Before discussing the findings related to academic undermatch, independent sample t-tests and one-way analysis of variance (ANOVA) were conducted in order to determine whether there were differences in the means of access and undermatch for students across each of the five racial groups: Asian, Black/African American, Hispanic, More than One Race, and White. All of the F statistics showed significant between-group differences at $p<.05$, which suggests that there are important differences across racial groups (See Table 4.5). Because of these significant statistics, I conducted Dunnett T3 post-hoc tests to identify where the differences exist. I used Dunnett T3 as the test of multiple comparisons because equal variance is not assumed. Appendix F shows the significant differences between racial groups for access to, application to, admission to, and attendance at four-year institutions. These differences are discussed in the following sections. Based on the findings from the analyses on the mean differences across racial groups, there is evidence to continue the investigation into academic undermatch by race. Since there were many significant differences in the ANOVA analyses and given that these differences existed across all racial groups, it is reasonable that further examination of undermatch is warranted.

Table 4.5 *One-way ANOVA Results – Access and Undermatch*

*One-way ANOVA Results - Access and Undermatch**

		Sum of Squares	df	Mean Square	F	Sig
Access (n=6810)	Between Groups	1263.66	<10	315.92	254.12	***
	Within Groups	8459.66	6810	1.24		
	Total	9723.32	6810			
Application (n=5420)	Between Groups	14.43	<10	3.61	31.51	***
	Within Groups	619.53	5410	0.12		
	Total	633.96	5410			
Admission (n=4880)	Between Groups	8.78	<10	2.19	14.53	***
	Within Groups	735.31	4870	0.15		
	Total	744.09	4870			
Attendance (n=4320)	Between Groups	22.78	<10	5.69	28.00	***
	Within Groups	876.58	4310	0.20		
	Total	899.35	4320			

*p<.05 **p<.01 ***p<.001

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

Source: HSLS:09 restricted data

Access Groups Based on Academic Qualifications

Before presenting the results for academic undermatch at application, admission, and attendance, it is necessary to first examine where students had access or are qualified to attend. This is important because if a student does not have access to schools based on their academic qualifications for a certain selectivity level, then he/she cannot undermatch at that level. Students can only undermatch when they apply to, are admitted to, or attend institutions that are *below* the level of selectivity to which they have access and are qualified to attend. For example, if the highest level of selectivity a student has access to is Very Competitive, then any institution below this level (e.g., Competitive, Less/Noncompetitive, or community college) would be considered an academic undermatch. However, he/she cannot undermatch at a Most/Highly Competitive institution because he/she did not have initial access qualifications.

It is important to consider which institutions students were qualified to apply and attend in order to determine if undermatch occurred. To identify these institutions, students were grouped into access groups based on their high school academic qualifications. For the purposes of this study, these qualifications included SAT/ACT scores, GPA, number of AP/IB credits and the highest level of math completed, as specified in previous undermatch studies (Belasco & Trivette, 2015; Rodriguez, 2013; Smith et al., 2012). Using information from students in the sample on their application and admissions offers, I established four access groups: Most/Highly Competitive, Very Competitive, Competitive, Less/Noncompetitive, and anyone who qualified for a four-year institution, but did not qualify for any of the above categories were considered to be qualified for community colleges. Once students were grouped into access groups, this represented the *highest* level of institutions to which a student had access, or should have applied to, been admitted to, and attended, based on his/her high school credentials. To examine the access groups across race, cross-tabulations were conducted comparing the five access groups with the seven racial groups, including the percentages for the national sample as well. The data were weighted using the normative weight, which resulted in 6,810 students and represents 1,479,374 students across the nation. See Table 4.6 for these results.

Table 4.6 *Percent of Students in each Access Group, by Racial Group*

Percent of Students in each Access Group for Norm Weighted Sample, by Racial Group (n=6,810)

Student Qualifies for:	Asian (n=340)	Black/African-American (n=760)	Hispanic (n=1130)	More than one Race (n=530)	White (n=4050)	Total (n=6,810)
Most/Highly Competitive	20.7	1.0	2.6	5.4	9.1	7.4
Very Competitive	39.5	17.2	25.2	33.2	46.2	38.1
Competitive	30.6	32.3	32.7	34.2	31.1	31.7
Less/Noncompetitive	1.6	5.5	12.4	4.2	2.9	4.8
Two-Year Institutions	7.6	44.1	27.0	23.1	10.6	17.9

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.
Source: HSLS:09 restricted data

In the national sample, students are represented across all five categories, with the majority of students in the middle two levels. Nearly 70% (69.7%) of students nationally have access to institutions identified as Very Competitive and Competitive. Furthermore, only 7.4% have access to Most/Highly Competitive institutions, which is in line with literature stating that the most selective institutions tend to have the highest requirements, which makes it more difficult to gain admission (Schmitt, 2015). Those students whose highest access level is Less/Noncompetitive colleges represent less than 5% (4.8%) of the national sample. Finally, nationally, just under one-fifth (18.1%) of the students qualify for four-year institutions, but do not meet the requirements for the other access groups, so these students have access to community colleges.

Despite the relatively normal distribution (with the exception of two-year colleges), when the access groups are examined across each racial group, there is more variation in the distribution. A large percentage of Black/African American students are only qualified for

community colleges. Almost half (44.1%) of all Black/African American students meet the requirements only for broad, open access institutions. In fact, Black/African American students have the lowest percentage of access to the Most/Highly Competitive institutions, with only 1% having the requisite high school credentials. Nearly half (49.5%) of Black students have access to Very Competitive and Competitive institutions, with a small percentage (5.5%) also having access to Less/Noncompetitive colleges as well. This means that Black/African American students have academic qualifications that concentrate them in less selective or non-selective colleges, with little access to more competitive institutions.

Hispanic students follow a similar pattern to that of Black/African American students. While a higher percentage of Hispanic students have access to more selective schools, over one-quarter (27%) are still only qualified for Two-Year institutions. Furthermore, only 2.6% of Hispanic students have access to Most/Highly Competitive institutions, which is far lower than the national average. Compared to Black/African American students, Hispanic students do have a higher percentage of students who are qualified for Very Competitive and Competitive institutions, with nearly two-thirds (57.9%) belonging to these two access groups. Finally, Hispanic students have the highest percentage of students who qualify for Less/Noncompetitive schools, where 12.4% of them are in this access group, which is much higher than the national sample as well. All of this means that while a higher percentage of Hispanic students have access to the middle selectivity levels than Black/African American students, they are still underrepresented in the Most/Highly Competitive access group and overrepresented in the community college group.

Multiracial students, or students who identify as more than one race have access patterns more similar to that of the national sample. This racial group most closely matches the

percentages in the national sample, with a fairly spread out distribution of access. The majority of students have the qualifications for schools in the Very Competitive and Competitive selectivity levels, and in fact, over two-thirds (67.4%) of multiracial students belong to these two groups. Compared to the national sample, multiracial students are slightly underrepresented at the highest selectivity level with only 5.4% of them having access to Most/Highly Competitive institutions.

In contrast to these other racial groups, two groups stand out as having different patterns of access to postsecondary institutions. The majority of White students (55.3%) have access qualifications to the top two selectivity levels: Most/Highly Competitive, Very Competitive. Furthermore, only 10.6% of them are only eligible for Two-Year schools meaning that nearly 90% of White students have the academic credentials for four-year institutions. Compared to all the other racial groups (except Asian students), White students have lower percentages of students in the last two selectivity levels, with only 13.5% of them belonging to these groups. This is far below the national average (22.7%) and even further below Black/African American students (49.6%) for these two selectivity levels. In other words, White students tend to be concentrated in the access groups that represent the most selective institutions, meaning that a higher percentage of these students have the high school credentials to access institutions in these categories.

Similar to White students, Asian students are also concentrated near the top of the selectivity levels. For Asian students, over 90% (90.8%) have access to institutions in the top three selectivity levels. Furthermore, Asian students have the highest percentage of students who are eligible for colleges in the Most/Highly Competitive level, with one-fifth (20.7%) qualifying for this access group. This means that only 9.2% of Asian students in this sample only have

access to Less/Noncompetitive and Two-Year institutions, which is the lowest percentage across the entire analytic sample. These percentages mean that Asian students are entering the college choice process with the highest percent of students who meet the most stringent requirements. This also means that for the vast majority students in this racial group, if they apply to, are admitted to, or attend any institution below the top selectivity schools, they have more opportunities to undermatch.

In summary, where students have access is an important consideration in order to better understand the patterns of academic undermatch. Black/African American and Hispanic students tend to be concentrated in lower selectivity access groups, thus reducing probabilities for undermatch. If their high school credentials limit the institutions to which they have access, there are fewer selectivity levels to apply to, be admitted to, or attend. In contrast, White and Asian students are concentrated in higher selectivity access groups, which increase opportunities to undermatch. Since these racial groups have access to institutions at the "top," there are more levels to which they can apply, be admitted to, and attend, which allows for more chances to academically undermatch. These patterns of access are necessary to consider because they will affect the rates of undermatch not only for the entire sample, but will influence these rates by racial group as well.

Undermatch

Given students' access to certain levels of selectivity, based on their high school academic qualifications, we can examine rates of undermatch at the application, admission, and attendance steps in the college choice process. Access groups play an important role in not only determining individual undermatch but also in examining undermatch rates across the sample. If a student does not have access to the most selective institutions and still applies there, this would

not be defined as undermatch because these institutions are not below where a student qualifies. The definition of undermatch is when a student is qualified or has access to a certain level of selectivity, but applies to (or is admitted to or attends) a level *below* his/her access group. Therefore, if students do not have access to the most selective institutions, their rates of undermatch will be low, to match their qualifications. The following section presents findings from the analysis on academic undermatch for the national sample and across racial groups for the application, admission, and attendance stages in the college choice process.

Nationally. In the nationally representative sample for all students who sought postsecondary education at a baccalaureate-granting institution, the rates of undermatch at all three steps is relatively high at highest selectivity institutions. Table 4.7 presents findings from the weighted national sample at the application stage, based on students' access groups and their submitted applications.

Table 4.7 *Extent of Academic Undermatch at Application*

*Extent of Academic Undermatch at Application for Norm Weighted National Sample (n=5,420)**

	Students Applied to Campuses:					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Non competitive	Total (by application)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	79.9	12.9	7.2	-	9.2	20.1
Very Competitive	42.2	34.6	20.6	2.6	43.7	23.2
Competitive	17.0	36.6	41.3	5.0	30.9	5.0
Less/Noncompetitive	12.2	25.3	47.4	15.1	4.6	†
Two-Year Institutions	8.5	26.5	53.2	11.7	11.6	†
Total (by access)	32.6	31.9	30.7	4.7	100.0	16.2

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

† As two-year institutions are open-access, there is no competitive application process. Given the operationalization of undermatch at application, these percentages cannot be determined.

Source: HSLS:09 restricted data

At the application stage, 16.2% of students undermatch by applying to institutions below their qualifications. This rate is lower than previous studies (Belasco & Trivette, 2015; Dillon & Smith, 2013; Hoxby & Avery, 2013) that found that the majority of academic undermatch occurs at the application stage. While these studies found that up to 70% of students undermatch at application (Belasco & Trivette, 2015; Dillon & Smith, 2013), this study found that the majority of undermatch is not at the application stage. However, at application, of those who had access to Very Competitive institutions, nearly one-quarter (23.2%) of them still undermatched by applying to less selective schools.

At the admission stage, the rate of undermatch was higher than at the application stage for the national sample. It is also important to note that the undermatch rate at admissions takes into consideration the application rate as well. In other words, of those students who actually *applied*, more of them were undermatched at admission than at application. The sample size gets smaller as well since, admission is based on those who applied. While previous studies of academic undermatch examined undermatch at the application and attendance stages, this is the first study to also investigate undermatch at the admission stage. This is an important distinction because the "choice" to undermatch is not made by the student as in where to apply or attend, but this decision is made by the institution. At this step in the college choice process, it is the institution that selects students for admission, therefore, any undermatch at this step is the responsibility of the institution and the admissions committee. Students are not electing to attend less selective institutions, they are not being admitted in the first place, even if they are academically qualified. This confirms that selective colleges use other criteria beyond academics when making admissions decisions. They are looking for more "well-rounded" students with extraordinary accomplishments as well, such as volunteer work, artistic talent, or starting a

business, to name a few (Bastedo & Flaster, 2014). Table 4.8 presents findings from the national sample on rates of undermatch at the admissions stage.

Table 4.8 *Extent of Academic Undermatch at Admission*

*Extent of Academic Undermatch at Admission for Norm Weighted National Sample (n=4,880)**

	Students Admitted to Campuses:					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Non competitive	Total (by admittance)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	72.4	17.6	10.0	-	10.2	27.6
Very Competitive	32.3	38.4	26.2	3.1	46.5	29.3
Competitive	10.1	33.5	48.7	7.6	30.9	7.6
Less/Noncompetitive	3.9	13.4	57.5	25.2	4.2	†
Two-Year Institutions	2.8	15.3	61.5	20.4	8.2	†
Total (by access)	25.9	31.8	35.7	6.5	100.0	21.4

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.
† As two-year institutions are open-access, there is no competitive admission process. Given the operationalization of undermatch at admission these percentages cannot be determined.
Source: HSLS:09 restricted data

In total, 21.4% of students were undermatched at this step, where much of the undermatch occurs for students who have access qualifications for the top two selectivity levels. Nearly 30% of each group (27.6% for Most/Highly Competitive, 29.3% for Very Competitive) of students who had access to the highest selectivity schools were undermatched in their admissions. This means that despite their high qualifications, postsecondary institutions did not admit these students and instead, were accepted to less-selective schools. Similar to the application stage, undermatch at admissions is based on the most selective institution to which students gained admission.

At the attendance stage, the rate of academic undermatch for the national sample is much higher than the other stages in the college choice process. Similar to the admission step, attendance rates are contingent on application and admission to institutions, therefore, attendance

rates reflect only those students who *applied* and were *admitted.* Table 4.9 presents findings on the national rate of undermatch at attendance, based on students' access qualification groups.

Table 4.9 *Extent of Undermatch at Attendance*

*Extent of Academic Undermatch at Attendance for Norm Weighted National Sample (n=4,320)**

	Students Attended Campuses:					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Non competitive	Total (by attendance)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	57.3	23.6	16.8	2.3	11.3	42.7
Very Competitive	21.3	35.0	38.3	5.4	48.1	43.7
Competitive	4.3	26.1	57.2	12.5	29.8	12.5
Less/Noncompetitive	0.7	10.5	44.2	44.6	3.6	†
Two-Year Institutions	0.1	11.9	60.2	27.8	17.9	†
Total (by access)	18.0	28.5	43.3	10.2	100.0	33.2

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

† This sample does not include information on two-year enrollment by institutional identifier. Therefore, unable to determine percent undermatch within the four-year sample. A separate two-year analysis is included later in the chapter.

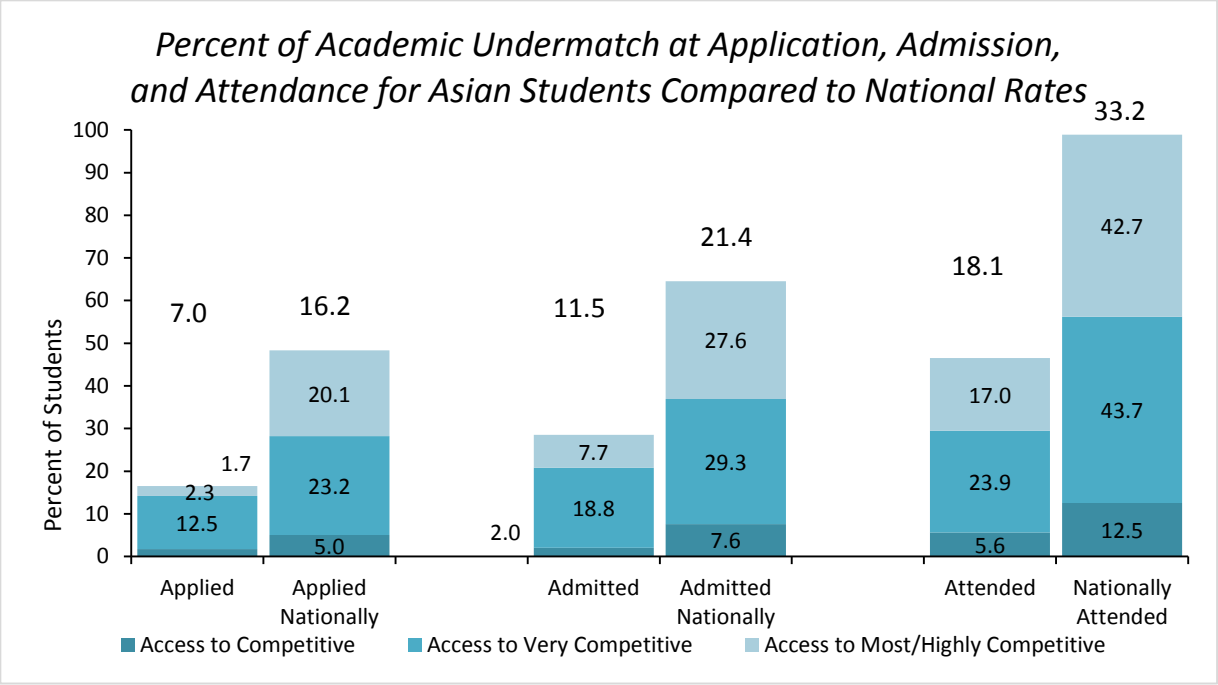
Source: HSLS:09 restricted data

Slightly lower than previous studies on academic undermatch (Bowen et al., 2009; Smith et al., 2013), this study found nearly one-third (33.2%) of students undermatch at attendance. This means that despite applying to and being admitted to appropriately matched institutions, students are "choosing" to attend lower selectivity institutions than their qualifications would indicate. This may be due to financial constraints, lack of information, or uninformed guidance (to name a few). Again, the majority of undermatch occurs for students who have access qualifications at the two levels of most selective schools, where just over two-fifths (42.7% for Most/Highly Competitive, 43.7% for Very Competitive) of all students that are qualified for these levels academically undermatch and enroll elsewhere.

In summary for the nationally representative sample, despite the hypothesis that the rates of undermatch would be similar to previous studies, the findings from this analysis reveal *lower* levels of undermatch at the application and attendance stages. This might be an indication that since earlier studies (Bowen et al., 2009; Roderick et al., 2009), there has been an increase in national attention devoted to access and issues of college choice and match.

Asian students. For Asian students in the sample, their rates of undermatch are lower than the national sample at all three steps in the college choice process. Figure 4.1 presents academic undermatch rate for Asian students in the sample compared the national sample (See Appendix E for tables with complete percentages). The rates of undermatch presented in the chart represent Asian students who had access to each selectivity level, yet applied to, were admitted to or attended institutions below these levels. The total undermatch rate for all the access levels is presented above each bar. For instance, 2.3% of Asian students who had access to the Most/Highly Competitive institutions actually undermatched at application. However, the total rate of academic undermatch for Asian students is only 7%, which is less than half of the national rate at application (16.2%). Furthermore, for Asian students, most of the undermatch at application occurs for students who have access to Very Competitive institutions (12.5%).

Figure 4.1 *Percent of Undermatch Among Asian Students*

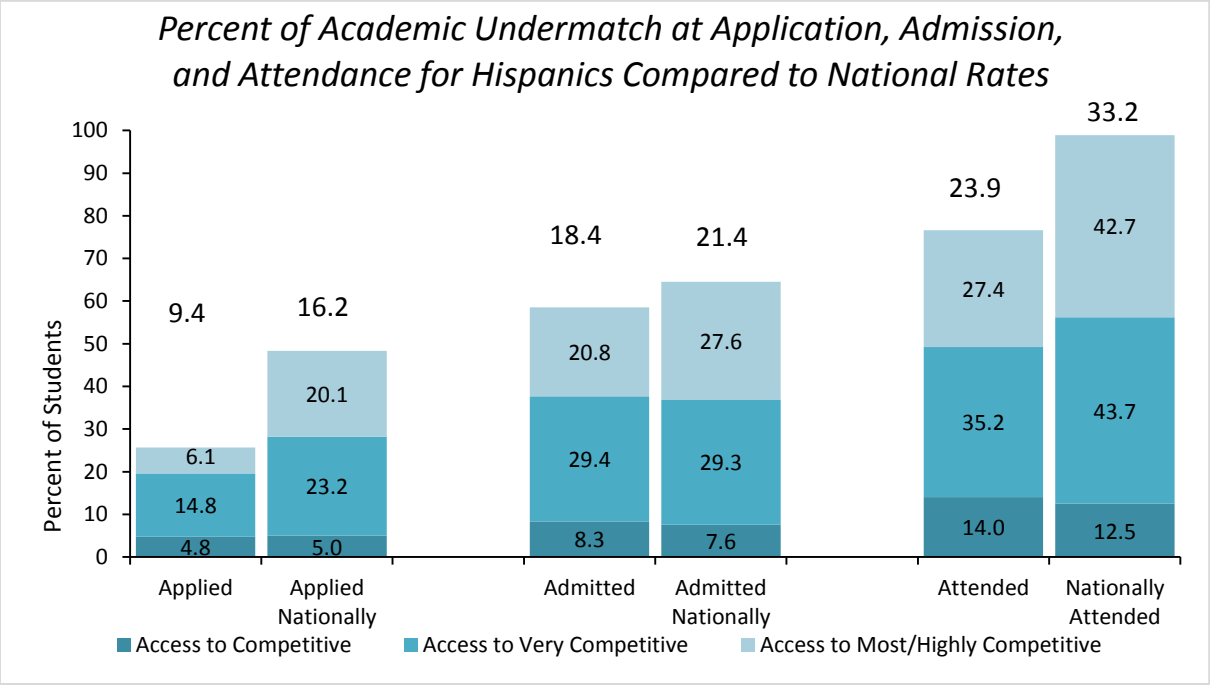


Similarly, at the admissions stage, Asian students are far less likely to academically undermatch here as well. Compared to the national rate, Asians students are half as likely to undermatch in admissions, with only 11.5% of them doing so. Like the application step, most of this undermatch occurs for students who have access to Very Competitive institutions, yet are admitted to less selective schools. Finally, with regards to attendance, Asian students have slightly higher percentages at this stage than the other two stages, but still much lower than the national rate. At attendance, 18.1% of Asian students undermatch in their final choice of college enrollment. While this percentage is slightly lower than the percentage in previous studies that included examinations of race (Smith et al., 2013), the general pattern holds where Asian students have lower rates of undermatch in general (Belasco & Trivette, 2015; Smith et al., 2013).

In summary, Asian students are less likely to undermatch at all three stages than any other racial group, and in comparison, to the national sample. One possible reason for these low rates of undermatch is due to the fact that Asian students have the highest percent of students who qualify for the most selective schools (see previous section on Access). This means that higher percentages of students qualify for the Most/Highly Competitive and Very Competitive institutions, so when they apply to, are admitted to, and attend these types of schools, they would be considered a "match." The higher percent of students who "match" reduces the percentage of students who undermatch, thus lower their overall rates at all three steps. Another potential reason for these low rates of undermatch is the tendency for many Asian students and their families to pay more attention to rankings and academic reputation as important factors in the college choice process (Teranishi, 2010; Teranishi et al., 2004). This means that as Asian students favored institutions with better academic reputations, they were more likely to apply to and attend these types of institutions. It is important to note, however, that these broad findings for Asian students in general mask important within group variation among Asian ethnicities, where Southeast Asian and Filipino students tend to focus more on costs and financial aid instead of reputation and rankings (Teranishi, 2010; Teranishi et al., 2004).

Hispanic students. Hispanic students also have relatively low rates of undermatch the application stage, compared to somewhat higher rates at the admission and attendance stage. Figure 4.2 presents academic undermatch rates for Hispanic students in the sample compared the national sample (See Appendix E for tables with complete percentages).

Figure 4.2 *Percent of Undermatch Among Hispanic Students*



The rates of undermatch presented in the chart represent Hispanic students who had access to each selectivity level, yet applied to, were admitted to or attended institutions below these levels. The total undermatch rate for all the access levels is presented above each bar. For instance, at application, only 9.4% of Hispanic students undermatch in deciding where to apply to college. This rate is much lower than the national rate and it is lower at every access qualification level as well. While the vast majority of Hispanic students who have access qualifications for Most/Highly Competitive institutions applied to these same institutions (which is a "match"), there was still a small percentage (6.1%) that applied to Very Competitive schools. For Hispanic students who had access qualifications to Very Competitive institutions, they undermatched at only 14.8%.

At the admissions stage, the rates of undermatch are slightly higher than at application, but still below the national percentages. Even though the rates of undermatch at admissions for

Hispanic students is below the national rates, the percentages are much closer here, with only a 3 percent point gap. With 18.4% of Hispanic students experiencing undermatch at the admissions stage, this means that academically qualified students are not gaining admissions to appropriately matched schools, despite their profiles and efforts. For Hispanic students, this phenomenon affects students who have access to the top two selectivity levels where Hispanic students are qualified to attend schools in these groups, yet are being turned away.

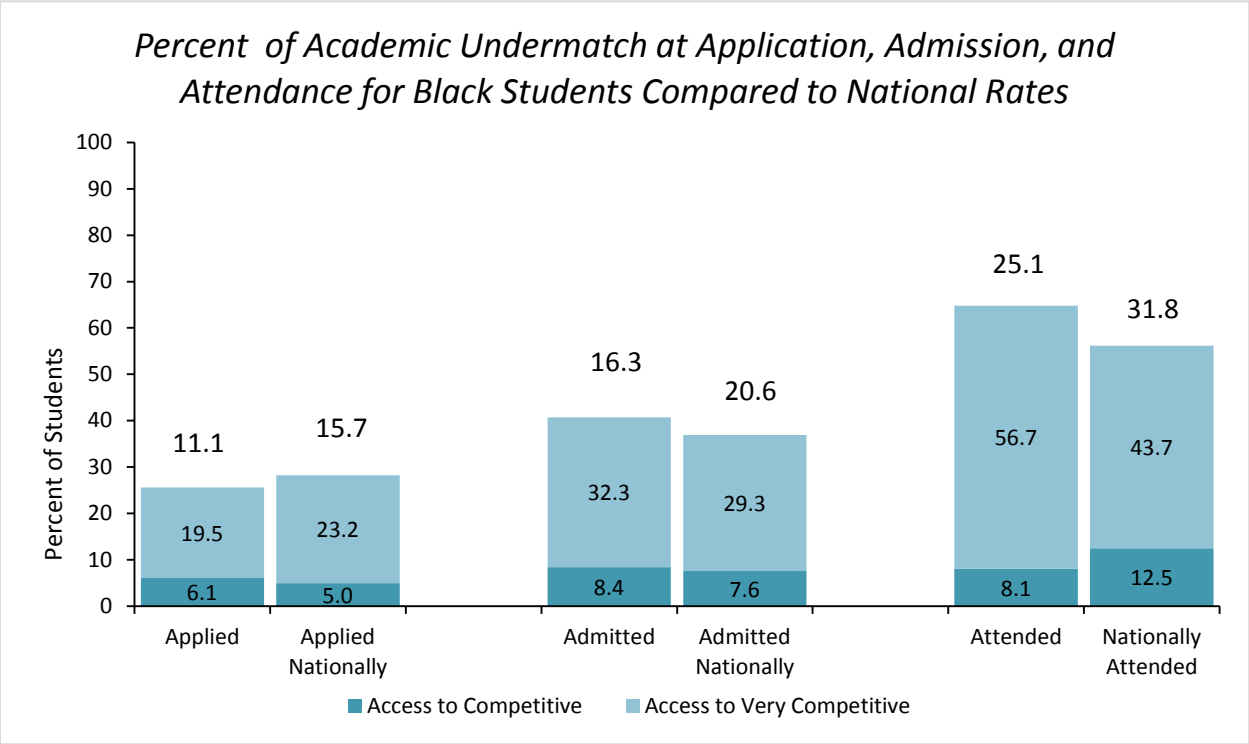
Finally, at the attendance stage, Hispanic students continue to have lower rates of undermatch, compared to the national sample. In this study, over one-fifth (23.9%) of Hispanic students undermatched in their decision on which college to attend. This rate is below other studies that have found Hispanic students to undermatch at much higher rates than their peers (Bowen et al., 2009; Goodwin, 2015; Roderick et al., 2009), yet is consistent with other studies that have found Hispanics to have lower rates of undermatch (Belasco & Trivette, 2015; Smith et al., 2013). While Hispanic students who have access to the highest levels of selectivity have lower undermatch rates, students in the Competitive access groups (which are in the middle of the selectivity categories) actually undermatch at a higher percentage compared to the national sample (14% for Hispanics, 12.5% nationally). This means for Hispanic students who are eligible to attend Competitive institutions are choosing to enroll in Less/Noncompetitive schools in greater rates than the rest of the nation. However, this may be due to the high numbers of Hispanic students that choose to attend community colleges, which will be discussed later in this chapter.

Black/African American students. Similar to Hispanic students, Black/African American students also have relatively low rates of undermatch but there are important differences based on the selectivity of the institutions. Figure 4.3 presents academic undermatch

rates for Black/African American students in the sample compared the national sample (See Appendix E for tables with complete percentages). The rates of undermatch presented in the chart represent Black/African American students who had access to only Competitive and Very Competitive institutions, yet applied to, were admitted to or attended institutions below these levels. The total undermatch rate for all the access levels is presented above each bar. Due to the small number of Black/African American students who had access to Most/Highly Competitive institutions (n=8), the undermatch rates are only based on students who had access to Competitive and Very Competitive institutions. For comparative purposes, the national rate presented in Figure 4.3 only includes percentages for students who met the qualifications for these two selectivity levels as well. At the application stage, 11.1% of Black/African American students undermatch, which is four percentage points lower than the national average. Nearly one-fifth (19.5%) of Black/African American students who qualified for Very Competitive institutions applied to colleges below this selectivity level.

At the admissions stage, a similar pattern emerges where the overall rate of undermatch is relatively low, but for students with access to Very Competitive institutions, it is higher than the national average. At admissions, 16.3% of Black/African American students do not gain admission to schools that match their academic qualifications. However, for students who are in the Very Competitive access group, their admissions undermatch rate is 32.3%, which is higher than the national rate. This means that among Black/African Americans, academically qualified students are experiencing undermatch at the higher rates and nearly one-third of them are not being admitted to their appropriately matched schools.

Figure 4.3 Percent of Undermatch Among Black/African American Students



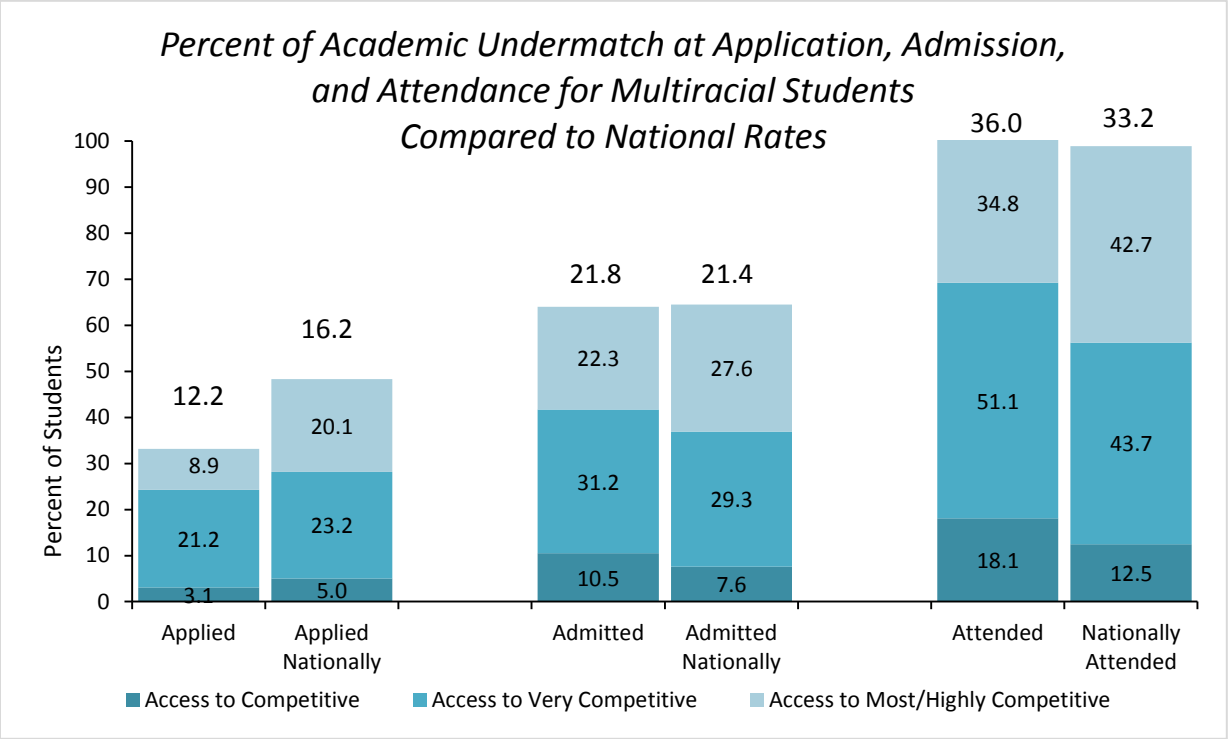
Finally, at the attendance stage, Black/African American students continue to have lower undermatch rates in general compared to the rest of the nation. While one-quarter (25.1%) of Black/African American students undermatch at attendance, this is still lower than the national average of 31.8% for the nation. This trend is similar to the findings in some studies that found that Black/African American students undermatched at lower rates (Belasco & Trivette, 2015; Smith et al., 2013) and contrary to other studies that found that this group of students had higher rates of undermatch (Bowen et al., 2009). It is still important to note, though, that of the students who have access to Very Competitive schools, over half (56.7%) of them still undermatch at attendance and the 11% of this undermatch is substantial, where they attend institutions two levels below where they are qualified (as defined by Smith et al., 2013). This means that even though many Black/African American students are qualified and eligible to attend selective

schools, they are attending institutions that are not only less selective, but ones that are two levels below their matched schools. This is an important distinction because it means that academically talented Black/African American students are not attending the appropriately matched institutions, which tend to promote higher retention and completion rates (Bowen & Bok, 1998; Bowen et al., 2009; Roderick, 2006).

Students who identify as more than one race. For students who identify as more than one race (multiracial), their rates of undermatch at all three steps in the college choice process are relatively similar to the national rates. Figure 4.4 presents academic undermatch rates for multiracial students in the sample compared the national sample (See Appendix E for tables with complete percentages). Similar to the charts for the students from the other racial groups, the rates of undermatch presented in the chart represent multiracial students who had access to each selectivity level, yet applied to, were admitted to or attended institutions below these levels. The total undermatch rate for all the access levels is presented above each bar.

At the application stage, among multiracial students, 12.2% choose to apply to colleges below their match selectivity. This is slightly lower than the national average (16.2%), but most of the difference occurs for students who have access to the Most/Highly Competitive institutions. Among these students, only 8.9% undermatch at application; this is less than half the rate for this same group in the national sample (20.1%). This means that among multiracial students with access to the most selective institutions, the vast majority of them are applying to appropriately matched schools.

Figure 4.4 Percent of Undermatch Among Multiracial Students



Among multiracial students at the admissions stage, 21.8% experience undermatch in the schools where they are accepted. This overall rate is on par with the national rate, yet a similar pattern to the application findings emerges as a lower percentage of multiracial students with access to the most selective institution undermatch than nationally (22.3% and 27.6%, respectively). However, multiracial students who have access to Competitive institutions have slightly higher rates of undermatch at admissions (10.5% compared to 7.6% nationally).

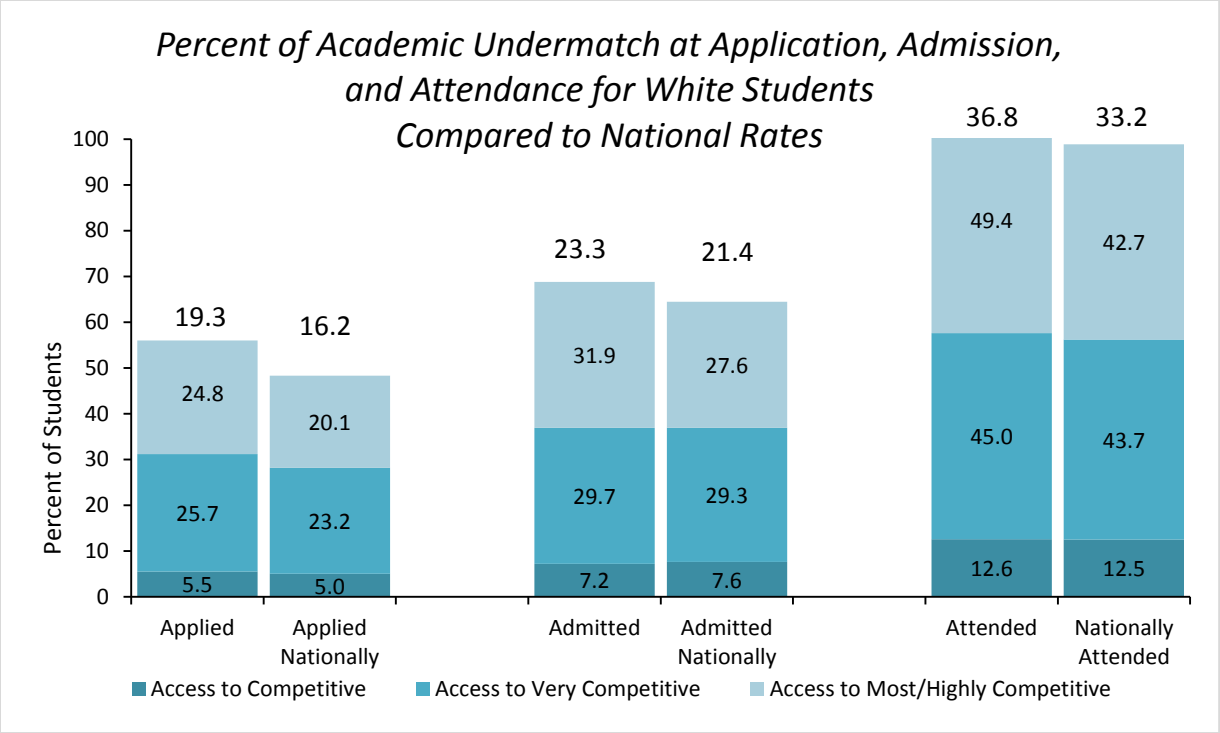
At the attendance stage, over one-third (36%) of multiracial students undermatch in their decision on where to enroll. Similar to the previous two steps, there is some important nuance, however, among students with access to Most/Highly Competitive and Very Competitive institutions. While a lower percentage (34.8%) of multiracial students with access to the most selective schools undermatch at attendance than the nation (42.7%), a higher percentage (51.1%)

with access to Very Competitive schools undermatch at this stage. This means that among students in the Very Competitive access group, over half of them elect to attend schools below their matched selectivity. Overall, despite the similarities between multiracial students and the national average, there are important nuances that emerge when examining the different types of schools students have access to. It is possible that some of this distinction exists because of the ways that multiracial students identify racially. Because multiracial as a broad term can encompass anyone who identifies with more than one race, there are a variety of different races and different racial experiences that are included. For instance, research has shown that historically, education has not served Black/African American students in an equitable or similar way as some Asian students (Adelman, 2006; The College Board, 2008; Whang Sayson, 2015). However, included in the multiracial category, there could be students who identify as Black/African American and others who identify as Asian. Their lived racial experiences may influence their educational outcomes, thus producing a wide variety of undermatch rates. Therefore, it is important to acknowledge the nuance *within* this racial category as an important consideration for interpretation. While the dataset used for this analysis does not allow for the identification of the different groups each student identifies with in their multiracial background (multiracial was a separate racial category on its own), future studies should explore this nuance further.

White students. For White students in the sample, their rates of undermatch are only slightly higher at all three stages in the college choice process. Figure 4.5 presents academic undermatch rates for White students in the sample compared the national sample (See Appendix E for tables with complete percentages). The rates of undermatch presented in the chart represent White students who had access to each selectivity level, yet applied to, were admitted to or

attended institutions below these levels. The total undermatch rate for all the access levels is presented above each bar.

Figure 4.5 *Percent of Undermatch Among White Students*



Among White students, nearly one-fifth (19.3%) undermatch at the application stage, which is only three percentage points higher than the national sample (16.2%). For White students in all access groups at the application step, the rates of undermatch are only slightly higher than the nation, but in general, the percentages are roughly the same.

At the admissions stage, the same pattern as the application stage emerges. Among White students, nearly one-quarter (23.3%) of them undermatch in where they are accepted for higher education. Again, this is only slightly higher than the national average (21.4%), yet there is a little more nuance at the admissions stage. Among White students who have access to the

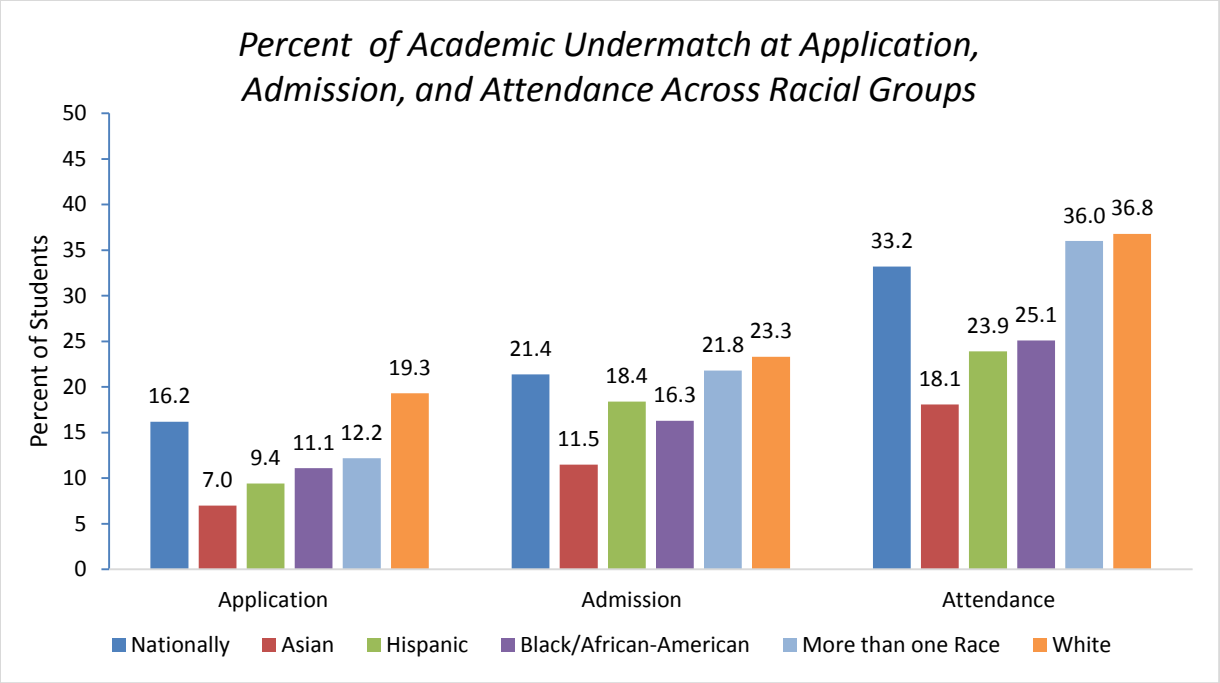
Most/Highly Competitive institutions, 31.9% experience undermatch at admissions. This is higher than the nation (27.6%), but this means that for White students with access to the most selective schools, they are not gaining admission at the same rate as the rest of the country. For the other two selectivity levels at the admissions stage, the percentage of students who undermatch is nearly identical to the national percentage.

Among White students at the attendance stage, over one-third (36.8%) undermatch in deciding where to enroll. While this rate is slightly higher than the nation, nearly all of this difference occurs among students with access to the most selective schools. Nearly half (49.4%) of White students in this access group choose to attend schools that are below their matched selectivity, whereas only 42.7% of the national sample elect this route. The finding that in general, White students undermatch at attendance at relatively high rates is both similar to and challenges previous undermatch studies that included racial identity. Some studies (Belasco & Trivette, 2015; Smith et al., 2013), found that White students were more likely to undermatch than other racial groups, while other studies found that Black/African American and Latino students undermatched at higher rates (Bowen et al., 2009; Goodwin, 2015; Roderick et al., 2009). This study found that White students had higher rates of undermatch than Asian, Hispanic, Black/African American, and multiracial students at all three stages in the college choice process.

Summary of Undermatch by Race. Looking across racial groups, at the application stage in the college choice process, students undermatch at rates between 7% and 19.3% (See Figure 4.6). Asian students have the lowest rate of undermatch at application, and White students have the highest rate for this same time point. Hispanic (9.4%), Black/African American

(11.9%), and multiracial (12.2%) students had relatively low rates as well and were all below the national average.

Figure 4.6 *Percent of Undermatch Across Racial Groups*



At admissions, Asian students again had the lowest undermatch rate (11.5%) and White students had the highest rate (23.3%). Black/African American students (17.2%) experience undermatch a slightly lower rate than Hispanic (18.4%) students, but are still below the national percentage (21.4%), and multiracial students have roughly the same rate of undermatch (21.8%) as the nation.

At attendance, Asian students continue to undermatch at the lowest rate, and 18.1% is far below the national percentage (33.2%). This finding matches previous literature that found that Asian students were less likely to undermatch than any other racial group (Belasco & Trivette, 2015; Smith et al., 2013). Both Hispanic (23.9%) and Black/African American students (25.8%)

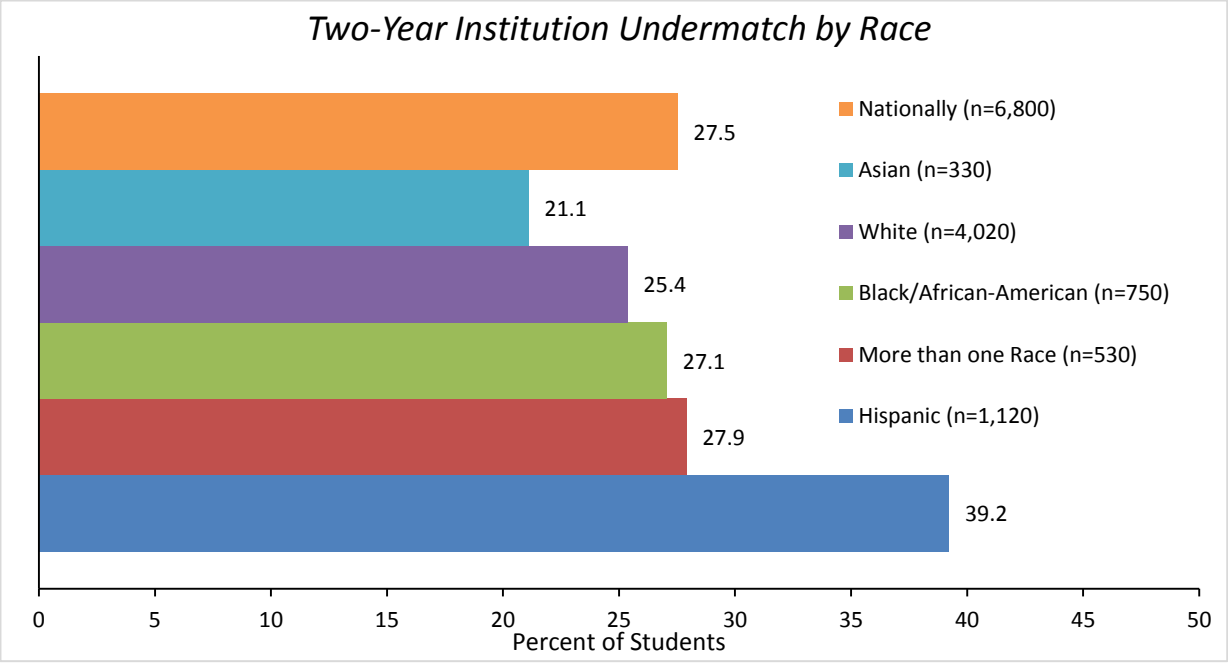
also undermatch at attendance at much lower rates, and are significantly below the national average. While this finding is in line with more recent research on undermatch (Belasco & Trivette, 2015; Smith et al., 2013), it is contrary to earlier findings regarding these two racial groups (Bowen et al., 2009; Roderick et al., 2009). Multiracial (36%) and White students (36.8%) undermatch at this stage at higher rates than Asian, Hispanic, and Black/African American students, but are slightly above the national percentage. Given the wide range of undermatch rates across racial groups and for the national sample at different time points in the college choice process, more attention needs to be given to the nuances of undermatch for different populations of students. Given the high rates for certain groups calls into question the specific ways that these groups experience college choice and requires greater consideration of the needs of these students.

At the attendance time point in the college choice process, there is also information regarding students who are eligible to attend baccalaureate-granting institutions, but enroll in community colleges. While this may be defined as undermatch, it is also important to note that many students attend community colleges as an alternative path to the baccalaureate-granting institution (Hilmer, 1998; Long & Kurlaender, 2009), so interpreting all of these cases as examples of undermatch at attendance may overestimate the rate of undermatch by institutional level. However, Figure 4.7 also presents attendance undermatch rates for students attending schools seeking their Associate's Degree.

At the national level, just over one-quarter (27.5%) of all students who meet the qualifications for a baccalaureate-granting institution enroll at community colleges. Asian students continue to have the lowest percentage of undermatch, with only 21.1% of them attending two-year institutions. Contrary to the undermatch at four-year institutions by

selectivity level, White students have much lower rates of undermatch (25.4%) when it comes to attending community colleges. In fact, besides Asian students, White students have the lowest undermatch attendance rate by institutional level. Black/African American students and Multiracial students have undermatch rates similar to the national percentage, with around one-quarter of them attending community colleges (27.1% and 27.9%, respectively). While Hispanic students have relatively low rates of attendance undermatch in terms of selectivity, when it comes to institutional level, Hispanic students have the highest percentages (39.2%) of students who are eligible for four-year institutions, yet enroll in two-year colleges. These institutional level undermatch rates reveal that patterns of undermatch at attendance not only differ by racial group and by institutional selectivity, but there are also a variety of differences when examining students who pursue their Associate's Degree. While the purpose of this study is not to understand the specific reasons students choose to enroll in certain institutions, it is important to note patterns in enrollment behavior to shape and inform future research dedicated to this task.

Figure 4.7 *Percent of Undermatch at Two-Year Colleges, by Racial Group*



CHAPTER 5 : FINDINGS ON PREDICTORS OF UNDERMATCH

This chapter presents the findings from the HGLM analysis on the relative influence of the school counseling program on academic undermatch. I conducted three distinct, parallel HGLM models to examine the school counseling program as a contextual predictor of undermatch at the application, admission, and attendance stages. The analytical model included four student-level concepts (and related measures), which follow the structure of Perna's (2006) Multi-Contextual Student College Choice conceptual model: human capital, habitus, social capital, and cultural capital. Two additional concepts were added to the models as school-level categories (Level 2 in HGLM), which were based on Engberg and Gilbert's (2014) Counseling Opportunity Structure conceptual model: counseling norms and counseling resources. An additional set of concepts for the school-level context included measures related to undermatch from the literature, specifically school resources and college-going culture. All these concepts had predictor measures hypothesized to affect student undermatch at the application, admission, and attendance phases of college choice.

The chapter begins with a brief description of the analytical sample used for the multilevel models (HGLM), including findings from the variance analysis and a description of how the models were constructed. This is followed by a presentation of findings from the HGLM analyses predicting the likelihood of undermatch at application, admission, and attendance. The section concludes with a comparison across final models, including a discussion of findings across racial groups.

Description of the HGLM Models

A detailed description of the variables included in the multilevel models was presented in the Methods section in Chapter Three. Before introducing any individual- or school-level controls, students are engaging in many experiences that would support their application and attendance in postsecondary institutions, such as having high aspirations, talking to parents about college, and participating in college information-related activities. However, the findings from the previous chapter on rates of undermatch reveal that there are still relatively high rates at all three steps in the college choice process. Given this reality and despite the efforts to attend higher education, indicators such as low percentage of time counselors spend on college preparation or lack of college-designated personnel indicate that maybe the support students receive is not enough to make informed decisions on their postsecondary endeavors. The following sections will present results of the HGLM analysis to help establish a better picture of the students who experience undermatch in the college choice process.

Each of the hierarchical generalized linear models (HGLM) was built in a series of steps at both the student-level (Level 1) and high school-level (Level 2). Initially, an unconditional model was run to gauge the variance without any predictors. At Level 1, seven blocks of variables were entered following Perna's (2006) conceptual model and to ensure that measures related to Human Capital, Habitus, Social Capital, and Cultural Capital were reflected in successive steps. At Level 2, four blocks were entered following Engberg and Gilbert's (2014) conceptual model relating to school counseling. This resulted in successive blocks of measures related to school characteristics, school population, Counseling Norms, and Counseling Resources. The tables with the complete twelve steps for each model (application, admission, and attendance) can be found in Appendix G. In addition, several cross-level interaction effects

were included in the models to test for the influence of racial background on counseling characteristics, but none emerged as significant.

Coefficients represent the unit-specific coefficients and findings are reported as delta-p statistics, using the methods recommended by Petersen (1985) and Cruce (2009). Delta-p values represent the difference in probability of a student undermatching at application (Model 1), admission (Model 2), or attendance (Model 3) associated with a one-unit change in the predictor variable. For dichotomous predictors, the delta-p statistic represents the difference in probability of undermatch (at application, admission or attendance) for a student with that characteristic compared to a student without it (e.g., Asian vs. not Asian).

For a multilevel model with a continuous dependent variable, the intra-class correlation (ICC) is utilized to determine the amount of variance in the outcome that is attributed to Level Two effects, or high school differences. However, since the dependent variables in this study are dichotomous, an alternative ICC calculation was used (Equation 3 in the Chapter 3) for all three HGLM models. With a dichotomous outcome variable, the individual-level variance is heteroscedastic, which reduces the accuracy of the ICC for these types of models (Raudenbush & Bryk, 2002). To account for this, each model was run as a fully unconditional model with no predictors to determine the significance of the variance component at Level Two. Table 5.1 shows the variance component, standard deviation, chi-square statistic, and significance for each of the models. The significance of all three models at $p<.001$ of the chi-square statistic suggests that there is variance across high schools and therefore, the use of HGLM is warranted.

Table 5.1 *Between-School Variance in Probability of Undermatch*

Description of Between-High School Variance in Students' Average Probability of Undermatch

	Variance Component	S.D.	Chi-Square	Sig.
Model 1: Undermatch at Application	1.085	1.042	1657.82	***
Model 2: Undermatch at Admission	0.926	0.962	1609.17	***
Model 3: Undermatch at Attendance	0.760	0.872	1561.21	***

*p<.05 **p<.01 ***p<.001

Source: HSLS:09 restricted data

Furthermore, results for the full multilevel models for Model 1 (Application Stage), Model 2 (Admission Stage), and Model 3 (Attendance Stage) are presented in Table 5.2.

Results for Undermatch at Application Stage

Using the alternative calculation method to compute the ICC mentioned in the last section resulted in an estimate of .248. This means that an estimated 24.8% of the variance in students undermatch at application might be attributable to high school-level effects. After controlling for all student- and school-level variables, a few human capital and social capital independent variables emerged as significant predictors at the individual level and one school counseling program variable was also significant. For instance, as students anticipate increasing ways to fund their college education, they are less likely to undermatch at application. This finding is supported in previous undermatch studies where financial aid and funding are important considerations in undermatch (Smith et al., 2012). However, in terms of costs, for every $1,000 increase in the cost of college (before financial aid), students are 1.02 percentage points *less* likely to undermatch. This runs counter to undermatch literature that has found that students do not apply more selective institutions partly due to relatively high tuition (Avery & Hoxby, 2004; Dillon & Smith, 2013; Hurwitz et al., 2012; Monks, 2009; Smith et al., 2012).

Despite the body of undermatch literature that linked likelihood of undermatch to socioeconomic status (SES) with lower SES students having a higher proclivity to undermatch (Belasco & Trivette, 2015; Bowen et al., 2009; Dillon & Smith, 2013; Hoxby & Avery, 2013; Roderick et al., 2009, 2011; Rodriguez, 2013; Smith et al., 2103), this study did not find a statistically significant relationship between application undermatch and SES. SES did not emerge as a significant predictor in any of step in the model-building (see Appendix G for all the steps), suggesting that other predictors in the model emerged as more significant.

With regard to demographic and background characteristics, none emerged as significant in the full multilevel model. While Asian and Black/African American students were significantly less likely than White students to undermatch with only Level 1 predictors in the model, once school-level characteristics entered (specifically with school population covariates), these race variables were no longer significant. This may mean that the variance between racial groups on an individual level was captured in school-level variables that examined school population characteristics. Even though Rodriguez (2015) specifically examined racial differences at the application stage and found that White students undermatched the most, in the multivariate analyses, this study did not find any significant differences in the sample with regard to the likelihood of undermatch at application. Numerically, however, White students were more likely to undermatch, as demonstrated in the crosstab analyses presented in the previous chapter.

Only one social capital (Level 1) variable was significant in the final multilevel model, indicating the importance of engaging in a variety of activities related to gaining college knowledge. Specifically, for every additional college preparation activity that a student participated in, he/she was 7.58 percentage points less likely to undermatch at application. This

not only makes intuitive sense, but it is also supported in the literature where students who have access to college information are less likely to undermatch (Bowen et al., 2009; Dillon & Smith, 2013; Smith et al., 2012; Venegas, 2006). While two other variables were significant in the Level 1 model, once Level 2 predictors entered the model, these variables hypothesized to affect application undermatch were not statistically significant at the final stage. One such variable related to whether or not students met with a counselor specifically about college admissions. This variable had a positive relationship to the likelihood of application undermatch, meaning that a student who met with their counselor was *more* likely to undermatch. However, once school characteristics entered the model (control, locale, type), this variable fell out of significance. This suggests possible indirect effects where the interaction between students and school counselors is mediated by characteristics of the school. While the purpose of this study is not to examine the quality of the interactions between students and counselors, it is disconcerting that any interaction with school counselors leads to undermatch for students. The other variable that dropped out of significance once Level 2 variables entered is the number of people students talked to about going to college. What is interesting about this variable is that it also has a positive relationship with application undermatch in the Level 1 model. This means that for every additional person a student talked to about college, the likelihood of undermatch at application *increased* by 9.02 percentage points, but their school counseling environments change this probability (Full Model). One potential reason may have to do with whom the students are having these discussions. While the variable is a count of people students talk with that includes parents, peers, and teachers, there is no control for the quality of information or the educational background or preferences of these individuals. Undermatch research highlights that information gaps in college knowledge for students may be a reflection of whom they are getting

information from, where there is the possibility of lack of information, preferences, or availability to provide such information (Smith et al., 2012).

At the school level, only one variable representing Counseling Norms emerged as a significant predictor of academic undermatch at the application stage. The percent of hours that school counselors spend on college readiness, selection, and application has a negative correlation with application undermatch. This means that the more time counselors devote to college preparation, the less likely students they interact with experience undermatch at application. This makes intuitive sense since more focus on providing college counseling services should lead to more informed decision-making by students. This notion is also supported by research on college counseling where school counselors have been shown to have a positive impact on increasing college opportunities and influencing the college choice process (Gándara & Bial, 2001; Hawkins, 2003; King, 1996; McDonough, 1997, 2005a, 2005b; Plank & Jordan, 2001; Venezia & Kirst, 2005). While the research suggests that other aspects of the counseling program have an impact on the college choice process for students, no other counseling measures were statistically significant in this model. For instance, even though counselor caseload has been the topic of discussion in many school counseling-related research (McDonough, 1997, 2005a; Perna et al., 2008; Pham & Keenan, 2011), this measure was not a significant predictor of application undermatch. The fact that only one counseling-related variable was significant in the final model may be an indication that undermatch is related to other school-level aspects not captured in this study or that the operationalization of the school counseling program is not inclusive of the ways in which counseling and undermatch occurs. Additionally, it may also indicate that counselors with higher caseloads are more strategic in how they work with students who also have outside college support, such as examining student GPAs

to target high ranking students for the best opportunities. Since their caseloads are higher, they are unable to provide quality services to all students, so they strategically provide the best opportunities to the top students.

Results for Undermatch at Admission Stage

Following the alternative calculation method to compute the ICC mentioned earlier in this chapter resulted in an estimate of .220. This means that an estimated 22.0% of the variance in undermatch at the admissions step might be attributable to high school-level effects. At the full multilevel model, several Human Capital, Social Capital, and Cultural Capital variables at the individual level, and school population, Counseling Norms and Resources at the school level emerged as significant predictors of admissions undermatch. Similar to application undermatch, both Human Capital measures, anticipated funding and the cost of college were significant in the final model. It is interesting to note that these two variables related to costs and funding college were significantly related to students' lower likelihood of undermatch. Even though students who better understand their financial situations and are realistic about their choices are more likely to be admitted to a matched institution, it is important to acknowledge that undermatch at the admissions stage relies primarily on decisions made by the institutions. Considering previous undermatch literature (Belasco & Trivette, 2015; Bowen et al., 2009; Dillon & Smith, 2013; Hoxby & Avery, 2013; Roderick et al., 2009, 2011; Rodriguez, 2013; Smith et al., 2013) has focused on undermatch as a function of student choice and not institutional selection, there is no literature related to undermatch at the admissions stage. Because this study also included the admissions stage, it is possible to examine institutional selection in the undermatch process.

Even though no demographic or background characteristics were statistically significant in the final model, it is interesting to note that before school-level variables were introduced to

the model, students who identified as Black/African American were less likely to undermatch than their White peers. However, once Level 2 variables entered the model (see Appendix G for statistics on all steps), this race variable was no longer significant. This may mean that where Black/African Americans go to school and their characteristics of the college-going environments explain matching for admissions. This makes sense since college recruiters often target schools where there is an established relationship and higher probability of student admission to their institution. With regards to Social Capital variables, only one measure was significant in both the Level 1 and full multilevel models: the number of college preparation activities in which the student participated. Specifically, for each additional activity that a student engaged in related to college preparation, he/she was 7.08 percentage points less likely to undermatch at the admissions stage. This means that more college-related activities, such as taking a college-level class or talking to high school counselors, the higher probability a student has of being admitted to a "match" school. This may be related to the amount, types and quality of college information and resources available to students. Specifically, literature suggests that students who have access to college information and college preparatory opportunities are less likely to undermatch (Belasco & Trivette, 2015; Bowen et al., 2009; Dillon & Smith, 2013; Smith et al., 2012; Venegas, 2006). Furthermore, since undermatch at the admissions stage is largely the result of *institutional* decision-making, it is possible that more selective institutions are taking into consideration more than academic qualifications when making admissions decisions (Hearn & Holdsworth, 2005; Kaufman & Gabler, 2004).

In terms of Cultural Capital and its relative impact on undermatch at admissions, there was only one variable that was significant in the final multilevel model. The further in school the student aspires, in terms of degree objective, the *more* likely they are to experience academic

undermatch at admissions. This finding is counter to previous research that found that postsecondary expectations where students expected to earn at least a baccalaureate degree were less likely to undermatch (Belasco & Trivette, 2015). With this study, it is possible that students have expectations for further education and graduate degrees, yet their admissions status is based on their undergraduate application process. Even though they endeavor to pursue education beyond the baccalaureate (the sample mean is the pursuit of a Master's Degree), they are earning undergraduate admission to schools that are below their qualification levels. Alternatively, selective institutions leave many able and high-aspiring students out of the selection process because they take relatively fewer students than less selective colleges and universities.

At the high-school level, four school covariates were statistically significant in the full multilevel model. For example, for every one unit increase in the percentage of students taking Advanced Placement classes in high school, students were .82 percentage points *more* likely to experience admissions undermatch. While on the surface, this finding seems counterintuitive because more of the study body taking AP classes contributes to the college culture, which leads to students being less likely to undermatch (Belasco & Trivette, 2015; Roderick et al., 2011; Rodriguez, 2013). However, this finding actually fits within the undermatch literature. Research has found that students attending competitive high schools, often indicated by the percentage of students taking AP classes, are less likely to gain admissions to elite colleges because it is more difficult to "stand out" in this secondary educational environment (Espenshade, Hale, & Chung, 2005; Wolniak & Engberg, 2007). Therefore, in this study, when AP course enrollment increases, undermatch at admissions is more likely due to the competitive high school environment.

The other school-level variables that were significant were related to the school counseling programs at the high schools. Similar to the model predicting undermatch at application, the percentage of time counselors spend devoted to college preparation negatively contributes to the likelihood of undermatch. In other words, the more hours school counselors spend on college-related activities, the less likely students are to experience undermatch at admissions. This may be due to the fact that students are applying to better "matched" schools because they are more informed by the specific attention school counselors are devoting to college. Furthermore, for every additional college entrance exam-related activity offered by the school, students are 24.22 percentage points *less* likely to undermatch at the admission stage. This may be due to the fact that students are more prepared and knowledgeable about entrance exams, such as the ACT and SAT, and are therefore seeking admission from schools with similar entrance exam scores. Schools and counseling programs that offer exam support may be helping students to increase their exam scores, thus encouraging them to apply to and eventually gain admission to more selective schools. Since SAT/ACT scores are an important eligibility requirement and predictor of elite college admissions (Espenshade et al., 2005), higher scores will allow students access to more selective institutions. Finally, the last variable to emerge as significant in the final model was whether or not high schools organized student visits to colleges. Specifically, students who attend schools that organize student visits to college campuses are 12.53 percentage points *more* likely to undermatch at admissions than students who attend schools without this opportunity. This finding is interesting as it seems counterintuitive in that exposure to colleges has been shown to increase college enrollment (Bridgeland & Bruce, 2011b). However, in this case, it also increases the likelihood of admissions undermatch. It is possible that students visit various campuses and make their

college decisions based on other criteria besides academics. Visiting campuses may provide students with information regarding the social environment, athletics, location, aesthetics of the institution, etc. that drive their decision to apply, therefore impacting their admissions as well. Furthermore, the literature has found that students who connect with postsecondary institutions through activities such as college tours and visits still need additional support to inform their decision-making process (Bridgeland & Bruce, 2011b). This suggests that students visiting colleges are attracted to other aspects of the campus besides academics, but may lack the necessary guidance to include this attraction in their decisions in a balanced and informative manner.

Results for Undermatch at Attendance Stage

Using the alternative calculation method to compute the ICC resulted in an estimate of .188, which means that an estimated 18.8% of the variance in undermatch at attendance might be attributable to high school-level effects. After controlling for student-level variables at Level 1 and school-level variables at Level 2, some Human Capital variables emerged as statistically significant in the full multilevel model. Similar to the application and admission models, funding and costs are significant predictors of undermatch. For example, for every unit increase in anticipated funding, the probability of undermatch at attendance *decreases* by 11.93 percentage points. This means that as students expect different sources and more funding to pay for their postsecondary education, they are more likely to attend institutions that match their academic profile. Specifically related to attendance, this finding fits in the undermatch literature that found that financial aid and expectations for funding decrease the likelihood of students undermatching at the enrollment stage (Smith et al., 2012). In terms of costs, however, this study found that at the higher cost institutions in their choice set, students' likelihood of academic undermatch is

lower at attendance. This finding may seem counterintuitive because with high cost choices, students may choose to attend less selective institutions that may be less expensive. However, higher cost institutions have more resources and specific financial plans targeted for low- and middle-income families. While this finding is counter to the research that indicates that students do not enroll in more selective institutions in part because of relatively high tuition (Avery & Hoxby, 2004; Dillon & Smith, 2013; Hurwitz et al., 2012; Monks, 2009; Smith et al., 2012), the role of these financial plans and increased funding expectations may encourage students to attend more expensive selective schools.

It is important to highlight that socioeconomic status (SES), specifically being in the third quintile (approximately $55,000- $75,000), was significant in steps previous to the full multilevel model. This means that students who are in the third SES quintile were more likely to undermatch at attendance than students who were in the highest quintile, or students from the highest SES bracket. For example, in the block just before the full multilevel model, students in the third SES quintile were 20.27 percentage points more likely to undermatch at attendance than the highest SES students. However, when measures related to Counseling Resources entered at the final step, this SES variable was no longer significant. This means that Counseling Resources provided at the school level may be mediating the direct effects of SES on the likelihood of undermatch at attendance.

While no demographic or background variables emerged as significant in the final model, it is important to note that in the Level 1 only model, identifying as Black/African American was statistically significant. It was only when the Level 2 school counseling variables entered the model that this race variable was no longer significance. This means that part of the relationship

between identifying as Black/African American and attendance undermatch is accounted for when Counseling Resources measures enter the model.

With regards to Cultural Capital measures in the model, only one variable emerged as a significant predictor: how far in school the student would want to go. For every one degree increase (e.g., earning a Bachelors' to earning a Master's), the likelihood of undermatch at attendance increases by 11.55 percentage points. This translates to the more education a student aspires to achieve, the more likely they are to undermatch in their choice of undergraduate institution. While previous literature indicates that students who have higher academic expectations for themselves are less likely to undermatch (Belasco & Trivette, 2015), the findings from this study suggest an indirect relationship between student aspirations and Counseling Norms at the school level. Once the block with Counseling Norms enters the model, the coefficient measuring student educational aspirations increases, thus signaling that student aspirations would have a larger effect on the likelihood of undermatch were it not for the fact that Counseling Norms suppresses this impact. It is possible that high aspiring students are more likely to undermatch because while they want to continue their education in the future, they tend to be in high schools where their counselors have higher caseloads or focus on attending colleges after high school, with little attention given to education beyond that level.

Among the school-level predictors, only one covariate measure was statistically significant. A student attending a private (including Catholic) high school is 17.43 percentage points *less* likely to undermatch at the enrollment stage. Given the disparity in resources between private schools and public schools (McDonough, 1997), this finding makes logical sense. Better resourced schools are able to provide more college-related opportunities such as a rigorous, college preparatory curriculum, quality school counseling programs, and a campus climate

focused on postsecondary attendance (Gándara, 2002; McDonough, 1997, 2005a; Oakes & Guiton, 1995; Perna, 2005; Perna & Kurban, 2013). While many public schools are able to also provide these services to some degree, they also contend with fewer resources and have competing, additional responsibilities, such as discipline and funding shortages, which makes it more difficult to focus solely on college counseling (ASCA, 2005; Bridgeland & Bruce, 2011b; Corwin et al., 2004; Hugo, 2004; McDonough, 2005a; Paisley & McMahon, 2001; Perna et al., 2008; NACAC, 2008).

In addition to the school-level covariate, several school counseling variables were also significant in the full multilevel model. Similar to the previous models predicting undermatch at application and admissions, the percent of hours spent on college readiness, selection, and application is an important measure related to undermatch at attendance. The more time school counselors spend on college preparation, the less likely students are to undermatch in their choice of school to attend. Only one previous study included time on task measures related to school counseling dosage (Goodwin, 2015). This study did find a significant relationship between the time counselors spent on college counseling and the odds of undermatch, yet these results were only apparent for counselors who spent between 21% - 49% of their time on college counseling. This relationship did not hold for counselors who spent 50% or more of their time on this same task. Therefore, the findings from this current study on the significant relationship between the hours counselors spent on college preparation and the likelihood of undermatch is the first time this relationship is empirically validated.

Another interesting finding that emerged in the full multilevel model for undermatch at attendance is the relationship between the average caseload for school counselors and the probability of undermatch. For every 50-student increase in a counselor's average caseload,

students are 4.32 percentage points *less* likely to undermatch at attendance. This finding appears to be counterintuitive and not aligned with some of the recent counseling literature. Research has shown that lower student-to-counselor ratios are associated with increased college attendance and better college planning (McDonough, 1997; Pham & Keenan, 2011). It is possible that even though school counselors want to provide quality college counseling services to their students (Bridgeland & Bruce, 2011a), they are unable to provide this level of quality, given higher caseloads (Bridgeland & Bruce, 2011a, Perna et al., 2008). Given this reality and this constraint, school counselors may be more targeted in their efforts by providing college counseling to a small number of students. Previous literature has suggested that counselors are less helpful than teachers and that high school counseling systems are a "weak" effort to increase college enrollment (Johnson & Rochkind, 2010) because counselors target their college counseling to students who are already on track to attend elite colleges (McDonough, 1997).

In examining the counseling norms that emerged as significant in the final model, the primary goal of the counseling program had a positive relationship with the probability of undermatch at attendance. This means that students who are in high schools where the primary goal of the counseling program is to help students prepare for postsecondary schooling are 15.54 percentage points *more* likely to undermatch at attendance. Similar to the relationship between average caseload and attendance undermatch, this finding appears to be counterintuitive. One possible explanation is that while supporting students in preparing for higher education is the professed priority, the reality of their daily working lives prevents them from executing this priority. Since school counselors are tasked with a multitude of competing responsibilities, such as class scheduling, testing, and crisis management to name a few (ASCA, 2005; Bridgeland & Bruce, 2011b; Corwin et al., 2004; Hugo, 2004; McDonough, 2005a; Paisley & McMahon,

2001; Perna et al., 2008; NACAC, 2008), they are unable to fully practice and enact the central priority of the counseling program and adequately provide college counseling services.

Finally, one variable related to Counseling Resources was statistically significant in the full multilevel model. For every additional service or activity related to entrance examination preparation, students were 23.66 percentage points *less* likely to undermatch at the attendance stage. In corroboration with the research, students who are better prepared and have better exam scores have more access to more selective institutions (Espenshade et al., 2005; Schmitt, 2015). This means that higher exam scores allow students to access a wider array of institutions, thus it is possible that students are choosing to attend "match" institutions and therefore, undermatch rates decrease. Furthermore, as counseling programs offer various exam services, this contributes to college counseling services, where students receive more information and support related to their postsecondary endeavors (Hill, 2008; Plank & Jordan, 2001).

Comparing Results Across Models

Table 5.2 presents the model statistics for the full multilevel models for each of the three outcomes.

Table 5.2 *Results from HGLM Models Predicting Undermatch*

Results from Final HGLM Models Predicting Undermatch at Application, Admission, and Attendance

	Application Stage (n=1,140 students, 560 high schools)				Admission Stage (n=1,080 students, 540 high schools)				Attendance Stage (n=1,000 students, 520 high schools)			
Variable	Coefficient	SE	Sig	Δ-p	Coefficient	SE	Sig	Δ-p	Coefficient	SE	Sig	Δ-p
Fixed effects												
Student-Level Predictors of Undermatch												
Human Capital: Supply of Resources												
SES† Lowest Quintile (ref: Highest Quintile)	1.049	0.889			1.237	0.856			0.721	0.812		
SES† Second Quintile (ref: Highest Quintile)	-0.266	0.682			-0.163	0.632			-0.116	0.568		
SES† Third Quintile (ref: Highest Quintile)	0.692	0.516			0.722	0.494			0.872	0.460		
SES† Fourth Quintile (ref: Highest Quintile)	-0.302	0.506			-0.072	0.456			0.469	0.372		
Anticipated Funding	-0.575	0.275	*	-14.20	-0.585	0.252	*	-14.48	-0.480	0.222	*	-11.93
Human Capital: Expected Benefits & Costs												
Importance of cost of attendance	-0.038	0.266			-0.153	0.249			0.160	0.215		
Importance of job placement	-0.056	0.270			-0.150	0.254			-0.182	0.239		
Importance of graduate school placement	0.043	0.233			-0.019	0.220			0.000	0.202		
Importance of particular program	0.456	0.328			0.167	0.293			0.021	0.249		
Teen thinks studying in high school rarely pays off later with good job	0.017	0.224			-0.165	0.208			-0.060	0.184		
Cost of current college before financial aid	-0.041	0.016	*	-1.02	-0.046	0.015	**	-1.14	-0.045	0.012	***	-1.10
Estimated cost of tuition/mandatory fees for college	-0.256	0.396			0.012	0.098			-0.014	0.103		
Habitus: Demographics & Background Characteristics												
Sex	0.225	0.373			0.341	0.358			0.124	0.301		
Racial Background: Asian	-1.529	0.930			0.068	0.636			-0.485	0.542		
Racial Background: Black/African American	-2.057	1.129			-1.653	0.918			-1.317	0.733		
Racial Background: Hispanic	-1.292	0.953			-1.008	0.790			-0.644	0.640		
Racial Background: More Than One Race	-0.363	0.813			-0.255	0.755			-0.506	0.716		
First language 9th grader learned to speak	0.121	0.277			-0.187	0.265			0.176	0.224		
Social Capital: Sources of Information about College												
Count of college preparation activities	-0.304	0.150	*	-7.58	-0.284	0.137	*	-7.08	-0.134	0.114		
Has met with high school counselor about college	0.702	0.419			0.582	0.404			0.640	0.378		

admissions											
Has met with high school counselor about financial aid in 2012-2013 year	-0.008	0.332		0.098	0.319			0.068	0.282		
Count of having ever participated in a college access program	0.328	0.379		0.415	0.359			0.256	0.319		
Social Capital: Networks											
How many friends plan to attend 2-year college	0.090	0.108		-0.001	0.102			-0.137	0.094		
How many friends plan to attend 4-year college	-0.053	0.192		-0.046	0.194			0.150	0.180		
Person who has had most influence on thinking about education after HS	-0.028	0.117		0.022	0.111			0.148	0.097		
Count of people student talked to about going to college	0.344	0.185		0.296	0.168			0.225	0.146		
9th grader talked to school counselor about going to college	0.293	0.429		0.229	0.394			0.307	0.339		
How often discussed applying to college/other schools after high school	0.076	0.225		0.104	0.215			0.080	0.188		
Cultural Capital: Value of College Attainment											
How far in school teenager would like to go	0.335	0.211		0.400	0.197	*	9.60	0.500	0.186	**	11.55
How far in school parents would like teenager to go	-0.235	0.144		-0.116	0.137			0.005	0.122		
What students think parents think is most important: continue education	-1.586	0.852		-1.442	0.834			-0.791	0.788		
Importance of academic quality when choosing college	0.308	0.408		0.282	0.372			-0.116	0.320		
Cultural Capital: Cultural Knowledge											
Count of cultural capital activities	-0.032	0.104		-0.014	0.096			0.041	0.083		
School-Level Predictors of Undermatch											
School Characteristics (Covariates)											
Private Control (Reference: Public)	0.278	0.407		0.099	0.373			-0.705	0.326	*	-17.43
School locale (urbanicity)	0.196	0.181		0.077	0.166			0.134	0.144		
School type: Regular school (not charter, magnet, or alternative)	1.364	1.525		1.406	1.209			1.255	0.807		
School Population (Covariates)											
% of student body receiving free or reduced-price	0.016	0.013		0.008	0.015			-0.001	0.011		

lunch												
% of student body enrolled in Advanced Placement courses	0.023	0.016			0.033	0.015	*	0.82	0.019	0.012		
% White students	0.019	0.010			0.015	0.009			0.009	0.007		
% of 08-09 seniors who went to 4-year Bachelor's-granting institution	0.001	0.012			-0.005	0.012			0.000	0.010		
Counseling Norms												
Average caseload for school's counselors	-0.068	0.086			-0.072	0.076			-0.175	0.067	**	-4.32
% hours spent on college readiness/selection/apply	-0.436	0.208	*	-10.84	-0.519	0.191	**	-12.89	-0.451	0.171	**	-11.21
School has counselor designated for college selection	-0.366	0.901			0.426	0.846			1.171	0.786		
School has counselor designated for college applications	0.381	0.849			-0.440	0.824			-0.637	0.760		
Primary goal of counseling program: college prep.	0.197	0.412			0.418	0.386			0.694	0.327	*	15.54
Composite score of counselor expectations	-0.155	0.196			-0.096	0.191			0.184	0.180		
Counseling Resources												
Count of college information support activities	-0.386	0.369			-0.102	0.354			0.074	0.312		
Count of financial aid support activities	0.231	0.146			0.214	0.133			0.199	0.103		
Count of college entrance exam support activities	-0.690	0.445			-1.013	0.416	*	-24.22	-0.973	0.388	*	-23.66
School organizes student visits to colleges	0.607	0.462			0.893	0.433	*	12.53	0.339	0.363		
School assists students with finding financial aid for college	-0.512	0.712			-0.365	0.694			-0.340	0.576		
School consults with postsecondary reps about requirement/qualifications	-0.139	0.939			0.080	0.913			0.279	0.866		
Intercept	-3.517	2.382			-3.478	2.079			-2.942	1.844		
Variance Component (S.D.)	0.446	0.668	***		0.521	0.722	***		0.243	0.493	*	
Reliability	0.079				0.107				0.068			
-2 Log Likelihood	1615.10				1479.65				1399.24			

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

*p<.05 **p<.01 ***p<.001

When looking across HGLM models, there are few similarities among the variables when predicting undermatch at application, admission, and attendance. In terms of student-level predictors, anticipated funding and the cost of tuition were significant predictors in all three models. Both of these measures have negative relationships to the undermatch variables meaning that as students anticipate increased funding opportunities, they are less likely to undermatch. Conversely, as the costs of college increase (based on the cost of their current college, including tuition and fees before financial aid), students are also less likely to undermatch at all three levels. This reveals that costs and financing of education continue to be considerations for students when making decisions related to their postsecondary futures (Avery & Hoxby, 2004; Heller, 1997; Kane, 1999; Long, 2004; Manski & Wise, 1983; Noeth & Wimberly, 2002; St. John, 1994). However, contrary to the literature on undermatch, socioeconomic status (SES) was not a significant predictor in any of the models. Previous studies indicated that SES was the strongest predictor of academic undermatch, where students from lower SES backgrounds undermatch at higher rates (Belasco & Trivette, 2015; Bowen et al., 2009; Dillon & Smith, 2013; Hoxby & Avery, 2013; Roderick et al., 2009, 2011; Rodriguez, 2013; Smith et al., 2103). However, this study found no significant relationship between SES and undermatch in the full multilevel models for application, admission, nor attendance. At the attendance stage, one dummy variable indicating the third SES quintile was significant until Counseling Resources entered the model. Using this as an indicator, it is possible that SES did not have a significant relationship to the likelihood of undermatch because it is being mediated through other measures, thus reducing any effect on undermatch to an indirect effect. For instance, SES is associated with the types of schools that students attend. Specifically, low-income students are more likely to attend low-resourced schools in impoverished neighborhoods

in a new form of segregation by class status (Kucsera & Orfield, 2014; Logan et al., 2012; Martin et al., 2005; Orfield et al., 2012; Yun & Moreno, 2006). Furthermore, the quality of school counseling programs tends to improve with higher SES of the students (Auwarter & Aruguete, 2008; Savitz-Romer, 2008). This means that the school environment and counseling context are mediating the effect of SES on undermatch, thus relegating it to more of an indirect effect that can be tested in the future.

The number of college preparation activities that students engage in also had a negative relationship to undermatch in all of the models. This means that as students engage in more activities and experiences related to preparing them for postsecondary education, the less likely they are to undermatch. However, this measure was only significant in the application and admission models, and did not emerge as significant in predicting the likelihood of attendance. Because this variable is related to activities a student engages in to *prepare* for college, such as taking a college tour or preparing for an entrance exam, it is less relevant to deciding where to actually enroll. Once students have completed these steps, it may be that these preparation activities no longer provide them with information related to their best "match" for enrollment.

Interestingly, one student-level measure emerged as a significant predictor of undermatch at admissions and attendance, but not at application. The variable that asks students their educational goals had a positive relationship with the outcome for all three models, but was not significant for application. This means that the more education students want to attain, the more likely they are to undermatch at admissions and at attendance. One possible explanation for this is students who have high aspirations for themselves apply to appropriately matched schools to provide them with opportunities to continue their education after they have earned their baccalaureate. But, for some reason, they are not gaining admission to these institutions, and

instead, are getting into less selective institutions, therefore causing undermatch to occur at admissions. If they are undermatched at admissions, they will also be undermatched at attendance as well.

When looking across models at school-level predictors, several measures had different relationships with the outcome variables. One covariate that emerged as significant was school control (private), which was discussed earlier in this section. Another covariate measure was significant only in the admissions model where students who attended high schools with greater percentages of the student body enrolled in Advanced Placement (AP) courses were more likely to undermatch at admissions. One reason that this variable may not have been significant in the probability of undermatch at application is that students who attend schools with higher percentages of students who take rigorous classes, such as AP courses, tend to apply to more selective schools given the school culture of college preparation and readiness (Belasco & Trivette, 2015; McDonough, 1997; Roderick et al., 2011; Rodriguez, 2013). Therefore, these students are likely applying to appropriate matched schools. However, earning admissions among this competitive pool is more difficult since some admissions criteria consider class rank as an important metric (Espenshade et al., 2005; Wolniak & Engberg, 2007). Therefore, if many students are taking AP classes, they will all be competitive and eligible, yet only a few of them will be admitted to the most selective schools. This would lead to students being admitted to less selective institutions, thus leading to undermatch at the admissions stage.

In terms of school counseling program predictors, the percentage of hours school counselors spent specifically devoted to college readiness, selection, and application was significant in all three models. This means that the more time school counselors dedicate to college preparation, the less likely students are to undermatch in their application decisions,

admissions notifications, and attendance choices. This finding supports the literature that says that students who have counselors who provide direct services and take an active role in administering college counseling tend to enroll in college and make more informed decisions in the college choice process (Gándara & Bial, 2001; Hawkins, 2003; King, 1996; McDonough, 2005a, 2005b; Plank & Jordan, 2001; Venezia & Kirst, 2005). Logically, this finding makes sense as well; if more time is devoted to providing college information and support in the college choice process, students will be more informed and be able to make decisions based on guidance and information, thus leading to lower levels of undermatch.

Similar to the percentage of hours spent on college preparation is the variable indicating the primary goal of the counseling program. Despite its similarity to the hours spent on college counseling (more hours spent college counseling leads to an increased focus and priority on college preparation), this item was only significant in predicting undermatch at attendance. Furthermore, this measure has a positive relationship with attendance undermatch, meaning that counseling programs that prioritize college preparation lead to students who are more likely to undermatch at attendance. While this study is unable to determine the reasons that lead to the positive relationship between a college preparatory counseling program and undermatch, future research should explore the types of services and quality of counseling that these types of school counseling programs provide. Furthermore, research should seek to better understand why this measure is more important and significant to the likelihood of undermatch at attendance and not for application or admission.

Surprisingly, the variable measuring the average counseling caseload was only significant in the model predicting attendance. Counseling research consistently highlights the importance of low student caseloads in order for school counselors to be effective in their jobs (McDonough,

1997; Pham & Keenan, 2011). However, the caseload variable is negatively related to undermatch in all three models, meaning that as the average caseload *increases*, the likelihood of undermatch *decreases*. Furthermore, this relationship is only significant in predicting undermatch at attendance. While this finding is disconcerting, a possible explanation may be the quality of services school counselors are able to provide, given their high caseloads. With higher caseloads schoolwide, it is possible that school counselors are better able to "sort" students and serve more as "gatekeepers" as has been suggested in previous critiques of school counselors (Johnson & Rochkind, 2010; Kitsuse & Cicourel, 1963; Rosenbaum, 1976). It is also possible that counselors with higher average caseloads are able to share some of the college counseling responsibilities with counselors designated solely to college counseling support. Since two-fifths of the analytic sample indicated that they had counselors designated for this purpose, they may be able to share these responsibilities.

Finally, previous literature has indicated that there are racial differences not only in the rates of undermatch (Belasco & Trivette, 2015; Bowen et al., 2009; Roderick et al., 2011; Rodriguez, 2013; Smith et al., 2013), but also in the extent to which school counseling programs impact certain students (Bridgeland & Bruce, 2011b; Lee & Ekstrom, 1987; Plank & Jordan, 2001). However, none of the interaction effects tested in this study resulted in statistically significant differences, suggesting that there were no differences across racial backgrounds with regards to the effect of counseling programs once one accounts for all measures in the model. One reason for this absence of a significant finding may be due to the way access was operationalized in the study. Only students who applied to, were admitted to, or attended institutions below their access group were defined as undermatched. This led to low rates of undermatch for some groups because they did not have access to more selective institutions.

Furthermore, some racial background variables were significant at some of the "blocks" before the final model, suggesting that other variables are highly correlated with these racial background measures. Even though there were no statistically significant interactions, further research needs to be conducted to explore the nuances of these relationships across racial groups.

As a whole, findings presented in this chapter reveal the extent to which school counseling measures (as school-level variables) contribute to estimates of undermatch at application, admissions, and attendance over and above student-level factors. Chapter 6 revisits findings from Chapter 4 and 5, discusses them in the broader context, and considers implications for policy, practice, and research for both P-12 and higher education.

CHAPTER 6 : DISCUSSION AND IMPLICATIONS

In the past few decades, opportunities to access postsecondary education have broadened to include groups of students that have historically been neglected or intentionally left out. However, gaining access to higher education is not enough; *where* students access higher education remains a stratifying reality for many students (Alon & Tienda, 2005; Roderick et al., 2011). Research has shown that more selective institutions have higher retention rates, higher graduation rates, and shorter time-to-degree (Bowen & Bok, 1998; Bowen et al., 2009; Roderick, 2006). Therefore, examining *where* students access higher education contributes to our understanding of inequality in college access and opportunity. Specifically, many of the same historically underserved groups of students who have been neglected by the system before continue to be underrepresented at selective colleges and universities. One possible explanation for this discrepancy is academic undermatch where students apply to, are admitted to, or attend institutions that are below their level of academic qualification (Roderick et al., 2011). Since this phenomenon impacts these populations of students more often, it is for this reason that academic undermatch serves as another form of social reproduction that maintains social and economic disparities (Bowen et al., 2009; Roderick et al., 2011; Smith et al., 2012).

Previous research has examined academic undermatch as a problematic college choice outcome (Goodwin, 2015; Hurwitz et al., 2012; Roderick et al., 2011; Rodriguez, 2013; Smith et al., 2012), and some studies have even considered the secondary school contexts that contribute to this problem as well (Belasco & Trivette, 2015; Dillon & Smith, 2013; Hoxby & Avery, 2013; Hurwitz et al., 2012; Rodriguez, 2013). However, given the ideal positioning of high school counselors to advance college access, no empirical work has been conducted to examine the extent to which school counselors impact undermatch. As student advocates who are often

charged with providing college counseling, school counselors and school counseling programs provide an optimal opportunity to not only understand the impact of these programs on college choice, but more importantly, ways that reduce the severity of undermatch at the school level. Utilizing a nationally representative dataset, this study sought to understand the magnitude of undermatch at the application, admission, and attendance stages, and the extent to which aspects of school counseling programs predict students' likelihood of undermatch at these same stages.

Significant Contributions of the Study

This study about academic undermatch and school counseling programs explored three specific areas: (1) academic undermatch at three distinct stages in the college choice process, (2) the extent of academic undermatch nationally and across racial groups, and (3) the relative influence of high school college counseling programs on patterns of undermatch. The study advances existing research on undermatch as a college choice outcome as well as the importance of research on school counseling programs in the college choice process. Furthermore, this study also significantly extends our understanding of these key areas in several important ways.

First, it expands the knowledge base on academic undermatch through its examination of this outcome at three distinct stages in the college choice process. Academic undermatch literature has explored individual and contextual factors that ultimately lead to undermatch in attendance and a few studies have also included undermatch at application as well (Belasco & Trivette, 2015; Bowen et al., 2009; Dillon & Smith, 2013; Hoxby & Avery, 2013; Roderick et al., 2009, 2011; Rodriguez, 2013; Smith et al., 2013). These examinations have established a literature base that provides information related to the extent of undermatch within a school district (Roderick et al., 2009, 2011), within a state (Bowen et al., 2009), nationally (Smith et al., 2013), and across various demographic backgrounds, such as socioeconomic status and racial

background (Belasco & Trivette, 2015; Bowen et al., 2009; Dillon & Smith, 2013; Hoxby & Avery, 2013; Roderick et al., 2011; Rodriguez, 2013; Smith et al., 2013). However, all of these studies examined undermatch at the attendance stage as the ultimate decision in the college choice process. Some of the studies (Belasco & Trivette, 2015, Dillon & Smith, 2013; Hoxby & Avery, 2013) acknowledged and incorporated undermatch considerations at the application stage as well. This study supplements this body of knowledge by including the admission stage into the examination of undermatch. While undermatch decisions made at the admissions stage do not necessarily reflect only students' decision-making, this knowledge sheds light on the role of admissions decisions in maintaining the social hierarchy. Having a better understanding of the ways in which undermatch occurs at this interim stage will place more responsibility on postsecondary institutions to address their role in undermatch instead of solely relying on students to make the necessary changes. College choice is a two-way street, and previous models have undertheorized the role of postsecondary institutions (Hossler & Gallagher, 1987; Hossler et al., 1999; Long, 2004; Perna, 2006; Plank & Jordan, 2001).

Furthermore, the inclusion of all three stages in this undermatch examination sheds light on the various student- and institutional-level factors that may affect undermatch at different stages. While some factors such as financial considerations are important considerations at all three stages, other factors have a different influence on the likelihood of undermatch, depending on the stage in the college choice process. For instance, conditioned on other controls, educational aspirations are a significant characteristic only at the admissions and attendance stages. The number of college preparation activities students engage in is only an important factor at the application and admissions stages. This study adds a deeper understanding of

undermatch to better understand the nuances of this college choice phenomenon that was previously absent in the literature.

The study also contributes to undermatch literature through its focus on a nationally representative sample, including nationally representative racial groups to gauge the extent of undermatch. Previous undermatch research has also included an examination across race (Belasco & Trivette, 2015; Bowen et al., 2009; Goodwin, 2015; Roderick et al., 2011; Smith et al., 2012), and a few studies have used nationally representative samples (Belasco & Trivette, 2015; Goodwin, 2015; Smith et al., 2012). This study fits within this literature base to extend findings on national undermatch rates across racial background. Because there have been mixed findings regarding the extent of undermatch for different racial groups, this study adds findings to this bank of knowledge. The findings from this study indicate that White students are more likely to undermatch than students of color, which is similar to the results reported by Belasco and Trivette (2015) and Smith et al. (2012). However, the inclusion of three distinct points of examination of undermatch across race complicates these results as the undermatch rates for each racial group vary at the different stages. For instance, Hispanic students have higher undermatch rates at admission than Black/African American students, but at attendance, Black/African American students undermatch at higher rates than Hispanic students. Furthermore, the examination of undermatch at the different selectivity levels also adds nuance to our understanding of this college choice outcome given the pattern of undermatch varies by racial group. For example, among multiracial students, most of the undermatch at attendance occurs for students who have access to Very Competitive institutions. However, at this same timepoint, among White students, most of their undermatch occurs for students who have access to the Most/Highly Competitive institutions. Therefore, while this study contributes to the overall

literature on undermatch, it extends the knowledge base to include a more granular and nuanced understanding of the ways this phenomenon impacts different groups of students.

Most importantly, this study contributes to the body of work on the role of secondary school contexts through its explicit focus on school counseling programs in secondary schools. Research has already demonstrated that high school contexts are important factors in the college choice process and various elements of the high school have differing effects on college choice outcomes (Freeman, 2005; Hill, 2008; McDonough, 2005a; Orfield et al., 2012). Furthermore, there have also been studies that specifically examined undermatch as a college choice outcome and the role that high school contexts play in contributing to this phenomenon (Belasco & Trivette, 2015; Dillon & Smith, 2013; Hoxby & Avery, 2013; Hurwitz et al., 2012; Roderick et al., 2009, 2011; Rodriguez, 2013). However, there has been no research conducted that explicitly examines both undermatch and high school counseling together. This study fills that gap by providing information on whether and how school counseling programs contribute to estimates of undermatch.

Furthermore, this study sheds light on the complex relationship between undermatch and school counseling programs by highlighting the different factors that influence undermatch at different steps in the college choice process. While including college counseling as an important predictor of undermatch is a new approach, this study extends that perspective to include college counseling as an important contextual predictor in undermatch at application, admission, and attendance. The findings from this study highlight specific characteristics of the school counseling program that influence undermatch at these three distinct phases as a way to disentangle the complexity in the connection between college choice and school counseling. Previous studies have provided some information regarding school counseling characteristics

that lead to college enrollment (Bridgeland & Bruce, 2011b; McDonough, 1997, 2005a; Pham & Keenan, 2011), earlier college planning (McDonough, 1997; Pham & Keenan, 2011), and knowledge of financial aid opportunities (ASCA, 2005; McDonough, 1997, 2005a, 2005b; Stone & Dahir, 2006), to name a few. However, none of these studies explored aspects of the school counseling program that factor into students' likelihood of undermatch at any stage in the college choice process. This study examined that relationship specifically.

These contributions will be further elaborated upon in the rest of this chapter. The next section first presents an overview of the study, including a summary of the theoretical frameworks and literature used to guide the study, as well as the research methods utilized to examine the problem. Following this section, the chapter discusses how the findings address the research questions presented in Chapter One and whether they support the hypotheses presented in Chapter Three. Following this is a discussion of the implications of the study's findings with regards to practice and policy at both the P-12 education level as well as higher education. Finally, the chapter concludes with a discussion of the limitations of the study and how many of these limitations may be addressed through future research.

Overview of the Study

Guiding Literature and Frameworks

Several perspectives and theoretical foundations informed the study's examination of undermatch and school counseling programs. Bourdieu's (1977, 1986) social reproduction theory was used to define undermatch as a type of reproduction that maintains the educational hierarchy. The conceptualizations of cultural and social capital provide some explanation of how students engage in the college choice process, which may ultimately lead to undermatch. In fact, findings from this study revealed that undermatch operates as a form of social reproduction, in

that students with social and cultural capital that is not valued by the educational system had fewer opportunities to attend elite postsecondary institutions. For instance, the majority of White and Asian students had the academic qualifications for the most elite colleges, while most of the historically underrepresented racial groups, such as Black/African American and Hispanic students, had access to noncompetitive and community colleges. Within the Social Reproduction theoretical foundation is Perna's (2006) conceptual framework that was used, in part, to develop this study's empirical models. This framework integrates theoretical concepts from both economic models of human capital and socio-cultural frameworks to examine the college choice process. According to the Multi-Contextual Student College Choice Model (Perna, 2006), the college choice process is shaped by four contextual layers: (1) the individual student, (2) school and community context (3) higher education context (4) broader social, economic, and policy context. Specifically, this study focused on the interaction between individual students and the school context, by defining the school counseling program as a contextual resource.

In addition to Social Reproduction Theory, Giddens' (1979, 1984) Theory of Structuration was utilized to incorporate aspects of the school counseling program and school counselors' behavior as important contextual elements in the college choice process. This theory examines the ways that people incorporate social structures into their everyday practice and actions (Giddens, 1984). The central premise of this theory is through their behaviors, people create social structures and these structures then shape people's actions (Hays, 1994; Giddens, 1984). This process of creating and reinforcing social structures through everyday practices is referred to as the process of structuration (Giddens, 1979). The identification of school counselors as institutional agents who either reinforce or disrupt social structures provides an important theoretical lens to understand how school counselors establish and maintain school

counseling programs as important secondary contexts that contribute to undermatch as a form of social reproduction. Findings from the study indicate that school counselors are interacting with their social structures to both reinforce and disrupt undermatch. Higher caseloads and not prioritizing college counseling contribute to undermatch, which reinforce the social structures that reproduce inequality in education. For instance, only a small percentage of Black/African American students qualify for the most elite colleges, thus suggesting that school counselors need to disrupt the social structures of counseling more effectively to ensure that their students have equal access to these institutions. In contrast, findings also reveal that counselors are engaging in behaviors that disrupt this reproduction by focusing more of their time on college counseling and providing more college preparation support. These behaviors restructure their counseling programs, which disrupts the hierarchy and provides increased opportunities for historically underserved students. To better understand the ways in which school counselors establish and maintain contexts that influence social structures, the conceptual framework by Engberg and Gilbert (2014) was used in part to create the empirical models for this study. This framework posits that norms and resources together create a counseling opportunity structure within which students interact with school counselors. Through these interactions with school counselors, they maintain or disrupt the counseling opportunity structure and therefore either promote or discourage undermatch.

One of the limitations of Perna's (2006) framework is that it does not take into consideration the individual agency and influence of school counselors in advising students in their college decisions. Similarly, one of the limitations of Engberg and Gilbert's (2014) framework is that it does not consider the student's role in the college choice process. This study sought to remedy these limitations by combining the two frameworks into one empirical model,

that incorporated the contextual nature of college choice, with a focus on school counseling programs as contextual influences. This specific theoretical lens provides a better understanding of the nuance of undermatch and the different ways that school counseling programs and counselors interact with this nuance. Combined, these two theories and their accompanying conceptual frameworks allowed for an examination of multiple layers and interactions within the college choice process.

Research Design

This two-part study explored the extent of academic undermatch and the relationship between this college choice outcome and school counseling programs. The first component of the study identified undermatch for a nationally representative sample and examined the extent of this outcome at the application, admission, and attendance stages across racial groups. To identify and categorized students as undermatched at application, admission, or attendance, I utilized logistic regression techniques based on information from other students in the sample.

The second component of the study investigated the extent to which secondary school counseling programs influenced these rates of undermatch. Given the nested nature of students within schools with one school counseling program, multilevel model was the most appropriate analytic strategy. Since the outcome of interest was predicting undermatch, the type of multilevel model necessary was hierarchical linear modeling (HGLM) with a Bernoulli sampling model and logit link. A sample of 1,020 students at 520 high schools nationwide was used in a series of HGLM models to compare the relative influence of school counseling programs on estimates of undermatch at application, admission, and attendance.

Discussion of Findings

Research Question One

The first research question in this study was: *What is the extent of academic undermatch for a nationally representative sample of students at the time of application to, admission to, and attendance in higher education and how do these rates vary by racial backgrounds?* The hypotheses proposed that there would be relatively high rates of undermatch across the national sample at all three steps in the college choice process: application, admission, and attendance. It was also hypothesized that students who already have social and cultural capital that is valued by the educational system will have lower rates of undermatch compared to their peers without such valued capital.

While the findings demonstrate there is some truth to this hypothesis, the reality of undermatch is more complicated and nuanced than originally projected. Students across the nation and across racial background undermatch at various rates and these rates fluctuate based on the stage in the college choice process and also regarding specific levels of selectivity. While previous research (Belasco & Trivette, 2015; Bowen et al., 2009; Roderick et al., 2009; Smith et al., 2013) has examined overall rates of undermatch across racial background, the nuanced understanding of undermatch in this study allows us to better understand where the undermatch occurs and for which students it is most problematic. Therefore, while general rates of undermatch have been presented across race in previous studies, the analysis in this project has allowed us to examine undermatch at three separate time points and for different groups of students *within* each racial group as well.

Nationally, findings from this study are similar to previous studies on undermatch. Even though previous research only examined undermatch at the attendance stage, the findings from undermatch at attendance is somewhat similar. This study found that about one-third (33.2%) of students undermatch at attendance, which is just below the rates found by Bowen et al. (2009) and Smith et al. (2013). However, this rate was also lower than that found by Roderick et al. (2009; 62%) and higher than that of Belasco and Trivette (2015; 27.8%). Unique to this study is the inclusion of additional findings related to application and admission as well. Among the national sample, 16.2% of students undermatched at application and 21.4% at admissions. Even though these other undermatch studies found that the majority of undermatch occurred at application (Belasco & Trivette, 2015, Dillon & Smith, 2013; Hoxby & Avery, 2013), the findings here indicated that once students do not apply to appropriately matched schools, they will not have the opportunity for admissions or attendance decisions, and the undermatch phenomenon continues to increase with every step in the process, thus resulting in higher undermatch rates at attendance.

In terms of the hypothesis that these rates would be lower for students with cultural and social capital valued by the education system, the findings from this study reveal that this assumption was not confirmed. However, this hypothesis does not take into consideration the types of postsecondary institutions to which students have access. The aspects of cultural and social capital that are valued by the educational system are more apparent in the high school contexts before the college choice process even begins. The educational environments within which historically underrepresented students learn at the secondary level are unequal, thus establishing structural barriers to more selective schools. For instance, Black/African American students tend to be in urban schools with higher percentages of students receiving free- or

reduced-price lunch, and fewer students enrolled in AP courses. This educational context limits opportunities for Black/African American students to be competitive in selective college admissions. Contrast that with the educational environment for White students. These students are least likely to be in urban settings, have far fewer students receiving free- or reduced-price lunch, and more students enrolled in AP classes. Therefore, these settings facilitate increased access to more selective colleges. This can be seen in the percentage of students who have the academic qualifications to access the Most/Highly Competitive institutions. Only 1% of Black/African American students in this sample meet these expectations (based on academics alone), while 9% of White students have the requisite qualifications. This means that while the hypothesis was not confirmed and White students have higher rates of undermatch, this is largely due to the fact that their P-12 educational environments prepare them to be more competitive and provide them with access to more selective schools. Even though the undermatch rates for Black/African American and Hispanic students are lower, these lower rates mask discrepancies in the educational system that perpetuate educational inequity by limiting the access that students have to competitive postsecondary opportunities.

This means that undermatch serves as a source of social reproduction as it maintains the racial and economic hierarchy. The appearance of higher undermatch rates for White students conveys the message that White students are being neglected by the system and are suffering in an unequal education structure. However, a closer examination of these undermatch rates reveals that this message is false and historically underserved students (Black/African American and Hispanic) continue to suffer from under-resourced schools and are expected to compete on equal ground in a system that was not meant to serve them. Undermatch becomes a tool of the privileged to justify continued inequity in the educational system, in the guise of perceived

disparity for more privileged students. The reality is that the study found that there are many more students qualified to attend the best colleges in the country but they are not admitted, as there are fewer seats at the most elite institutions.

Research Question Two

The second research question was: *What is the relative influence of high school counseling programs on academic undermatch in a nationally representative sample and how does this influence vary by racial backgrounds?* The hypothesis proposed that that high schools with strong counseling programs that emphasize college counseling will have lower rates of undermatch compared to other schools with weaker programs or less emphasis on college counseling. It was also hypothesized that the influence of the school counseling program would be greater for students from underrepresented minority (Black/African American, Latinx) backgrounds than for other racial groups (White, Asian).

While the findings reveal that there is some truth to this hypothesis, the reality is more complex as there are various aspects that contribute to a "strong" counseling program. While the literature related to school counseling (ASCA, 2005; Bridgeland & Bruce, 2012; McDonough, 2005a; Stone & Dahir, 2006) offers various markers of quality for counseling programs (e.g., certified school counselors, number of full-time counselors, percent of students who go to baccalaureate-granting institutions), there is no universal list of indicators that signify whether or not a counseling program is "strong." Because counselors are tasked with numerous responsibilities that often reflect the needs of their students (ASCA, 2016; McDonough, 2005a, 2005b; Perna et al., 2008), "quality" programs will look different across schools and student populations. For the purposes of this study, where "strength" might be defined by the emphasis placed on college counseling or the degree to which counseling programs decrease the likelihood

for undermatch, there are a few characteristics that might indicate program quality. The percent of time that counselors spend on college readiness, selection, and application makes a positive difference for students in their likelihood to appropriately match at all three stages in the college choice process. Counselors who devote more of their time and energy preparing students for college results in a decreased likelihood of undermatch. However, increasing the percentage of hours spent on this task may not be enough. It is also important for counselors to provide informed and accurate information when engaging in these college preparatory activities. While this study demonstrates that it is important to increase the time spent on college preparation, it is just as important to ensure that this time is spent providing students with useful information that will support them in their postsecondary endeavors and match their qualifications.

Furthermore, simple solutions to address the counseling program "quality" may not be as simple as providing more resources. Given that the findings from this study also revealed that higher counselor caseloads were associated with a reduced likelihood of undermatch, conditional on the other variables in the model, suggests that the solution to increased college access may not be as simple as adding more counselors or simply reducing student-to-counselor ratios. It may well be that such high caseloads lead to more strategic ways of handling a specific focus on college access. However, organizing college visits were also associated with an increased likelihood of undermatch as well, which suggests that simply engaging in these activities and providing more resources may not be enough to limit the amount of academic undermatch that students experience. Similar to the time spent mentioned above, more thought and intention needs to be taken into consideration when and which stage requires specific college preparation opportunities for students. College counseling should not necessarily equate providing the best

or most appropriate opportunities for the population of students with "going through the motions" to report college-related activities.

Another important finding from this study reveals that funding and finances continue to play a role in students' college decision-making, even when other contextual factors are considered. At all three stages of the college choice process, students' anticipated sources of funding and the estimated costs of college significantly decreased the probability of academic undermatch. Previous college choice literature has highlighted the important role of financial aid and tuition as key predictors not only of college enrollment (Avery & Hoxby, 2004; Long, 2004; Noeth & Wimberly, 2002; Perna & Titus, 2004; St. John, 1994), but of undermatch as well (Avery & Hoxby, 2004; Dillon & Smith, 2013; Hurwitz et al., 2012; Monks, 2009; Smith et al., 2012). This study confirms these findings and demonstrates that considerations regarding financial aid funding and tuition continue to be important considerations when students decide where to apply and where to attend. Contrary to the literature, however, students' socioeconomic status (SES) did not impact the importance placed on finances in the college choice process. Financial considerations were important across the sample, regardless of SES of the student.

In terms of relative impact of the school counseling program across racial background, the hypothesis predicting differential impact was unfounded. There were no significant differences in the relative influence of the counseling program on the likelihood of undermatch. Even though none of the interaction terms by race and counseling program characteristics were significant, there were some notable differences between racial background and the characteristics of schools that students attend. For instance, a higher percentage of Black/African American and Latinx students attend schools with large numbers of students receiving free- or reduced-price lunch, compared to White and Asian students. Additionally, a lower percentage of

Black/African American and Latinx students have school counseling programs where the counselors have higher than average expectations for the students compared to their White and Asian peers. These two examples of the different normative contexts within which students attend high school reveal that other elements of their educational context may be influencing their likelihood of undermatch and these influences may be different across racial groups. While these specific interactions were not tested in the HGLM models, z score tests identified the two groups differed significantly (the above mentioned two examples). In other words, underrepresented students of color (Black/African American and Latinx) attend high schools with very different educational contexts than Asian and White students, which may indicate that *access* to school counseling programs is vastly different across racial background. Literature has shown that competent school counselors and quality school counseling programs tend not to be readily available in schools that serve mostly racial minority students and more privileged students tend to receive better counseling services (Auwarter & Aruguete, 2008; Bridgeland & Bruce, 2011b; McDonough, 1997, 2005a, 2005b; Paul, 2002; Perna et al., 2008; Plank & Jordan, 2001; Savitz-Romer, 2008 Stone & Dahir, 2006). Following this line of reasoning, there is some merit in the previously mentioned hypothesis, where students who do not have cultural and social capital recognized as valuable by the education system (e.g., Black/African American and Latinx) do not have access to quality counseling programs, thus the relative impact on these students is inconclusive. More study is needed on both direct and long term indirect effects of school norms, expectations, and programs.

Implications for Practice and Policy

Several important conclusions arise from the findings collectively presented in Chapters Four and Five. One of the biggest takeaways is that undermatch is a pervasive phenomenon at

multiple stages in the college choice process and some characteristics of school counseling programs play a role in these estimates. The following sections present implications of these findings for practice and policy at both the P-12 education sector as well as higher education.

P-12 Education

Practice. In the context of this study, findings indicated that there were several characteristics of school counseling programs that contributed to estimates of undermatch at the application, admission, and attendance stages in the college choice process. In light of these findings, there are some important strategies P-12 educators, counselors and administrators can employ to prevent increasing rates of undermatch. Although some undermatch is inevitable, P-12 education can structure opportunities to limit the overall impact of this phenomenon. One aspect of the counseling program that was an important deterrant against undermatch at all three stages was the percentage of time counselors spend focused on college preparation and readiness. Given the reality that most counselors spend very little time on college counseling (McDonough, 2005a; Parsad et al., 2003) because they are asked to engage in many non-counseling tasks (Lombana, 1985; McDonough, 1997, 2005a; McDonough et al., 2000; NACAC, 2010; Wilson & Rossman, 1993), simply increasing time spent on providing college-preparation services may have a large impact. Furthermore, restructuring the counseling program in general may also achieve this goal. For the most part, schools do not use counselors as effectively or efficiently as is necessary to ensure that students are well-informed about their postsecondary options and plans. Counselors want to actively engage in college counseling (Bridgeland & Bruce, 2011a), but the dominance of other responsibilities overshadows their ability to provide quality college preparation services (Bridgeland & Bruce, 2011a; McDonough, 2005a, 2005b; Perna et al., 2008). Restructuring the program and allowing for more time for college counseling and

postsecondary services will not only provide students with the opportunity to increase their college knowledge, but it may also decrease the likelihood of undermatch as students are making more informed decisions.

Another important practice implication is ensuring that counselors are well-informed and up-to-date in their knowledge of postsecondary options and requirements as well. Findings from this study indicated that there were some aspects of the counseling programs that actually contributed to students' likelihood of undermatch at various points in the college choice process. While this is disconcerting, there are ways to address this problem and ensure that counseling programs are encouraging students to live up to their potential and supporting them along the way. One strategy is to ensure that school counselors have access to professional development and training opportunities to increase knowledge and skills related to postsecondary counseling. School counselors have expressed their readiness and desire to provide these types of services, but feel untrained to engage in quality college counseling (Bridgeland & Bruce, 2012). This professional development not only includes information related to admissions requirements, financial aid opportunities, and application workshops, but also knowledge related to structural barriers for certain populations of students and ways that counselors can ensure they are not "cooling out" (Clark, 1960, 1980) students from pursuing higher education opportunities. These types of training and development resources will certify that when students meet with counselors about their postsecondary options, they are receiving quality information and up-to-date knowledge.

Finally, findings from this study demonstrate that finances and funding continue to be an important consideration for students in their college choice process. While this is not new information (Avery & Hoxby, 2004; Heller, 1997; Kane, 1999; Long, 2004; Manski & Wise,

1983; Noeth & Wimberly, 2002; St. John, 1994), combined with findings on the relative impact of the counseling program, this information leads to an ideal opportunity to address these concerns. As a component of college counseling services, counselors need to incorporate more information regarding financial literacy, costs of college, and financial aid opportunities. Armed with this knowledge, students are better-informed to understand finances related to college as well as the myriad ways to pay for it. Furthermore, this type of information has been shown to have a large impact on *where* students apply and attend (Perna, 2008). By providing accurate information, support, and guidance to students on funding and finances, there is the potential to reduce undermatch in the college choice process as students will be able to make educated decisions regarding their financial futures.

Policy. In light of the findings presented in this study, there are some important policy issues that need to be considered as well. This study brings together P-12 contexts and their influence on postsecondary choices and enrollment. The findings suggest that a "college for all" program at the high school level does not necessarilty produce desired results for the nation if we are not sending highly qualified and talented students from all backgrounds to the top institutions. Given that undermatch rates were substantial nationally and across racial groups in this study, it is clear that many qualified students are not attending some of the top institutions in the country. The "college for all" model ignores the complexity of the college choice process for different populations of students and neglects to consider historical policies of discrimination, willful neglect, and racism with regards to college access, enrollment, and graduation. It may also channel students to institutions with fewer resources (i.e. large public, broad access institutions). This continuing pattern of inequity can be seen in the differences in undermatch rates presented in this study. While to some degree, we can celebrate small victories, such as

increasing access to higher education overall for all populations of students (McDonough, 1997; Swail & Perna, 2002), undermatch as a form of social reproduction reveals that inequities in access and opportunities persist when consideration is given to *where* students are attending and which students are qualified, but not in attending the elite institutions. Therefore, with national programs such as "college for all," there needs to be increased attention paid to how these programs reduce inequity in access and opporutnities as well as focusing on the complexities of historical classism and racism when implementing these types of programs for historically underrepresented students. We need to ensure that these programs are not based on pretense that proclaim a social justice mission by sending all students to college, yet in reality perpetuate inequity by relegating historically underserved students to institutions for which they are overqualified.

Furthermore, recent efforts to increase the college-going rate by improving college preparation and readiness in the P-12 masks important inequities in *where* students are prepared to attend after high school. Recently, national mandates have called for increased college- and career-readiness and an increase in the number of students who graduate from college (United States Department of Education, 2010b). The emphasis in these mandates is not only ensuring that more students attend college, but that they do so at institutions where they are likely to graduate. Research has shown that as the selectivity of the postsecondary institution increases, so does the retention and graduate rates (Bowen & Bok, 1998; Bowen et al., 2009; Roderick, 2006). However, these institutions tend to have the highest academic requirements and tend to be the most competitive in terms of admissions (Schmitt, 2015). The findings from this study reveal that not all high school students are receiving quality college preparation that would make them eligible to attend these more selective institutions. The access gap that exists between racial

groups demonstrates that underrepresented students (Black/African American, Latinx) continue to be underrepresented in who has the academic qualifications to access more selective higher education institutions. P-12 education needs to do a better job of providing equitable opportunities to students from all backgrounds to access all types of higher education and not be satisfied with increasing college enrollment in general. *Where* students go matters if we want to increase college graduation rates as well. It is no longer sufficient to want to prepare students for postsecondary education in general; we need to prepare students for competitive higher education. When certain populations of students receive inferior preparation and college readiness support, the educational contexts within which this occurs make the college decisions for these students, by relegating them as unqualified for certain opportunities. However, if all students receive quality preparation to pursue *all* types of postsecondary schooling, then the decisions become that of the students, where they are qualified, informed, and prepared to make choices that are best for them. Therefore, there needs to be an increased effort to provide equitable college preparation services to all students in order to include all students in the wide variety of college opportunities.

Finally, findings from this study demonstrate that school counselors have an impact on the college choice process and through their programs, can influence students' decisions. Given this reality, school counselors should be involved in school reform efforts and included in college readiness agendas. Recent national mandates have called on states and schools to better prepare students to be college- and career-ready by the time they graduate from high school (United States Department of Education, 2010a). However, school counselors were not included in these efforts and were absent from these discussions (Holcomb-McCoy, Lee, Bryan, & Young, 2011; House & Hayes, 2002; Paisley & Hayes, 2003; Stone & Dahir, 2006). Findings

from this study show that school counselors can improve students' college choices and can be integral to school reform efforts. A primary responsibility of school counselors is to support students in their academic and career development (ASCA, 2016), which are the same objectives of these national mandates. If our goal as a nation is to improve the educational environments, experiences, and outcomes for students, then school counselors need to be invited to the table. Their expertise, knowledge, and optimal positioning as leaders and practitioners make them ideal policy advocates to help the nation meet these college enrollment and graduation aspirations.

Higher Education

Practice. Similar to P-12, the findings from this study have implications for higher education as well. Some of the findings indicated that a substantial number of students experience undermatch at the admissions stage in the college choice process. The fact that qualified students are not gaining admission to appropriately matched institutions places responsibility for undermatch at this step on the postsecondary institutions. When colleges are turning away qualified students across a variety of backgrounds, there needs to be a closer examination of admissions criteria and admissions procesesses. If students are making the effort to prepare for and apply to colleges for which they are qualified, then it is up to the institutions to ensure that they are accepting these students for admission. In practice, colleges and universities should first examine their eligibility requirements to verify that the minimum qualifications are accessible to all students and that students from all backgrounds are able to attain these goals. Additionally, they should also scrutinize their admissions process to make certain that highly qualified students are reviewed carefully and considered for admission based on their academic qualifications. While many selective admissions processes also consider additional experiences

and talents in the admissions process, admissions committees should confirm that these are also opportunities open to students of all backgrounds.

Another implication for practice that emerged from findings in this study is that it is important for higher education institutions to engage in outreach to students of various backgrounds to provide application and admissions information to a wider variety of students. Admissions departments at many selective colleges are already familiar with elite high schools from which they already recruit applicants (Attewell, 2001). While this might protect the respective competitive positions of both the college and the high school (Attewell, 2001; Wolniak & Engberg, 2007) since there is a clear pathway from elite high school to selective college, this partnership perpetuates the educational hierarchy and reproduces the inequity in the system. In order to disrupt this social reproduction, higher education institutions need to make a concerted effort to outreach to students outside of these networks and recruit students from all backgrounds. Establishing these connections with a variety of high schools will not only allow students to become exposed to more selective colleges and their admissions requirements, but it will also form relationships between high school counselors and admissions personnel to better streamline the full educational pipeline.

Finally, in line with previous research, findings from this study confirm that finances and funding continue to be important considerations for students in the college choice process. Given this reality for many students, higher education institutions need to find ways to keep tuition and costs reasonable and transparent to prospective applicants. Colleges and universities need to take a more proactive approach to helping students alleviate their financial concerns. One approach is to be more transparent and clear about the costs of college, including providing accurate information on the difference between sticker price and net price to students and their families.

Even though net price is based on individual students and their financial situations, colleges can provide a definition of net price as well as include examples of students net costs so prospective students and families can better understand how much college is going to cost them. This may help families avoid "sticker shock," which may dissuade them from applying to or attending more expensive institutions that may be a better academic match. Colleges and universities also need to provide more opportunities for funding besides solely relying on loans to provide the bulk of their financial aid. In the last twenty-five years, many public institutions have moved away from financial need as the primary criterion for financial aid in favor of merit-based aid (Baum & Lapovsky, 2006; Heller, 2006; McPherson & Schapiro, 1998). However, this type of tuition discounting disproportionately favors students from privileged backgrounds already, thus limiting access to students who rely on need-based aid for college (Heller, 2006). Because findings from this study indicate that highly qualified students are still concerned about their ability to pay for college, higher education institutions should examine their financial aid policies and the extent to which need-based aid is used as a way to reduce the inequity in education.

Policy. In light of the findings presented in this study, there are some important higher education policy issues that need to be considered as well. Recently, there has been an increased emphasis on increasing diversity on higher education campuses and especially among the top colleges in the country (Carnevale & Van Der Werf, 2017; Fry, 2004). Researchers, practitioners, policy-makers, and the media have all called for more diversity and decreasing disparites to ensure that all postsecondary institutions reflect the diversity of our nation (Bowen, Kurzweil, Tobin, & Pichler, 2005; Carnevale & Van Der Werf, 2017; Fry, 2004; Smith, 2015). However, since students from a variety of backgrounds experience academic undermatch at the admissions stage, then institutions are not really being proactive to increase the diversity on their

campuses. Many highly qualified, diverse students are not being admitted to appropriately matched schools, thus limiting the opportunity for an increase in diversity at this stage. This means that while higher education examines and strategizes ways to increase their diversity, they are missing large percentages of qualified, diverse students who could partially rectify this issue simply by being admitted.

Furthermore, diversity considerations have been homogenized to reflect a broad definition of what is considered diverse. But findings from this study demonstrate that with regards to college choice and academic undermatch, there are important nuances and complexities involved in the diversity considerations. Specifically, context matters. The context of the higher education environment to which students are applying, being admitted, or attending are important when addressing issues of diversity. For instance, while nearly a quarter of Black/African American students undermatch at the application stage, over half of them do so at the most selective institutions. Examining rates of undermatch to these elite schools reveal that not only do Black/African American students undermatch at the highest rates to these institutions, but their rates are more than *double* that of White students. This is an example of how diversity rhetoric needs to take into consideration the complexity of the institutional context as well as the complexities of the undermatch phenonmenon. While calling for increased diversity at postsecondary institutions nationwide is an important and necessary endeavor, when it comes to actually addressing how to do this, policy must consider the impacts of historical racism and discrimination, especially at the most selective and elite institutions and how these realities impact students' decisions in the college choice process. Related to this diversity is the consideration of Affirmative Action in selective admissions processes. While the findings from this study show that White students have higher rates of undermatch, it is likely that these rates

are an artifact of inequitable schooling opportunities in the P-12 system. These rates have no bearing on Affirmative Action considerations as the focus of this study is on the secondary contexts within which students initially access higher education, which is separate from admissions policies. Therefore, undermatch may be viewed as a manifestation of White privilege due to the cumulative advantage of White students in more privileged secondary contexts (Brown, et al., 2003). Furthermore, the findings of this study reframe admissions in terms of unequal opportunity structures that influence merit, but not as an issue of merit itself. Thus, Affirmative Action may still contribute to more diverse and equitable admissions as there is an increased possibility to consider historical racism in unequal opportunity structures. Consequently, the findings from this study in no way should be used to undercut the potential advantages of Affirmative Action in increasing racial diversity on postsecondary campuses.

Another policy implication that arises from the findings in this study is the need to streamline and coordinate the P-12 and higher education sectors. While there is this notion of an educational "pipeline" that smoothly carries students through the education system from preschool to graduate school this metaphor does not accurately represent the coordination of the educational sectors (McDonough & Gildersleeve, 2006; Perna & Armijo, 2014). In reality, there is an absence of a P-16 (or P-20) approach that would coordinate the different educational sectors to ensure smooth transitions and increased opportunities between P-12 and postsecondary educational context. This misalignment results in unequal preparation and access to higher education because not all students are prepared to compete for college admissions. This reality is evident in the findings from this study in the rates of undermatch at all three stages in the college choice process. At application, higher education needs to do a better job of communicating with students and high schools about eligibility and admissions requirements in an effort to clarify the

application process. At admissions, higher education should ensure that they are admitting appropriately qualified students and not turning away students who have the academic credentials for admission to their institutions. At attendance, higher education should strive to understand why students choose to attend alternate colleges and explore ways to entice highly qualified students to attend their colleges in future cohorts.

Furthermore, there is not a high level of policy coordination that exists between the various policy domains. Most of the policy efforts that have come to fruition are done so in a piecemeal fashion where the policy actors take action within their policy domain. For instance, many of the policies occur within specific policy contexts where the actors have the capacity to take action (Callan, 2011). This relative independent policy making creates barriers to coordinating policy across multiple policy domains and across multiple policy contexts. Therefore, higher education needs to be proactive in communicating with P-12 and coordinating policies that will provide increased opportunities for secondary students to not only participate in higher education, but do so at appropriately matched institutions, where students can succeed, grow, and thrive. For example, some states have increased enrollment at the top instituions to meet the demands of better prepared students graduating from high schools in the state (e.g. the University of California increasing enrollment at the most selective UC campuses).

In general, colleges and universities across the nation need to reflect on and consider their roles in perpetuating inequality and reproducing the educational hierarchy. For instance, highly selective institutions not only confer a status marker and elements of prestige upon their graduates, but these elite institutions provide their students and graduates with post-graduate opportunities as well. However, if these institutions continue to only serve specific populations of students and other students are excluded, despite the fact that they qualify, then these

"bastions of social mobility" are nothing more than shallow promises and neoliberal structures set to reify inequity.

Limitations and Directions for Future Research

In considering the implications for this study, it is important to note several limitations, many of which may be addressed by future research. First, this study is based on estimates of academic undermatch for this specific sample of students. Academic undermatch in and of itself is somewhat problematic since it is an *estimate* based on probabilities for application, admission, and attendance. Furthermore, academic undermatch is operationalized by focusing solely on academic measures to predict admissions. Even though the method used in this study to operationalize undermatch follows previous research and processes (Bowen et al., 2009; Roderick et al., 2009; Rodriguez, 2013; Smith et al., 2013), the assumption that admissions is based solely on academic qualifications is somewhat problematic. The limitation is that any approach to estimate undermatch assumes that the researcher can predict admissions decisions based solely on academic characteristics, when holistic admissions processes (especially for elite institutions) rely on more than academic and personal accomplishment measures (Bastedo & Flaster, 2014).

Furthermore, estimates of academic undermatch need to explore other important factors that impact application, admission, and attendance decisions. Specifically, on an individual level, students make decisions about their postsecondary education based on a variety of influences, such as their financial reality (Bettinger et al**.,** 2009b; McDonough, 1997; McDonough & Gildersleeve, 2006; Noeth & Wimberly, 2002; Seftor et al., 2009; Tierney & Venegas, 2009), proximity to family (Gándara, 1993, 1995; Pérez & McDonough, 2008), desire to experience a unique environment, such as attendance at an HBCU (Bowen et al., 2009), or

scholarship opportunities (Avery & Hoxby, 2004; Heller, 1997; Perna, 2010). At an institutional level, admissions committees consider more than just academic criteria when making admissions decisions. These may include personal statements, letters of recommendation, legacy status, extraordinary accomplishments, leadership in extracurricular activities, athletic or artistic talent. It is also important to note that more elite institutions accept fewer students (Schmitt, 2015) to maintain their elite status and due to institutional capacity. Examining undermatch at the admissions stage makes assumptions about probability of admission, disregarding structural constraints on admissions processes as well.

One more way that this study is limited with regard to the estimation of undermatch is the inclusion of community colleges in the analysis. Because there were no two-year college identifiers, operationalizing undermatch by institutional type for the same sample of students was not possible. Furthermore, including two-year or community colleges in the conceptualization of undermatch can be problematic as traditional conceptions of undermatch perceive attending community college when one meets the qualifications for a four-year college as an example of undermatch (Belasco & Trivette, 2015; Smith et al., 2012). However, with articulation agreements between community colleges and four-year institutions, this pathway has become a way for many privileged students to either attend a school that is more selective than they would have gained admissions given their high school record (Anderson, Alfonso, & Sun, 2006; Hilmer, 1998; Long & Kurlaender, 2009) or as a means to cut costs by not having to pay the full cost of tuition for part of their undergraduate education (Kane & Rouse, 1999; Melguizo, 2009; Wellman, 2002). Therefore, future research should complicate our understanding of undermatch by critically taking account of the role of community colleges play in this phenomenon.

Another limitation in this study is with the inclusion of school-level contexts and predicting direct effects of these on estimates of undermatch. The methodology employed in this study focuses on the direct effects of a variety of individual- and school-level measures on the likelihood of undermatch at application, admission, and attendance. While the findings revealed some interesting direct effects related to individual concerns with finances and hours spent focused on college counseling, it is difficult to discern indirect effects through this method. Given that in previous undermatch studies, socioeconomic status (SES) was a significant predictor of the likelihood of undermatch (Avery & Hoxby, 2004; Dillon & Smith, 2013; Hurwitz et al., 2012; Monks, 2009; Smith et al., 2012), yet was insignificant in this study, conditional on other variables in the model, suggests the presence of a number of indirect effects. Given that SES is correlated with the types of secondary schools students attend as well as the level of resources available (Kucsera & Orfield, 2014; Logan et al., 2012; Martin et al., 2005; Orfield et al., 2012; Yun & Moreno, 2006), the predictive power of SES might be mitigated by counseling and school-level effects. Therefore, future research should further investigate these indirect effects to better understand the relationship between various individual-level measures (such as SES and racial background), school-level measures (such as counseling caseload and primary goal of the counseling program), and the likelihood of undermatch at the application, admission, and attendance stages. One way to better understand these relationships is by employing a method such as structural equation modeling to identify the pathways of both direct and indirect effects for these measures.

Finally, this study examines academic undermatch and the relationship to school counseling programs, yet it focuses on these interactions at the school level. While the findings from this study illuminate the relationship between academic undermatch and school counseling,

it ignores broader contexts that shape the ways in which these interactions occur. For instance, the examination of school counseling programs in the study takes place on a national level, disregarding district funding for counselor support or state mandates for maximum caseloads. These broader, contextual influences shape how the counseling programs operate and function on a daily basis and greatly affect how the school counselors are able to meet student needs. Furthermore, this study also ignores national political contexts that serve as external forces in prioritizing certain elements within a school setting. The data for this study were collected under the Obama administration where the Executive Branch was focused on college readiness through volunteer grant programs such as the Common Core Initiative and Race to the Top (United States Department of Education, 2010a, 2010b). These programs encouraged schools to prioritize the mandates in the grants, which may have influenced the structure and prominence of school counseling programs. Future research that seeks to examine undermatch, college choice, and/or school contexts should include these broader social and political contexts in their analysis. For instance, when looking across school counseling programs, state funding and mandates matter. Therefore, location and state context should be included as measures in the quantitative modeling or contextual factors in the qualitative inquiry.

Conclusion

In conclusion, equitable access to higher education must include equitable access to to the best institutions for which students are qualified. We must be critical of the structures that allocate differential educational opportunities to some students based on privilege, while neglecting to provide the same opportunities to other students who come from marginalized communities. As such, it is important to frame academic undermatch in terms of how it operates as a mechanism to reproduce educational inequity. However, there are structures and people in

place that are uniquely positioned to disrupt this social reproduction by discouraging undermatch and providing equitable services to all students (Giddens, 1979, 1984). School counseling programs have the potential to be impactful, positive mechanisms for change to better equip both students and facilitate postsecondary institutions to make informed decisions regarding the college choice process. Unless we willingly acknowledge systems of inequity, we will be doomed to reproduce the same patterns that leave some groups of students far behind. It is in the nation's best interest to assist students toward high schools and postsecondary institutions with the resources to ensure gains toward a more prosperous, diverse, and educated nation.

Appendices

Appendix A: HSLS Survey Instruments

Base Year

Administrative Questionnaire: https://nces.ed.gov/surveys/hsls09/pdf/2009q_admin.pdf

Counselor Questionnaire: https://nces.ed.gov/surveys/hsls09/pdf/2009q_counselor.pdf

Student Questionnaire: https://nces.ed.gov/surveys/hsls09/pdf/2009q_student.pdf

First Follow-up

Counselor Questionnaire: https://nces.ed.gov/surveys/hsls09/pdf/2012_counselor.pdf

Parent Questionnaire: https://nces.ed.gov/surveys/hsls09/pdf/2012_parent.pdf

Student Questionnaire: https://nces.ed.gov/surveys/hsls09/pdf/2012_student.pdf

2013 Update

Student Questionnaire:
https://nces.ed.gov/surveys/hsls09/pdf/2013_Student_Parent_Questionnaire.pdf

Appendix B: Variables and Coding Schemes for HGLM Models

Description of Measures

Description	Measure
Dependent Variables	
Undermatch at Application	0=Not undermatch, 1=Undermatch
Undermatch at Admissions	0=Not undermatch, 1=Undermatch
Undermatch at Attendance	0=Not undermatch, 1=Undermatch
Variables Used to Determine Undermatch	
Postsecondary institution attending as of Nov. 1, 2013 (IPEDS ID)	
ID of other postsecondary institution to which applied (1)	
ID of other postsecondary institution to which applied (2)	
Admission status at first school applied to (1)	1=Rejected, 2=Wait-listed, 3=Accepted
Admission status at second school applied to (2)	1=Rejected, 2=Wait-listed, 3=Accepted
Barron's selectivity levels of institution attending	1=Less/Noncompetitive, 2=Competitive, 3=Very Competitive, 4=Most/Highly Competitive
Barron's selectivity levels of institution applied (1)	1=Less/Noncompetitive, 2=Competitive, 3=Very Competitive, 4=Most/Highly Competitive
Barron's selectivity levels of institution applied (2)	1=Less/Noncompetitive, 2=Competitive, 3=Very Competitive, 4=Most/Highly Competitive
Human Capital: Academic Preparation	
Highest level mathematics course taken/pipeline	0=No Math, 1=Basic math, 2=Other math, 3=Pre-algebra, 4=Algebra I, 5=Geometry, 6=Algebra II, 7=Trigonometry, 8=Other advanced math, 9=Probability and statistics, 10=Other AP/IB math, 11= Precalculus, 12=Calculus, 13=AP/IB Calculus
Credits earned in: AP/IB combined	0 - 19.5 credits
Human Capital: Academic Achievement	

Overall GPA computed	0.0 - 4.0
College entrance exam composite score in terms of SAT composite score	4.2 - 16.00

Student-Level Predictors of Undermatch

Human Capital: Supply of Resources

SES† Lowest Quintile (ref: Highest Quintile)	1=First quintile (lowest), 0=Else
SES† Second Quintile (ref: Highest Quintile)	1=Second quintile, 0=Else
SES† Third Quintile (ref: Highest Quintile)	1=Third quintile, 0=Else
SES† Fourth Quintile (ref: Highest Quintile)	1=Fourth quintile, 0=Else
SES† Highest Quintile	1=Fifth quintile (highest), 0=Else
Anticipated Funding	Factor

Human Capital: Expected Benefits & Costs

Importance of cost of attendance when choosing college	1=Don't know, 2=Not at all important, 3=Somewhat important, 4=Very important
Importance of job placement when choosing college	1=Don't know, 2=Not at all important, 3=Somewhat important, 4=Very important
Importance of graduate school placement when choosing college	1=Don't know, 2=Not at all important, 3=Somewhat important, 4=Very important
Importance of particular program when choose college	1=Don't know, 2=Not at all important, 3=Somewhat important, 4=Very important
Teen thinks studying in high school rarely pays off later with good job	1=Strongly disagree, 2= Disagree, 3= Agree, 4=Strongly agree
Cost of current college before financial aid for 2013-2014 school year (divided by $1,000)	$0 - 800.00
Estimated cost of tuition/mandatory fees for college (factor)	Factor

Habitus: Demographics & Background Characteristics

Sex	1=Male, 2=Female
Racial Background: Asian	0=Not Asian, 1=Asian
Racial Background: Black/African American	0=Not Black/African American, 1=Black/African American
Racial Background: Hispanic	0=Not Hispanic, 1=Hispanic

Racial Background: More Than One Race	0=Not More Than One Race, 1=More Than One Race
First language 9th grader learned to speak is English, Spanish, or other	1=English, 2=Spanish, 3=Another language, 4=English and Spanish equally, 5=English and another language equally
Social Capital: Sources of Information about College	
Count of college preparation activities	0=No, 1=Yes
Has met with high school counselor about college admissions in 2012-2013 year	1=Yes, 2=No, 3=Don't know
Has met with high school counselor about financial aid in 2012-2013 year	1=Yes, 2=No, 3=Don't know
Count of having ever participated in a college access program	1=Yes, 2=No, 3=Don't know what this is
Social Capital: Networks	
How many friends plan to attend 2-year community college	0=None of them, 1=Less than half, 2=About half, 3=More than half, 4=All of them, 5=Don't know
How many friends plan to attend 4-year college	0=None of them, 1=Less than half, 2=About half, 3=More than half, 4=All of them, 5=Don't know
Person who has had most influence on thinking about education after HS	1=High school counselor, 2=Teacher, 3=Parents or Family, 4=Friends, 5=Other (hired counselor, employer, recruiter, coach), 6=Yourself, No one in particular, Don't know
Count of people student talked to about going to college	0=No, 1=Yes
9th grader talked to school counselor about going to college	0=No, 1=Yes
How often discussed applying to college/other schools after high school	1=Never, 2=Once or twice, 3=Three or four times, 4=More than four times
Cultural Capital: Value of College Attainment	

How far in school teenager would like to go	1=Less than high school completion, 2=Complete HS diploma/GED/alternative HS credential, 3=Complete certificate/diploma from school providing occupational training, 4=Complete Associate's degree, 5=Complete Bachelor's degree, 6=Complete Master's degree, 7=Complete Ph.D./M.D./law degree/other high level professional degree, 8=Don't know
How far in school parents would like teenager to go	1=Less than high school completion, 2=Complete HS diploma/GED/alternative HS credential, 3=Complete certificate/diploma from school providing occupational training, 4=Complete Associate's degree, 5=Complete Bachelor's degree, 6=Complete Master's degree, 7=Complete Ph.D./M.D./law degree/other high level professional degree, 8=Don't know
What students think parents think is most important: continue education	0=Working, Serving in the military, Starting family/taking care of children, Attending high school/GED completion course; 1=Continuing education after high school
Importance of academic quality when coosing college	1=Don't know, 2=Not at all important, 3=Somewhat important, 4=Very important
Cultural Capital: Cultural Knowledge	
Count of cultural capital activities	0=No, 1=Yes
School-Level Predictors of Undermatch	
School Characteristics (Covariates)	
Control	1=Public, 2=Catholic or other private
School locale (urbanicity)	1=City, 2=Suburb, 3=Town, 4=Rural
School type: Regular school	0= Not regular school 1=Regular school (not incl. magnet/charter)

School Population (Covariates)	
% of student body receiving free or reduced-price lunch	0-100%
% of student body enrolled in Advanced Placement courses	0-100%
% White students	0-100%
% of 08-09 seniors who went to 4-year Bachelor's-granting institution	0-100%
Counseling Norms	
Average caseload for school's counselors	1=0-50, 2=51-100…16=751=800, 17=801+
% hours spent on college readiness/selection/apply	1=5% or less, 2=6%-10%, 3=11%-20%, 4=21%-50%, 5=More than 50%
School has counselor designated for college selection	0=No, 1=Yes
School has counselor designated for college applications	0=No, 1=Yes
Primary goal of counseling program: college prep.	0=Help students with other things besides college prep 1=Help students prep for postsec schooling
Composite score of counselor expectations	Factor
Counseling Resources	
Count of college information support activities	0=No, 1=Yes
Count of financial aid support activities	0=No, 1=Yes
Count of college entrance exam support activities	0=No, 1=Yes
School organizes student visits to colleges	0=No, 1=Yes
School assists students with finding financial aid for college	0=No, 1=Yes
School consults with postsecondary reps about requirement/qualifications	0=No, 1=Yes

Source: HSLS:09 restricted data

Appendix C: Factors

Factors included in HGLM models

Construct Description	Factor Loadings
Human Capital: Expected Benefits and Costs- Estimated College Costs	Chronbach's Alpha=.80
Cost of tuition/mandatory fees at public in-state 2-year college	0.70
Cost of tuition/mandatory fees at typical private 4-year college	0.76
Cost of tuition/mandatory fees at public in-state 4-year college	0.90
Human Capital: Supply of Resources- Anticipated Funding	Chronbach's Alpha=.72
Will pay for college with scholarships/grants	0.50
Will pay for college with federal or state loans	0.77
Will pay for college with private loans in family members' name	0.82
Will pay for college with private loans in student's name	0.85
Counseling Norms: Composite score of counselor expectations	Chronbach's Alpha=.78*
Counselors in this school set high standards for students' learning	
Counselors in this school believe all students can do well	
Counselors in this school work hard to make sure all students learn	
Counselors in this school have given up on some students	
Counselors in this school care only about smart students	
Counselors in this school expect very little from students	

*Factor developed by HSLS. SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. High School Longitudinal Study of 2009 (HSLS:09) Base Year.
NOTE: School counselor estimates were calculated from the school-level file using the school-level weight (W1SCHOOL).
Source: HSLS:09 restricted data

Appendix D: Count Variables

Items in Count Variables

Item Description	Variable Name
Student-Level Count Variables	
Count of college preparation activities	
Attended a program at, or taken a tour of a college campus	S2CLGTOUR
Sat in on or taken a college class	S2CLGCLASS
Searched Internet or read college guides for college options	S2CLGSEARCH
Talked w/ high school counselor about options for after high school	S2TALKHSCNSL
Talked about options w/ counselor hired to prepare for college admission	S2TALKCLGCNSL
Took a course to prepare for a college admission exam	S2CLGEXAMPREP
Count of having ever participated in a college access program	
Teen has ever participated in Upward Bound	S2EVERUPWARD
Teen has ever participated in Talent Search	S2EVERTALENT
Teen has ever participated in Gear Up	S2EVERGEARUP
Teen has ever participated in AVID	S2EVERAVID
Teen has ever participated in MESA	S2EVERMESA
Count of people student talked to about going to college	
9th grader talked to mother about going to college	S1MOMTALKCLG
9th grader talked to father about going to college	S1DADTALKCLG
9th grader talked to friends about going to college	S1FRNDTLKCLG
9th grader talked to teacher about going to college	S1TCHTALKCLG
Count of cultural capital activities	
Visited science-related destination together in last year	P2MUSEUM
Worked or played on computer with teenager in last year	P2COMPUTER
Helped teenager with a school science fair project in last year	P2SCIPROJ
Discussed STEM program or article with teenager in last year	P2STEMDISC
Visited a library with teenager in last year	P2LIBRARY
Went to a play, concert, or live show with teenager in last year	P2SHOW
Went to an art museum or exhibit together in last year	P2ARTEXHIBIT
School-Level Count Variables	
Count of college entrance exam support activities	

School provides information on date/location of college entrance exams	C2CLGEXAMINFO
School provides assistance with college entrance exam registration	C2CLGEXAMREG
School provides assistance with college entrance exam fees	C2CLGEXAMFEE
School provides assistance with college entrance exam preparation	C2CLGEXAMPREP
Count of financial aid support activities	
School sends reminders of FAFSA deadlines	C2AIDDEADLINE
School assists with completing FAFSA	C2AIDFAFSA
School provides computer access for completing FAFSA	C2AIDCOMPUTER
School holds meetings on FAFSA process	C2AIDPROCESS
School assists with non-FAFSA financial aid applications	C2AIDOTHAPP
School offers meetings on sources of financial aid	C2AIDSOURCE
School offers individual counseling to identify financial aid	C2AIDCNSL
School provides flyers/pamphlets on financial aid	C2AIDFLYER
Count of college information support activities	
School holds or participates in college fairs	C2CLGFAIR
School holds college information sessions	C2INFOSESSN
School helps with completing college applications	C2CLGAPPS
School provides access to information on colleges	C2CLGINFO
School helps with selecting colleges to apply to	C2CLGSELECT

Source: HSLS:09 restricted data

Appendix E: Correlations of Secondary School (L2) Variables

Correlations of Secondary School Variables (n=940 schools)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Control: Public	-																		
2	School locale (urbanicity): City	-0.24	-																	
3	School type: Regular school, not charter or magnet	0.16	0.25	-																
4	75%+ of student body receiving FRP lunch	-0.62	0.13	-0.31	-															
5	25%+ of students enrolled in AP courses	0.11	-0.35	-0.06	-0.23	-														
6	75%+ White students	0.03	0.35	0.33	-0.38	-0.25	-													
7	75%+ of students went to Bachelor's-granting institution	0.43	-0.26	0.04	-0.52	0.43	0.02	-												
8	Average caseload for school's counselors is 500+	-0.45	0.04	0.07	0.16	0.12	-0.11	-0.16	-											
9	50%+ hours spent on college readiness/selection/apply	-0.10	-0.07	-0.05	0.02	0.22	-0.08	0.31	0.09	-										
10	School has counselor designated for college selection	0.09	-0.04	0.09	-0.08	0.08	-0.02	0.21	0.06	0.29	-									
11	School has counselor designated for college applications	0.18	-0.04	0.03	-0.12	0.10	0.01	0.19	-0.04	0.24	0.85	-								
12	Primary goal of counseling program: college prep.	0.13	-0.03	0.03	-0.18	0.26	0.06	0.33	-0.03	0.30	0.16	0.13	-							
13	Counselors have higher than average expectations for students	0.04	-0.07	-0.07	-0.11	0.17	-0.06	0.12	0.09	0.16	0.09	0.10	0.10	-						
14	There are 5 college information support activities	-0.26	-0.05	0.03	0.15	0.19	-0.01	0.07	0.08	0.30	0.20	0.10	0.13	0.01	-					
15	There are 8 financial aid support activities	-0.43	0.13	-0.08	0.42	0.04	-0.08	-0.19	0.14	0.26	0.13	0.05	0.04	-0.02	0.57	-				
16	There are 4 college entrance exam support activities	-0.32	0.05	-0.09	0.28	0.04	0.01	-0.11	-0.02	0.24	0.06	0.02	0.08	0.01	0.54	0.50	-			
17	School organizes student visits to colleges	-0.09	-0.08	-0.10	0.18	0.03	-0.14	-0.06	0.11	0.19	0.14	0.11	0.03	0.10	0.17	0.23	0.14	-		
18	School assists students with finding financial aid	-0.35	0.09	-0.02	0.31	0.02	-0.04	0.03	0.19	0.26	0.09	0.00	0.04	0.00	0.28	0.37	0.07	0.15	-	
19	School consults with postsecondary reps	-0.10	-0.07	0.16	0.02	0.09	0.11	0.08	0.08	0.03	0.07	-0.01	0.07	-0.02	0.13	0.02	0.05	0.02	0.18	-

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

Source: HSLS:09 restricted data

Appendix F: Description of Student Sample at First Two Collection Points

Description of Student Sample at Base-year and First Follow-Up Collection points

Description	Proportion	
	Base-Year (n=20,952)	First Follow-Up (n=20,175)
Sex: Female	49.3	49.6
Race: Hispanic/Latino	16.4	15.9
Race: White	74.4	74.6
Race: Black/African American	16.6	16.1
Race: Asian	11.1	11.3
Race: NHPI	3.0	2.9
Race: AIAN	8.0	7.5
Student's native language: English	83.4	83.5
SES†:Top two-fifths	46.2	47.5

† function of a) highest education among parents/guardians, b) education level of other parent/guardian, c) highest occupation prestige score among parent/guardians, d) occupation prestige score of other parent/guardian, e) family income

Source: HSLS:09 restricted data

Appendix G: Undermatch Tables for Racial Groups

Extent of Academic Undermatch for Asian Students

	Students Applied to Campuses: (n=300)*					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Noncompetitive	Total (by application)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	97.8	1.1	1.2	-	23.4	2.3
Very Competitive	58.6	28.9	12.3	0.2	44.1	12.5
Competitive	29.1	30.7	38.5	1.7	25.9	1.7
Less/Noncompetitive	34.7	30.1	7.7	27.5	1.4	§
Two-Year Institutions	14.2	13.9	71.0	1.0	5.2	§
Total (by access)	57.5	22.1	19.5	0.9	100.0	7.0
	Students Admitted to Campuses: (n=270)*					
Student Qualifies for:						
Most/Highly Competitive	92.4	6.4	1.3	-	25.5	7.7
Very Competitive	44.0	37.3	18.6	0.2	44.5	18.8
Competitive	11.3	41.9	44.8	2.0	24.2	2.0
Less/Noncompetitive	2.6	18.1	27.2	52.1	1.1	§
Two-Year Institutions	-	-	57.4	42.6	4.6	§
Total (by access)	45.9	28.6	22.4	3.1	100.0	11.5
	Students Attended Campuses: (n=250)*					
Student Qualifies for:						
Most/Highly Competitive	83.0	13.1	3.2	0.7	27.7	17.0
Very Competitive	32.3	43.8	21.7	2.2	47.8	23.9
Competitive	12.3	37.9	44.2	5.6	19.7	5.6
Less/Noncompetitive	-	17.0	25.0	58.1	1.1	†
Two-Year Institutions	-	-	42.9	57.1	3.6	†
Total (by access)	40.9	32.2	21.8	5.1	100.0	18.1

† This sample does not include information on two-year enrollment by institutional identifier. Therefore, unable to determine percent undermatch within the four-year sample. A separate two-year analysis is included later in the chapter.

§ As two-year institutions are open-access, there is no competitive admission process. Given the operationalization of undermatch at application and admission these percentages cannot be determined.

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

Source: HSLS:09 restricted data

Extent of Academic Undermatch for Black/African American Students

	Students Applied to Campuses: (n=620)*					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Noncompetitive	Total (by application)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	49.7	50.3	-	-	1.2	50.3
Very Competitive	63.0	17.6	13.2	6.3	20.5	19.5
Competitive	23.0	33.2	37.7	6.1	35.0	6.1
Less/Noncompetitive	6.2	35.6	36.9	21.3	5.2	§
Two-Year Institutions	8.3	30.9	46.4	14.5	38.0	§
Total (by access)	25.1	29.4	35.5	10.0	100.0	11.1
	Students Admitted to Campuses: (n=470)*					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Noncompetitive	Total (by admittance)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	48.7	51.3	-	-	1.6	51.3
Very Competitive	36.8	30.9	24.0	8.3	20.7	32.3
Competitive	16.5	31.0	44.1	8.4	42.3	8.4
Less/Noncompetitive	-	17.5	52.4	30.1	6.0	§
Two-Year Institutions	2.6	10.9	63.2	23.3	29.4	§
Total (by access)	16.2	24.6	45.3	13.9	100.0	16.3
	Students Attended Campuses: (n=420)*					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Noncompetitive	Total (by attendance)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	48.7	1.1	50.3	-	1.8	51.4
Very Competitive	17.4	25.9	45.7	11.0	22.9	56.7
Competitive	7.6	23.2	61.1	8.1	42.5	8.1
Less/Noncompetitive	-	12.8	54.3	32.9	6.2	†
Two-Year Institutions	0.0	10.5	59.3	30.2	26.6	†
Total (by access)	8.1	19.4	56.5	16.0	100.0	25.1

† This sample does not include information on two-year enrollment by institutional identifier. Therefore, unable to determine percent undermatch within the four-year sample. A separate two-year analysis is included later in the chapter.

§ As two-year institutions are open-access, there is no competitive admission process. Given the operationalization of undermatch at application and admission these percentages cannot be determined.

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

Source: HSLS:09 restricted data

Extent of Academic Undermatch for Hispanic Students

	Students Applied to Campuses: (n=830)*					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Noncompetitive	Total (by application)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	93.9	6.1	-	-	3.6	6.1
Very Competitive	45.1	40.1	11.0	3.8	31.4	14.8
Competitive	22.1	30.7	42.5	4.8	34.9	4.8
Less/Noncompetitive	19.1	12.5	52.6	15.7	13.9	§
Two-Year Institutions	15.2	22.5	54.0	8.4	16.1	§
Total (by access)	30.4	28.9	34.4	6.4	100.0	9.4
	Students Admitted to Campuses: (n=710)*					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Noncompetitive	Total (by admittance)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	79.2	12.5	8.3	-	4.2	20.8
Very Competitive	36.0	34.6	24.6	4.8	34.3	29.4
Competitive	17.9	25.1	48.7	8.3	38.0	8.3
Less/Noncompetitive	6.7	7.4	56.5	29.4	12.7	§
Two-Year Institutions	6.0	17.5	63.7	12.8	10.8	§
Total (by access)	23.9	24.8	41.4	9.9	100.0	18.4
	Students Attended Campuses: (n=570)*					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Noncompetitive	Total (by attendance)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	72.6	17.1	10.3	-	5.2	27.4
Very Competitive	29.8	35.0	28.2	7.0	34.7	35.2
Competitive	3.8	21.6	60.6	14.0	41.6	14.0
Less/Noncompetitive	-	7.5	30.9	61.6	10.3	†
Two-Year Institutions	0.8	17.9	65.0	16.4	8.2	†
Total (by access)	15.7	24.3	44.0	15.9	100.0	23.9

† This sample does not include information on two-year enrollment by institutional identifier. Therefore, unable to determine percent undermatch within the four-year sample. A separate two-year analysis is included later in the chapter.

§ As two-year institutions are open-access, there is no competitive admission process. Given the operationalization of undermatch at application and admission these percentages cannot be determined.

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

Source: HSLS:09 restricted data

Extent of Academic Undermatch for Students of more than One Race

	Students Applied to Campuses: (n=400)*					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Noncompetitive	Total (by application)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	91.2	3.3	5.6	-	6.6	8.9
Very Competitive	44.6	34.2	19.6	1.6	40.1	21.2
Competitive	17.5	41.0	38.4	3.1	37.0	3.1
Less/Noncompetitive	-	67.2	12.0	20.8	4.8	§
Two-Year Institutions	3.3	33.1	54.6	9.0	11.5	§
Total (by access)	30.7	36.1	29.3	3.8	100.0	12.2
	Students Admitted to Campuses: (n=370)*					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Noncompetitive	Total (by admittance)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	77.6	16.6	5.7	-	7.0	22.3
Very Competitive	29.7	39.1	29.6	1.6	43.7	31.2
Competitive	8.8	35.4	45.3	10.5	36.2	10.5
Less/Noncompetitive	-	-	79.2	20.8	5.3	§
Two-Year Institutions	-	20.0	61.4	18.6	7.7	§
Total (by access)	21.6	32.6	38.7	7.0	100.0	21.8
	Students Attended Campuses: (n=310)*					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Noncompetitive	Total (by attendance)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	65.2	23.5	8.0	3.3	8.2	34.8
Very Competitive	16.1	32.8	46.2	4.9	42.6	51.1
Competitive	4.3	19.8	57.8	18.1	35.5	18.1
Less/Noncompetitive	-	-	44.6	55.4	6.1	†
Two-Year Institutions	-	17.8	44.8	37.3	7.6	†
Total (by access)	13.7	24.3	47.0	15.0	100.0	36.0

† This sample does not include information on two-year enrollment by institutional identifier. Therefore, unable to determine percent undermatch within the four-year sample. A separate two-year analysis is included later in the chapter.

§ As two-year institutions are open-access, there is no competitive admission process. Given the operationalization of undermatch at application and admission these percentages cannot be determined.

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

Source: HSLS:09 restricted data

Extent of Academic Undermatch for White Students

	Students Applied to Campuses: (n=3,260)*					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Noncompetitive	Total (by application)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	75.2	15.6	9.2	-	11.2	24.8
Very Competitive	38.7	35.6	23.3	2.4	51.7	25.7
Competitive	13.0	39.0	42.5	5.5	28.7	5.5
Less/Noncompetitive	6.4	29.4	54.9	9.4	2.4	§
Two-Year Institutions	5.1	23.4	59.3	12.3	6.0	§
Total (by access)	32.6	33.5	30.1	3.8	100.0	19.3
	Students Admitted to Campuses: (n=3,060)*					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Noncompetitive	Total (by admittance)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	68.1	19.6	12.3	-	11.9	31.9
Very Competitive	30.9	39.4	26.8	2.9	53.8	29.7
Competitive	6.3	35.9	50.6	7.2	27.5	7.2
Less/Noncompetitive	2.9	24.0	56.0	17.1	2.1	§
Two-Year Institutions	1.9	18.7	59.2	20.2	4.7	§
Total (by access)	26.6	34.8	33.8	4.8	100.0	23.3
	Students Attended Campuses: (n=2,760)*					
	Most/Highly Competitive	Very Competitive	Competitive	Less/ Noncompetitive	Total (by attendance)	Percent Undermatch
Student Qualifies for:						
Most/Highly Competitive	50.6	26.7	19.9	2.8	12.9	49.4
Very Competitive	20.0	35.0	39.8	5.2	55.3	45.0
Competitive	3.0	28.5	55.9	12.6	25.6	12.6
Less/Noncompetitive	2.2	16.6	55.9	25.3	1.8	†
Two-Year Institutions	-	10.5	63.5	26.0	4.3	†
Total (by access)	18.4	30.9	42.7	8.0	100.0	36.8

† This sample does not include information on two-year enrollment by institutional identifier. Therefore, unable to determine percent undermatch within the four-year sample. A separate two-year analysis is included later in the chapter.

§ As two-year institutions are open-access, there is no competitive admission process. Given the operationalization of undermatch at application and admission these percentages cannot be determined.

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

Source: HSLS:09 restricted data

Extent of Academic Undermatch at Two-Year Institutions for Norm Weighted National Sample by Racial Group*

Student Qualifies for:	Nationally (n=6,800)	Asian (n=330)	Hispanic (n=1,120)	Black/ African-American (n=750)	More than one Race (n=530)	White (n=4,020)
Most/Highly Competitive	5.5	4.6	12.0	-	7.4	5.2
Very Competitive	20.8	13.3	33.5	7.9	27.8	19.5
Competitive	39.2	42.7	45.7	39.8	32.8	37.8
Less/Noncompetitive	38.2	44.7	39.7	16.9	14.6	47.9
Two-Year Institutions	43.4	54.1	51.9	36.5	34.0	44.1
Percent Undermatch	27.5	21.1	39.2	27.1	27.9	25.4

*Numbers and subsequent references to student and institutional sample size have been rounded per NCES reporting guidelines.

Source: HSLS:09 restricted data

Appendix H: Post-Hoc Tests by Racial Groups

Dunnett's T3 Post-Hoc Tests for Access by Racial Groups

1st Group	2nd Group	Means	Mean Diff. (1st-2nd)	p<.05
Asian	Black/African-American	1.26	1.39	***
	Hispanic	1.64	1.00	***
	More than One Race	1.93	0.71	***
	White	2.40	0.24	**
Black/African-American	Asian	2.64	-1.39	***
	Hispanic	1.64	-0.38	***
	More than One Race	1.93	-0.68	***
	White	2.40	-1.15	***
Hispanic	Asian	2.64	-1.00	***
	Black African-American	1.26	0.38	***
	More than One Race	1.93	-0.30	***
	White	2.40	-0.76	***
More than One Race	Asian	2.64	-0.71	***
	Black African-American	1.26	0.68	***
	Hispanic	1.64	0.30	***
	White	2.40	-0.47	***
White	Asian	2.64	-0.24	**
	Black African-American	1.26	1.15	***
	Hispanic	1.64	0.76	***
	More than One Race	1.93	0.47	***

*p<.05 **p<.01 ***p<.001

Source: HSLS:09 restricted data

Dunnett's T3 Post-Hoc Tests for Undermatch at Application by Racial Groups

1st Group	2nd Group	Means	Mean Diff. (1st-2nd)	p<.05
Asian	Black/African-American	0.067	-0.003	
	Hispanic	0.065	-0.001	
	More than One Race	0.102	-0.038	
	White	0.177	-0.112	***
Black/African-American	Asian	0.065	0.003	
	Hispanic	0.065	0.002	
	More than One Race	0.102	-0.035	
	White	0.177	-0.109	***
Hispanic	Asian	0.065	0.001	
	Black African-American	0.067	-0.002	
	More than One Race	0.102	-0.037	
	White	0.177	-0.111	***
More than One Race	Asian	0.065	0.038	
	Black African-American	0.067	0.035	
	Hispanic	0.065	0.037	
	White	0.177	-0.074	***
White	Asian	0.065	0.112	***
	Black African-American	0.067	0.109	***
	Hispanic	0.065	0.111	***
	More than One Race	0.102	0.074	***

*p<.05 **p<.01 ***p<.001

Source: HSLS:09 restricted data

Dunnett's T3 Post-Hoc Tests for Undermatch at Admission by Racial Groups

1st Group	2nd Group	Means	Mean Diff. (1st-2nd)	p<.05
Asian	Black/African-American	0.111	-0.003	
	Hispanic	0.141	-0.033	
	More than One Race	0.191	-0.083	*
	White	0.218	-0.110	***
Black/African-American	Asian	0.108	0.003	
	Hispanic	0.141	-0.030	
	More than One Race	0.191	-0.079	*
	White	0.218	-0.107	***
Hispanic	Asian	0.108	0.033	
	Black African-American	0.111	0.030	
	More than One Race	0.191	-0.049	
	White	0.218	-0.076	***
More than One Race	Asian	0.108	0.083	*
	Black African-American	0.111	0.079	*
	Hispanic	0.141	0.049	
	White	0.218	-0.027	
White	Asian	0.108	0.110	***
	Black African-American	0.111	0.107	***
	Hispanic	0.141	0.076	***
	More than One Race	0.191	0.027	

*p<.05 **p<.01 ***p<.001

Source: HSLS:09 restricted data

Dunnett's T3 Post-Hoc Tests for Undermatch at Attendance by Racial Groups

1st Group	2nd Group	Means	Mean Diff. (1st-2nd)	p<.05
Asian	Black/African-American	0.174	-0.001	
	Hispanic	0.195	-0.022	
	More than One Race	0.311	-0.138	**
	White	0.345	-0.173	***
Black/African-American	Asian	0.173	0.001	
	Hispanic	0.195	-0.021	
	More than One Race	0.311	-0.137	***
	White	0.345	-0.172	***
Hispanic	Asian	0.173	0.022	
	Black African-American	0.174	0.021	
	More than One Race	0.311	-0.116	**
	White	0.345	-0.151	***
More than One Race	Asian	0.173	0.138	**
	Black African-American	0.174	0.137	***
	Hispanic	0.195	0.116	**
	White	0.345	-0.034	
White	Asian	0.173	0.173	***
	Black African-American	0.174	0.172	***
	Hispanic	0.195	0.151	***
	More than One Race	0.311	0.034	

*p<.05 **p<.01 ***p<.001

Source: HSLS:09 restricted data

HGLM Results for Undermatch at Application (n=1,140 students, 560 high schools)

	Unconditional Model			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)				
SES Second Quintile (ref: Highest Quintile)				
SES Third Quintile (ref: Highest Quintile)				
SES Fourth Quintile (ref: Highest Quintile)				
Anticipated Funding				
Importance of cost of attendance when choosing college				
Importance of job placement when choosing college				
Importance of graduate school placement when choosing college				
Importance of particular program when choose college				
Teen thinks studying in high school rarely pays off later with good job				
Cost of curent college before financial aid for 2013-2014 school year				
Estimated cost of tuition/mandatory fees for college (factor)				
Sex				
Racial Background: Asian				
Racial Background: Black/African American				
Racial Background: Hispanic				
Racial Background: More Than One Race				
First language 9th grader learned to speak is English, Spanish, or other				
Count of college preparation activities				
Has met with high school counselor about college admissions in 2012-2013 year				
Has met with high school counselor about financial aid in 2012-2013 year				
Count of having ever participated in a college access program				
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-1.638	0.124	***	
Variance Component (S.D.)	1.085	1.042	***	
Reliability	0.423			
-2 Log Likelihood	7613.92			

*p<.05 **p<.01 ***p<.001

HGLM Results for Undermatch at Application (n=1,140 students, 560 high schools), continued

	Human Capital: Resources			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	-0.369	0.451		
SES Second Quintile (ref: Highest Quintile)	0.073	0.359		
SES Third Quintile (ref: Highest Quintile)	0.306	0.296		
SES Fourth Quintile (ref: Highest Quintile)	-0.063	0.253		
Anticipated Funding	-0.371	0.143	**	-9.24
Importance of cost of attendance when choosing college				
Importance of job placement when choosing college				
Importance of graduate school placement when choosing college				
Importance of particular program when choose college				
Teen thinks studying in high school rarely pays off later with good job				
Cost of curent college before financial aid for 2013-2014 school year				
Estimated cost of tuition/mandatory fees for college (factor)				
Sex				
Racial Background: Asian				
Racial Background: Black/African American				
Racial Background: Hispanic				
Racial Background: More Than One Race				
First language 9th grader learned to speak is English, Spanish, or other				
Count of college preparation activities				
Has met with high school counselor about college admissions in 2012-2013 year				
Has met with high school counselor about financial aid in 2012-2013 year				
Count of having ever participated in a college access program				
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-1.585	0.136	***	
Variance Component (S.D.)	1.035	1.017	***	
Reliability	0.360			
-2 Log Likelihood	5365.15			

HGLM Results for Undermatch at Application (n=1,140 students, 560 high schools), continued

	Human Capital: Benefits & Costs			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	-0.389	0.645		
SES Second Quintile (ref: Highest Quintile)	0.029	0.397		
SES Third Quintile (ref: Highest Quintile)	0.396	0.347		
SES Fourth Quintile (ref: Highest Quintile)	-0.063	0.293		
Anticipated Funding	-0.375	0.168	*	-9.34
Importance of cost of attendance when choosing college	0.186	0.176		
Importance of job placement when choosing college	0.188	0.194		
Importance of graduate school placement when choosing college	-0.010	0.167		
Importance of particular program when choose college	-0.007	0.179		
Teen thinks studying in high school rarely pays off later with good job	0.099	0.132		
Cost of curent college before financial aid for 2013-2014 school year	-0.028	0.010	**	-0.70
Estimated cost of tuition/mandatory fees for college (factor)	-0.058	0.223		
Sex				
Racial Background: Asian				
Racial Background: Black/African American				
Racial Background: Hispanic				
Racial Background: More Than One Race				
First language 9th grader learned to speak is English, Spanish, or other				
Count of college preparation activities				
Has met with high school counselor about college admissions in 2012-2013 year				
Has met with high school counselor about financial aid in 2012-2013 year				
Count of having ever participated in a college access program				
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-1.606	0.152	***	
Variance Component (S.D.)	1.051	1.025	***	
Reliability	0.315			
-2 Log Likelihood	3966.58			

HGLM Results for Undermatch at Application (n=1,140 students, 560 high schools), continued

	Habitus: Background			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.136	0.596		
SES Second Quintile (ref: Highest Quintile)	0.164	0.423		
SES Third Quintile (ref: Highest Quintile)	0.573	0.366		
SES Fourth Quintile (ref: Highest Quintile)	0.118	0.296		
Anticipated Funding	-0.417	0.173	*	-10.37
Importance of cost of attendance when choosing college	0.196	0.177		
Importance of job placement when choosing college	0.218	0.197		
Importance of graduate school placement when choosing college	0.032	0.174		
Importance of particular program when choose college	-0.035	0.184		
Teen thinks studying in high school rarely pays off later with good job	0.039	0.135		
Cost of curent college before financial aid for 2013-2014 school year	-0.029	0.010	**	-0.72
Estimated cost of tuition/mandatory fees for college (factor)	-0.092	0.272		
Sex	0.087	0.246		
Racial Background: Asian	-1.036	0.767		
Racial Background: Black/African American	-1.580	0.577	**	-12.21
Racial Background: Hispanic	-0.665	0.608		
Racial Background: More Than One Race	-0.825	0.452		
First language 9th grader learned to speak is English, Spanish, or other	-0.564	0.376		
Count of college preparation activities				
Has met with high school counselor about college admissions in 2012-2013 year				
Has met with high school counselor about financial aid in 2012-2013 year				
Count of having ever participated in a college access program				
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-0.857	0.566		
Variance Component (S.D.)	0.853	0.923	***	
Reliability	0.256			
-2 Log Likelihood	3811.99			

HGLM Results for Undermatch at Application (n=1,140 students, 560 high schools), continued

	Social Capital: Sources of College Info.			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	-0.052	0.604		
SES Second Quintile (ref: Highest Quintile)	-0.099	0.444		
SES Third Quintile (ref: Highest Quintile)	0.324	0.374		
SES Fourth Quintile (ref: Highest Quintile)	-0.028	0.306		
Anticipated Funding	-0.453	0.177	*	-11.25
Importance of cost of attendance when choosing college	0.189	0.180		
Importance of job placement when choosing college	0.196	0.202		
Importance of graduate school placement when choosing college	0.071	0.180		
Importance of particular program when choose college	0.012	0.192		
Teen thinks studying in high school rarely pays off later with good job	0.034	0.137		
Cost of curent college before financial aid for 2013-2014 school year	-0.026	0.010	**	-0.65
Estimated cost of tuition/mandatory fees for college (factor)	-0.039	0.247		
Sex	0.082	0.251		
Racial Background: Asian	-1.008	0.775		
Racial Background: Black/African American	-1.562	0.595	**	-12.13
Racial Background: Hispanic	-0.690	0.619		
Racial Background: More Than One Race	-0.827	0.462		
First language 9th grader learned to speak is English, Spanish, or other	-0.566	0.380		
Count of college preparation activities	-0.141	0.106		
Has met with high school counselor about college admissions in 2012-2013 yea	0.660	0.272	*	15.52
Has met with high school counselor about financial aid in 2012-2013 year	-0.493	0.241	*	-12.23
Count of having ever participated in a college access program	0.276	0.240		
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-0.929	0.644		
Variance Component (S.D.)	0.919	0.959	***	
Reliability	0.262			
-2 Log Likelihood	3732.70			

HGLM Results for Undermatch at Application (n=1,140 students, 560 high schools), continued

	Social Capital: Networks			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.494	0.844		
SES Second Quintile (ref: Highest Quintile)	-0.137	0.602		
SES Third Quintile (ref: Highest Quintile)	0.619	0.494		
SES Fourth Quintile (ref: Highest Quintile)	-0.123	0.456		
Anticipated Funding	-0.631	0.267	*	-15.52
Importance of cost of attendance when choosing college	0.002	0.250		
Importance of job placement when choosing college	-0.052	0.253		
Importance of graduate school placement when choosing college	0.022	0.219		
Importance of particular program when choose college	0.483	0.313		
Teen thinks studying in high school rarely pays off later with good job	-0.044	0.209		
Cost of curent college before financial aid for 2013-2014 school year	-0.032	0.014	*	-0.80
Estimated cost of tuition/mandatory fees for college (factor)	-0.173	0.353		
Sex	0.265	0.350		
Racial Background: Asian	-1.532	0.829		
Racial Background: Black/African American	-3.023	1.488	*	-17.36
Racial Background: Hispanic	-1.437	0.798		
Racial Background: More Than One Race	-0.696	0.816		
First language 9th grader learned to speak is English, Spanish, or other	-0.055	0.280		
Count of college preparation activities	-0.266	0.138		
Has met with high school counselor about college admissions in 2012-2013 yea	0.827	0.403	*	18.98
Has met with high school counselor about financial aid in 2012-2013 year	-0.194	0.330		
Count of having ever participated in a college access program	0.466	0.370		
How many friends plan to attend 2-year community college	0.091	0.100		
How many friends plan to attend 4-year college	-0.103	0.176		
Person who has had most influence on thinking about education after HS	0.049	0.113		
Count of people student talked to about going to college	0.316	0.176		
9th grader talked to school counselor about going to college	0.254	0.386		
How often discussed applying to college/other schools after high school	0.006	0.211		
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-2.578	1.026	*	
Variance Component (S.D.)	0.568	0.754	***	
Reliability	0.119			
-2 Log Likelihood	1616.19			

HGLM Results for Undermatch at Application (n=1,140 students, 560 high schools), continued

	Cultural Capital: Value of College			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.713	0.844		
SES Second Quintile (ref: Highest Quintile)	0.061	0.598		
SES Third Quintile (ref: Highest Quintile)	0.653	0.498		
SES Fourth Quintile (ref: Highest Quintile)	-0.160	0.461		
Anticipated Funding	-0.552	0.260	*	-13.65
Importance of cost of attendance when choosing college	-0.015	0.255		
Importance of job placement when choosing college	-0.068	0.257		
Importance of graduate school placement when choosing college	0.042	0.217		
Importance of particular program when choose college	0.492	0.308		
Teen thinks studying in high school rarely pays off later with good job	-0.024	0.206		
Cost of curent college before financial aid for 2013-2014 school year	-0.033	0.014	*	-0.82
Estimated cost of tuition/mandatory fees for college (factor)	-0.315	0.392		
Sex	0.278	0.349		
Racial Background: Asian	-1.866	0.949		
Racial Background: Black/African American	-3.038	1.528	*	-17.40
Racial Background: Hispanic	-1.338	0.790		
Racial Background: More Than One Race	-0.661	0.828		
First language 9th grader learned to speak is English, Spanish, or other	-0.089	0.294		
Count of college preparation activities	-0.326	0.139	*	-8.13
Has met with high school counselor about college admissions in 2012-2013 yea	0.866	0.406	*	19.75
Has met with high school counselor about financial aid in 2012-2013 year	-0.198	0.331		
Count of having ever participated in a college access program	0.334	0.359		
How many friends plan to attend 2-year community college	0.099	0.100		
How many friends plan to attend 4-year college	-0.069	0.175		
Person who has had most influence on thinking about education after HS	0.071	0.116		
Count of people student talked to about going to college	0.363	0.183	*	8.83
9th grader talked to school counselor about going to college	0.314	0.390		
How often discussed applying to college/other schools after high school	0.035	0.212		
How far in school teenager would like to go	0.278	0.184		
How far in school parents would like teenager to go	-0.232	0.134		
What students think parents think is most important: continue education	-1.867	0.788	*	-35.05
Importance of academic quality when coosing college	0.304	0.390		
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-1.047	1.172		
Variance Component (S.D.)	0.457	0.676	***	
Reliability	0.095			
-2 Log Likelihood	1633.26			

HGLM Results for Undermatch at Application (n=1,140 students, 560 high schools), continued

	Cultural Capital: Cultural Knowledge			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.698	0.847		
SES Second Quintile (ref: Highest Quintile)	0.044	0.617		
SES Third Quintile (ref: Highest Quintile)	0.657	0.496		
SES Fourth Quintile (ref: Highest Quintile)	-0.162	0.462		
Anticipated Funding	-0.554	0.261	*	-13.70
Importance of cost of attendance when choosing college	-0.016	0.255		
Importance of job placement when choosing college	-0.064	0.257		
Importance of graduate school placement when choosing college	0.043	0.218		
Importance of particular program when choose college	0.496	0.309		
Teen thinks studying in high school rarely pays off later with good job	-0.023	0.207		
Cost of curent college before financial aid for 2013-2014 school year	-0.033	0.014	*	-0.82
Estimated cost of tuition/mandatory fees for college (factor)	-0.311	0.394		
Sex	0.285	0.350		
Racial Background: Asian	-1.864	0.946	*	-12.12
Racial Background: Black/African American	-3.037	1.532	*	-17.40
Racial Background: Hispanic	-1.324	0.785		
Racial Background: More Than One Race	-0.643	0.823		
First language 9th grader learned to speak is English, Spanish, or other	-0.083	0.294		
Count of college preparation activities	-0.327	0.139	*	-8.16
Has met with high school counselor about college admissions in 2012-2013 yea	0.861	0.408	*	19.65
Has met with high school counselor about financial aid in 2012-2013 year	-0.199	0.333		
Count of having ever participated in a college access program	0.333	0.360		
How many friends plan to attend 2-year community college	0.099	0.100		
How many friends plan to attend 4-year college	-0.069	0.176		
Person who has had most influence on thinking about education after HS	0.073	0.114		
Count of people student talked to about going to college	0.371	0.182	*	9.02
9th grader talked to school counselor about going to college	0.312	0.391		
How often discussed applying to college/other schools after high school	0.042	0.213		
How far in school teenager would like to go	0.280	0.184		
How far in school parents would like teenager to go	-0.235	0.133		
What students think parents think is most important: continue education	-1.870	0.791	*	-35.12
Importance of academic quality when coosing college	0.305	0.390		
Count of cultural capital activities	-0.022	0.095		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-1.009	1.222		
Variance Component (S.D.)	0.472	0.687	***	
Reliability	0.098			
-2 Log Likelihood	1631.57			

HGLM Results for Undermatch at Application (n=1,140 students, 560 high schools), continued

	School Characteristics			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	1.086	0.827		
SES Second Quintile (ref: Highest Quintile)	0.156	0.637		
SES Third Quintile (ref: Highest Quintile)	0.742	0.503		
SES Fourth Quintile (ref: Highest Quintile)	-0.141	0.480		
Anticipated Funding	-0.523	0.264	*	-12.95
Importance of cost of attendance when choosing college	-0.039	0.254		
Importance of job placement when choosing college	-0.050	0.563		
Importance of graduate school placement when choosing college	0.054	0.224		
Importance of particular program when choose college	0.561	0.318		
Teen thinks studying in high school rarely pays off later with good job	-0.018	0.211		
Cost of curent college before financial aid for 2013-2014 school year	-0.037	0.014	**	-0.92
Estimated cost of tuition/mandatory fees for college (factor)	-0.257	0.371		
Sex	0.212	0.356		
Racial Background: Asian	-1.801	0.920		
Racial Background: Black/African American	-2.506	1.270	*	-15.83
Racial Background: Hispanic	-1.439	0.836		
Racial Background: More Than One Race	-0.376	0.776		
First language 9th grader learned to speak is English, Spanish, or other	0.073	0.258		
Count of college preparation activities	-0.286	0.141	*	-7.14
Has met with high school counselor about college admissions in 2012-2013 yea	0.782	0.412		
Has met with high school counselor about financial aid in 2012-2013 year	-0.166	0.334		
Count of having ever participated in a college access program	0.368	0.364		
How many friends plan to attend 2-year community college	0.095	0.102		
How many friends plan to attend 4-year college	-0.065	0.181		
Person who has had most influence on thinking about education after HS	0.000	0.112		
Count of people student talked to about going to college	0.316	0.178		
9th grader talked to school counselor about going to college	0.308	0.402		
How often discussed applying to college/other schools after high school	0.105	0.212		
How far in school teenager would like to go	0.342	0.192		
How far in school parents would like teenager to go	-0.223	0.136		
What students think parents think is most important: continue education	-1.698	0.797	*	-31.03
Importance of academic quality when coosing college	0.245	0.399		
Count of cultural capital activities	-0.019	0.097		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)	0.391	0.301		
School locale (urbanicity)	0.311	0.165		
School type: Regular school (not charter, magnet, or alternative)	1.347	1.503		
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-3.588	2.042		
Variance Component (S.D.)	0.447	0.668	*	
Reliability	0.088			
-2 Log Likelihood	1587.65			

HGLM Results for Undermatch at Application (n=1,140 students, 560 high schools), continued

	School Population			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.907	0.867		
SES Second Quintile (ref: Highest Quintile)	0.033	0.662		
SES Third Quintile (ref: Highest Quintile)	0.824	0.511		
SES Fourth Quintile (ref: Highest Quintile)	-0.150	0.497		
Anticipated Funding	-0.603	0.271	*	-14.86
Importance of cost of attendance when choosing college	-0.060	0.261		
Importance of job placement when choosing college	-0.019	0.269		
Importance of graduate school placement when choosing college	0.020	0.226		
Importance of particular program when choose college	0.503	0.330		
Teen thinks studying in high school rarely pays off later with good job	-0.009	0.216		
Cost of curent college before financial aid for 2013-2014 school year	-0.039	0.015	**	-0.97
Estimated cost of tuition/mandatory fees for college (factor)	-0.189	0.355		
Sex	0.208	0.360		
Racial Background: Asian	-1.636	0.905		
Racial Background: Black/African American	-2.113	1.150		
Racial Background: Hispanic	-1.171	0.937		
Racial Background: More Than One Race	-0.347	0.799		
First language 9th grader learned to speak is English, Spanish, or other	0.157	0.254		
Count of college preparation activities	-0.288	0.146	*	-7.19
Has met with high school counselor about college admissions in 2012-2013 yea	0.806	0.415		
Has met with high school counselor about financial aid in 2012-2013 year	-0.102	0.343		
Count of having ever participated in a college access program	0.352	0.381		
How many friends plan to attend 2-year community college	0.065	0.104		
How many friends plan to attend 4-year college	-0.060	0.189		
Person who has had most influence on thinking about education after HS	-0.016	0.116		
Count of people student talked to about going to college	0.322	0.182		
9th grader talked to school counselor about going to college	0.271	0.415		
How often discussed applying to college/other schools after high school	0.122	0.218		
How far in school teenager would like to go	0.340	0.200		
How far in school parents would like teenager to go	-0.261	0.140		
What students think parents think is most important: continue education	-1.586	0.811		
Importance of academic quality when coosing college	0.334	0.409		
Count of cultural capital activities	-0.015	0.101		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)	0.638	0.342		
School locale (urbanicity)	0.273	0.176		
School type: Regular school (not charter, magnet, or alternative)	1.262	1.417		
% of student body receiving free or reduced-price lunch	0.019	0.012		
% of student body enrolled in Advanced Placement courses	0.016	0.016		
% White students	0.018	0.010		
% of 08-09 seniors who went to 4-year Bachelor's-granting institution	-0.003	0.011		
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-4.176	2.061	*	
Variance Component (S.D.)	0.546	0.739		
Reliability	0.100			
-2 Log Likelihood	1543.51			

HGLM Results for Undermatch at Application (n=1,140 students, 560 high schools), continued

	Counseling Norms			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	1.005	0.877		
SES Second Quintile (ref: Highest Quintile)	-0.083	0.646		
SES Third Quintile (ref: Highest Quintile)	0.725	0.502		
SES Fourth Quintile (ref: Highest Quintile)	-0.271	0.497		
Anticipated Funding	-0.564	0.270	*	-13.93
Importance of cost of attendance when choosing college	-0.027	0.264		
Importance of job placement when choosing college	-0.077	0.268		
Importance of graduate school placement when choosing college	0.015	0.226		
Importance of particular program when choose college	0.510	0.331		
Teen thinks studying in high school rarely pays off later with good job	0.010	0.218		
Cost of curent college before financial aid for 2013-2014 school year	-0.042	0.015	**	-1.05
Estimated cost of tuition/mandatory fees for college (factor)	-0.219	0.365		
Sex	0.245	0.362		
Racial Background: Asian	-1.666	0.903		
Racial Background: Black/African American	-2.080	1.139		
Racial Background: Hispanic	-1.416	0.939		
Racial Background: More Than One Race	-0.270	0.784		
First language 9th grader learned to speak is English, Spanish, or other	0.153	0.257		
Count of college preparation activities	-0.305	0.146	*	-7.61
Has met with high school counselor about college admissions in 2012-2013 yea	0.690	0.416		
Has met with high school counselor about financial aid in 2012-2013 year	-0.132	0.343		
Count of having ever participated in a college access program	0.344	0.375		
How many friends plan to attend 2-year community college	0.083	0.105		
How many friends plan to attend 4-year college	-0.055	0.188		
Person who has had most influence on thinking about education after HS	-0.039	0.115		
Count of people student talked to about going to college	0.320	0.178		
9th grader talked to school counselor about going to college	0.317	0.412		
How often discussed applying to college/other schools after high school	0.093	0.219		
How far in school teenager would like to go	0.315	0.203		
How far in school parents would like teenager to go	-0.253	0.140		
What students think parents think is most important: continue education	-1.446	0.828		
Importance of academic quality when coosing college	0.379	0.410		
Count of cultural capital activities	-0.019	0.101		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)	0.382	0.380		
School locale (urbanicity)	0.206	0.170		
School type: Regular school (not charter, magnet, or alternative)	1.468	1.503		
% of student body receiving free or reduced-price lunch	0.019	0.012		
% of student body enrolled in Advanced Placement courses	0.019	0.016		
% White students	0.018	0.010		
% of 08-09 seniors who went to 4-year Bachelor's-granting institution	0.003	0.012		
Average caseload for school's counselors	-0.022	0.084		
% hours spent on college readiness/selection/apply	-0.434	0.202	*	-10.79
School has counselor designated for college selection	-0.533	0.870		
School has counselor designated for college applications	0.669	0.833		
Primary goal of counseling program: college prep.	0.237	0.399		
Composite score of counselor expectations	-0.135	0.193		
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-3.968	2.165		
Variance Component (S.D.)	0.422	0.649	*	
Reliability	0.079			
-2 Log Likelihood	1578.42			

HGLM Results for Undermatch at Application (n=1,140 students, 560 high schools), continued

	Counseling Resources			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	1.049	0.889		
SES Second Quintile (ref: Highest Quintile)	-0.266	0.682		
SES Third Quintile (ref: Highest Quintile)	0.692	0.516		
SES Fourth Quintile (ref: Highest Quintile)	-0.302	0.506		
Anticipated Funding	-0.575	0.275	*	-14.20
Importance of cost of attendance when choosing college	-0.038	0.266		
Importance of job placement when choosing college	-0.056	0.270		
Importance of graduate school placement when choosing college	0.043	0.233		
Importance of particular program when choose college	0.456	0.328		
Teen thinks studying in high school rarely pays off later with good job	0.017	0.224		
Cost of curent college before financial aid for 2013-2014 school year	-0.041	0.016	*	-1.02
Estimated cost of tuition/mandatory fees for college (factor)	-0.256	0.396		
Sex	0.225	0.373		
Racial Background: Asian	-1.529	0.930		
Racial Background: Black/African American	-2.057	1.129		
Racial Background: Hispanic	-1.292	0.953		
Racial Background: More Than One Race	-0.363	0.813		
First language 9th grader learned to speak is English, Spanish, or other	0.121	0.277		
Count of college preparation activities	-0.304	0.150	*	-7.58
Has met with high school counselor about college admissions in 2012-2013 yea	0.702	0.419		
Has met with high school counselor about financial aid in 2012-2013 year	-0.008	0.332		
Count of having ever participated in a college access program	0.328	0.379		
How many friends plan to attend 2-year community college	0.090	0.108		
How many friends plan to attend 4-year college	-0.053	0.192		
Person who has had most influence on thinking about education after HS	-0.028	0.117		
Count of people student talked to about going to college	0.344	0.185		
9th grader talked to school counselor about going to college	0.293	0.429		
How often discussed applying to college/other schools after high school	0.076	0.225		
How far in school teenager would like to go	0.335	0.211		
How far in school parents would like teenager to go	-0.235	0.144		
What students think parents think is most important: continue education	-1.586	0.852		
Importance of academic quality when coosing college	0.308	0.408		
Count of cultural capital activities	-0.032	0.104		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)	0.278	0.407		
School locale (urbanicity)	0.196	0.181		
School type: Regular school (not charter, magnet, or alternative)	1.364	1.525		
% of student body receiving free or reduced-price lunch	0.016	0.013		
% of student body enrolled in Advanced Placement courses	0.023	0.016		
% White students	0.019	0.010		
% of 08-09 seniors who went to 4-year Bachelor's-granting institution	0.001	0.012		
Average caseload for school's counselors	-0.068	0.086		
% hours spent on college readiness/selection/apply	-0.436	0.208	*	-10.84
School has counselor designated for college selection	-0.366	0.901		
School has counselor designated for college applications	0.381	0.849		
Primary goal of counseling program: college prep.	0.197	0.412		
Composite score of counselor expectations	-0.155	0.196		
Count of college information support activities	-0.386	0.369		
Count of financial aid support activities	0.231	0.146		
Count of college entrance exam support activities	-0.690	0.445		
School organizes student visits to colleges	0.607	0.462		
School assists students with finding financial aid for college	-0.512	0.712		
School consults with postsecondary reps about requirement/qualifications	-0.139	0.939		
Intercept	-3.517	2.382		
Variance Component (S.D.)	0.446	0.668	***	
Reliability	0.079			
-2 Log Likelihood	1615.10			

HGLM Results for Undermatch at Admission (n=1,080 students, 540 high schools)

	Unconditional Model			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)				
SES Second Quintile (ref: Highest Quintile)				
SES Third Quintile (ref: Highest Quintile)				
SES Fourth Quintile (ref: Highest Quintile)				
Anticipated Funding				
Importance of cost of attendance when choosing college				
Importance of job placement when choosing college				
Importance of graduate school placement when choosing college				
Importance of particular program when choose college				
Teen thinks studying in high school rarely pays off later with good job				
Cost of curent college before financial aid for 2013-2014 school year				
Estimated cost of tuition/mandatory fees for college (factor)				
Sex				
Racial Background: Asian				
Racial Background: Black/African American				
Racial Background: Hispanic				
Racial Background: More Than One Race				
First language 9th grader learned to speak is English, Spanish, or other				
Count of college preparation activities				
Has met with high school counselor about college admissions in 2012-2013 year				
Has met with high school counselor about financial aid in 2012-2013 year				
Count of having ever participated in a college access program				
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-1.325	0.116	***	
Variance Component (S.D.)	0.926	0.962	***	
Reliability	0.424			
-2 Log Likelihood	7232.16			

*p<.05 **p<.01 ***p<.001

HGLM Results for Undermatch at Admission (n=1,080 students, 540 high schools), continued

	Human Capital: Resources			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	-0.310	0.473		
SES Second Quintile (ref: Highest Quintile)	0.234	0.312		
SES Third Quintile (ref: Highest Quintile)	0.292	0.292		
SES Fourth Quintile (ref: Highest Quintile)	0.041	0.233		
Anticipated Funding	-0.328	0.134	*	-8.18
Importance of cost of attendance when choosing college				
Importance of job placement when choosing college				
Importance of graduate school placement when choosing college				
Importance of particular program when choose college				
Teen thinks studying in high school rarely pays off later with good job				
Cost of curent college before financial aid for 2013-2014 school year				
Estimated cost of tuition/mandatory fees for college (factor)				
Sex				
Racial Background: Asian				
Racial Background: Black/African American				
Racial Background: Hispanic				
Racial Background: More Than One Race				
First language 9th grader learned to speak is English, Spanish, or other				
Count of college preparation activities				
Has met with high school counselor about college admissions in 2012-2013 year				
Has met with high school counselor about financial aid in 2012-2013 year				
Count of having ever participated in a college access program				
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	1.261	0.127	***	
Variance Component (S.D.)	0.805	0.897	***	
Reliability	0.345			
-2 Log Likelihood	5091.25			

HGLM Results for Undermatch at Admission (n=1,080 students, 540 high schools), continued

	Human Capital: Benefits & Costs			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	-0.293	0.623		
SES Second Quintile (ref: Highest Quintile)	0.056	0.382		
SES Third Quintile (ref: Highest Quintile)	0.466	0.344		
SES Fourth Quintile (ref: Highest Quintile)	0.193	0.266		
Anticipated Funding	-0.411	0.161	*	-10.24
Importance of cost of attendance when choosing college	0.026	0.164		
Importance of job placement when choosing college	0.151	0.187		
Importance of graduate school placement when choosing college	-0.014	0.158		
Importance of particular program when choose college	-0.059	0.174		
Teen thinks studying in high school rarely pays off later with good job	0.079	0.123		
Cost of curent college before financial aid for 2013-2014 school year	-0.025	0.009	**	-0.62
Estimated cost of tuition/mandatory fees for college (factor)	0.018	0.140		
Sex				
Racial Background: Asian				
Racial Background: Black/African American				
Racial Background: Hispanic				
Racial Background: More Than One Race				
First language 9th grader learned to speak is English, Spanish, or other				
Count of college preparation activities				
Has met with high school counselor about college admissions in 2012-2013 year				
Has met with high school counselor about financial aid in 2012-2013 year				
Count of having ever participated in a college access program				
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	1.317	0.145	***	
Variance Component (S.D.)	0.871	0.933	***	
Reliability	0.308			
-2 Log Likelihood	40301160.00			

HGLM Results for Undermatch at Admission (n=1,080 students, 540 high schools), continued

	Habitus: Background			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.076	0.579		
SES Second Quintile (ref: Highest Quintile)	0.119	0.401		
SES Third Quintile (ref: Highest Quintile)	0.549	0.362		
SES Fourth Quintile (ref: Highest Quintile)	0.306	0.270		
Anticipated Funding	-0.398	0.163	*	-9.92
Importance of cost of attendance when choosing college	0.030	0.165		
Importance of job placement when choosing college	0.167	0.190		
Importance of graduate school placement when choosing college	0.028	0.165		
Importance of particular program when choose college	-0.088	0.177		
Teen thinks studying in high school rarely pays off later with good job	0.023	0.126		
Cost of curent college before financial aid for 2013-2014 school year	-0.029	0.010	**	-0.72
Estimated cost of tuition/mandatory fees for college (factor)	0.020	0.172		
Sex	0.123	0.234		
Racial Background: Asian	-0.406	0.592		
Racial Background: Black/African American	-1.435	0.548	**	-15.57
Racial Background: Hispanic	-0.497	0.541		
Racial Background: More Than One Race	-0.388	0.401		
First language 9th grader learned to speak is English, Spanish, or other	-0.404	0.267		
Count of college preparation activities				
Has met with high school counselor about college admissions in 2012-2013 year				
Has met with high school counselor about financial aid in 2012-2013 year				
Count of having ever participated in a college access program				
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-0.865	0.469		
Variance Component (S.D.)	0.738	0.859	***	
Reliability	0.259			
-2 Log Likelihood	854828500.00			

HGLM Results for Undermatch at Admission (n=1,080 students, 540 high schools), continued

	Social Capital: Sources of College Info.			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	-0.058	0.580		
SES Second Quintile (ref: Highest Quintile)	-0.103	0.419		
SES Third Quintile (ref: Highest Quintile)	0.337	0.366		
SES Fourth Quintile (ref: Highest Quintile)	0.199	0.276		
Anticipated Funding	-0.431	0.166	**	-10.73
Importance of cost of attendance when choosing college	0.021	0.165		
Importance of job placement when choosing college	0.150	0.193		
Importance of graduate school placement when choosing college	0.056	0.169		
Importance of particular program when choose college	-0.058	0.181		
Teen thinks studying in high school rarely pays off later with good job	0.008	0.126		
Cost of curent college before financial aid for 2013-2014 school year	-0.026	0.010	**	-0.64
Estimated cost of tuition/mandatory fees for college (factor)	0.050	0.142		
Sex	0.110	0.236		
Racial Background: Asian	-0.358	0.596		
Racial Background: Black/African American	-1.406	0.563	*	-15.36
Racial Background: Hispanic	-0.516	0.546		
Racial Background: More Than One Race	-0.387	0.407		
First language 9th grader learned to speak is English, Spanish, or other	-0.411	0.271		
Count of college preparation activities	-0.118	0.098		
Has met with high school counselor about college admissions in 2012-2013	0.587	0.259	*	13.77
Has met with high school counselor about financial aid in 2012-2013 year	-0.357	0.219		
Count of having ever participated in a college access program	0.250	0.227		
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-1.019	0.549		
Variance Component (S.D.)	0.765	0.875	***	
Reliability	0.260			
-2 Log Likelihood	64629060.00			

HGLM Results for Undermatch at Admission (n=1,080 students, 540 high schools), continued

	Social Capital: Networks			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.708	0.782		
SES Second Quintile (ref: Highest Quintile)	-0.054	0.573		
SES Third Quintile (ref: Highest Quintile)	0.614	0.481		
SES Fourth Quintile (ref: Highest Quintile)	-0.008	0.419		
Anticipated Funding	-0.669	0.250	**	16.49
Importance of cost of attendance when choosing college	-0.071	0.239		
Importance of job placement when choosing college	-0.071	0.246		
Importance of graduate school placement when choosing college	-0.032	0.211		
Importance of particular program when choose college	0.270	0.293		
Teen thinks studying in high school rarely pays off later with good job	-0.144	0.198		
Cost of curent college before financial aid for 2013-2014 school year	-0.037	0.013	**	-0.92
Estimated cost of tuition/mandatory fees for college (factor)	0.023	0.100		
Sex	0.325	0.333		
Racial Background: Asian	0.103	0.575		
Racial Background: Black/African American	-2.336	1.075	*	-20.78
Racial Background: Hispanic	-0.979	0.703		
Racial Background: More Than One Race	-0.436	0.772		
First language 9th grader learned to speak is English, Spanish, or other	-0.282	0.271		
Count of college preparation activities	-0.225	0.128		
Has met with high school counselor about college admissions in 2012-2013	0.716	0.394		
Has met with high school counselor about financial aid in 2012-2013 year	-0.138	0.312		
Count of having ever participated in a college access program	0.537	0.356		
How many friends plan to attend 2-year community college	0.006	0.096		
How many friends plan to attend 4-year college	-0.051	0.177		
Person who has had most influence on thinking about education after HS	0.046	0.108		
Count of people student talked to about going to college	0.287	0.166		
9th grader talked to school counselor about going to college	0.188	0.368		
How often discussed applying to college/other schools after high school	0.022	0.208		
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-2.104	0.962	*	
Variance Component (S.D.)	0.584	0.764	***	
Reliability	0.139			
-2 Log Likelihood	1507.57			

HGLM Results for Undermatch at Admission (n=1,080 students, 540 high schools), continued

	Cultural Capital: Value of College			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.797	0.788		
SES Second Quintile (ref: Highest Quintile)	0.126	0.570		
SES Third Quintile (ref: Highest Quintile)	0.685	0.478		
SES Fourth Quintile (ref: Highest Quintile)	-0.001	0.423		
Anticipated Funding	-0.590	0.243	*	-14.60
Importance of cost of attendance when choosing college	-0.077	0.243		
Importance of job placement when choosing college	-0.085	0.247		
Importance of graduate school placement when choosing college	-0.072	0.206		
Importance of particular program when choose college	0.254	0.277		
Teen thinks studying in high school rarely pays off later with good job	-0.153	0.194		
Cost of curent college before financial aid for 2013-2014 school year	-0.039	0.014	**	-0.97
Estimated cost of tuition/mandatory fees for college (factor)	-0.007	0.112		
Sex	0.353	0.335		
Racial Background: Asian	0.046	0.587		
Racial Background: Black/African American	-2.435	1.135	*	-21.23
Racial Background: Hispanic	-0.833	0.694		
Racial Background: More Than One Race	-0.383	0.774		
First language 9th grader learned to speak is English, Spanish, or other	-0.333	0.277		
Count of college preparation activities	-0.280	0.127	*	-6.98
Has met with high school counselor about college admissions in 2012-2013	0.732	0.392		
Has met with high school counselor about financial aid in 2012-2013 year	-0.130	0.315		
Count of having ever participated in a college access program	0.375	0.343		
How many friends plan to attend 2-year community college	0.010	0.096		
How many friends plan to attend 4-year college	-0.036	0.177		
Person who has had most influence on thinking about education after HS	0.069	0.110		
Count of people student talked to about going to college	0.305	0.170		
9th grader talked to school counselor about going to college	0.321	0.366		
How often discussed applying to college/other schools after high school	0.054	0.208		
How far in school teenager would like to go	0.343	0.176		
How far in school parents would like teenager to go	-0.138	0.130		
What students think parents think is most important: continue education	-1.638	0.799	*	-34.54
Importance of academic quality when coosing college	0.259	0.363		
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-0.769	1.129		
Variance Component (S.D.)	0.543	0.737	***	
Reliability	0.126			
-2 Log Likelihood	1494.51			

HGLM Results for Undermatch at Admission (n=1,080 students, 540 high schools), continued

	Cultural Capital: Cultural Knowledge			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.800	0.790		
SES Second Quintile (ref: Highest Quintile)	0.128	0.587		
SES Third Quintile (ref: Highest Quintile)	0.684	0.477		
SES Fourth Quintile (ref: Highest Quintile)	0.000	0.424		
Anticipated Funding	-0.590	0.242	*	-14.60
Importance of cost of attendance when choosing college	-0.077	0.243		
Importance of job placement when choosing college	-0.085	0.246		
Importance of graduate school placement when choosing college	-0.073	0.209		
Importance of particular program when choose college	0.254	0.277		
Teen thinks studying in high school rarely pays off later with good job	-0.153	0.194		
Cost of curent college before financial aid for 2013-2014 school year	-0.039	0.014	**	-0.97
Estimated cost of tuition/mandatory fees for college (factor)	-0.007	0.112		
Sex	0.352	0.334		
Racial Background: Asian	0.047	0.588		
Racial Background: Black/African American	-2.435	1.134	*	-21.23
Racial Background: Hispanic	-0.835	0.687		
Racial Background: More Than One Race	-0.385	0.770		
First language 9th grader learned to speak is English, Spanish, or other	-0.334	0.277		
Count of college preparation activities	-0.280	0.127	*	-6.98
Has met with high school counselor about college admissions in 2012-2013	0.732	0.395		
Has met with high school counselor about financial aid in 2012-2013 year	-0.130	0.316		
Count of having ever participated in a college access program	0.375	0.343		
How many friends plan to attend 2-year community college	0.010	0.096		
How many friends plan to attend 4-year college	-0.036	0.177		
Person who has had most influence on thinking about education after HS	0.069	0.110		
Count of people student talked to about going to college	0.304	0.167		
9th grader talked to school counselor about going to college	0.321	0.366		
How often discussed applying to college/other schools after high school	0.053	0.210		
How far in school teenager would like to go	0.343	0.177		
How far in school parents would like teenager to go	-0.138	0.129		
What students think parents think is most important: continue education	-1.639	0.798	*	-34.56
Importance of academic quality when coosing college	0.259	0.363		
Count of cultural capital activities	0.003	0.089		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-0.775	1.177		
Variance Component (S.D.)	0.542	0.736	***	
Reliability	0.126			
-2 Log Likelihood	1494.58			

HGLM Results for Undermatch at Admission (n=1,080 students, 540 high schools), continued

	School Characteristics			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	1.241	0.773		
SES Second Quintile (ref: Highest Quintile)	0.255	0.596		
SES Third Quintile (ref: Highest Quintile)	0.761	0.477		
SES Fourth Quintile (ref: Highest Quintile)	0.050	0.431		
Anticipated Funding	-0.535	0.240	*	-13.28
Importance of cost of attendance when choosing college	-0.098	0.235		
Importance of job placement when choosing college	-0.093	0.247		
Importance of graduate school placement when choosing college	-0.043	0.209		
Importance of particular program when choose college	0.291	0.281		
Teen thinks studying in high school rarely pays off later with good job	-0.148	0.195		
Cost of curent college before financial aid for 2013-2014 school year	-0.042	0.014	**	-1.04
Estimated cost of tuition/mandatory fees for college (factor)	-0.016	0.093		
Sex	0.316	0.333		
Racial Background: Asian	0.029	0.590		
Racial Background: Black/African American	-1.922	1.015		
Racial Background: Hispanic	-0.992	0.715		
Racial Background: More Than One Race	-0.194	0.727		
First language 9th grader learned to speak is English, Spanish, or other	-0.212	0.253		
Count of college preparation activities	-0.263	0.127	*	-6.56
Has met with high school counselor about college admissions in 2012-2013	0.673	0.392		
Has met with high school counselor about financial aid in 2012-2013 year	-0.125	0.314		
Count of having ever participated in a college access program	0.348	0.340		
How many friends plan to attend 2-year community college	0.002	0.096		
How many friends plan to attend 4-year college	-0.029	0.179		
Person who has had most influence on thinking about education after HS	0.015	0.105		
Count of people student talked to about going to college	0.255	0.160		
9th grader talked to school counselor about going to college	0.304	0.368		
How often discussed applying to college/other schools after high school	0.129	0.205		
How far in school teenager would like to go	0.378	0.179	*	9.09
How far in school parents would like teenager to go	-0.116	0.130		
What students think parents think is most important: continue education	-1.494	0.791		
Importance of academic quality when coosing college	0.231	0.369		
Count of cultural capital activities	0.000	0.089		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)	0.304	0.279		
School locale (urbanicity)	0.166	0.151		
School type: Regular school (not charter, magnet, or alternative)	1.377	1.257		
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-2.859	1.807		
Variance Component (S.D.)	0.460	0.678	**	
Reliability	0.108			
-2 Log Likelihood	1485.67			

HGLM Results for Undermatch at Admission (n=1,080 students, 540 high schools), continued

	School Population			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	1.114	0.816		
SES Second Quintile (ref: Highest Quintile)	0.166	0.616		
SES Third Quintile (ref: Highest Quintile)	0.838	0.485		
SES Fourth Quintile (ref: Highest Quintile)	0.055	0.444		
Anticipated Funding	-0.582	0.243	*	-14.41
Importance of cost of attendance when choosing college	-0.124	0.240		
Importance of job placement when choosing college	-0.057	0.252		
Importance of graduate school placement when choosing college	-0.047	0.212		
Importance of particular program when choose college	0.246	0.288		
Teen thinks studying in high school rarely pays off later with good job	-0.153	0.198		
Cost of curent college before financial aid for 2013-2014 school year	-0.044	0.014	**	-1.09
Estimated cost of tuition/mandatory fees for college (factor)	0.017	0.092		
Sex	0.300	0.336		
Racial Background: Asian	0.190	0.602		
Racial Background: Black/African American	-1.666	0.914		
Racial Background: Hispanic	-0.902	0.803		
Racial Background: More Than One Race	-0.225	0.741		
First language 9th grader learned to speak is English, Spanish, or other	-0.198	0.256		
Count of college preparation activities	-0.277	0.131	*	-6.91
Has met with high school counselor about college admissions in 2012-2013	0.703	0.394		
Has met with high school counselor about financial aid in 2012-2013 year	-0.079	0.321		
Count of having ever participated in a college access program	0.341	0.357		
How many friends plan to attend 2-year community college	-0.024	0.098		
How many friends plan to attend 4-year college	-0.018	0.187		
Person who has had most influence on thinking about education after HS	0.015	0.108		
Count of people student talked to about going to college	0.268	0.164		
9th grader talked to school counselor about going to college	0.253	0.381		
How often discussed applying to college/other schools after high school	0.148	0.211		
How far in school teenager would like to go	0.384	0.185	*	9.23
How far in school parents would like teenager to go	-0.136	0.132		
What students think parents think is most important: continue education	-1.435	0.801		
Importance of academic quality when coosing college	0.286	0.371		
Count of cultural capital activities	-0.009	0.092		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)	0.536	0.315		
School locale (urbanicity)	0.147	0.157		
School type: Regular school (not charter, magnet, or alternative)	1.313	1.166		
% of student body receiving free or reduced-price lunch	0.011	0.011		
% of student body enrolled in Advanced Placement courses	0.023	0.015		
% White students	0.012	0.009		
% of 08-09 seniors who went to 4-year Bachelor's-granting institution	-0.009	0.011		
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-3.267	1.791		
Variance Component (S.D.)	0.543	0.737	**	
Reliability	0.120			
-2 Log Likelihood	1463.80			

HGLM Results for Undermatch at Admission (n=1,080 students, 540 high schools), continued

	Counseling Norms			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	1.222	0.839		
SES Second Quintile (ref: Highest Quintile)	0.077	0.603		
SES Third Quintile (ref: Highest Quintile)	0.790	0.475		
SES Fourth Quintile (ref: Highest Quintile)	0.010	0.440		
Anticipated Funding	-0.564	0.242	*	-13.98
Importance of cost of attendance when choosing college	-0.111	0.242		
Importance of job placement when choosing college	-0.140	0.252		
Importance of graduate school placement when choosing college	-0.038	0.212		
Importance of particular program when choose college	0.268	0.288		
Teen thinks studying in high school rarely pays off later with good job	-0.165	0.200		
Cost of curent college before financial aid for 2013-2014 school year	-0.046	0.014	**	-1.14
Estimated cost of tuition/mandatory fees for college (factor)	0.009	0.095		
Sex	0.387	0.341		
Racial Background: Asian	0.102	0.599		
Racial Background: Black/African American	-1.632	0.912		
Racial Background: Hispanic	-1.125	0.789		
Racial Background: More Than One Race	-0.179	0.733		
First language 9th grader learned to speak is English, Spanish, or other	-0.192	0.255		
Count of college preparation activities	-0.287	0.131	*	-7.16
Has met with high school counselor about college admissions in 2012-2013	0.609	0.397		
Has met with high school counselor about financial aid in 2012-2013 year	-0.105	0.323		
Count of having ever participated in a college access program	0.376	0.354		
How many friends plan to attend 2-year community college	-0.013	0.098		
How many friends plan to attend 4-year college	-0.022	0.186		
Person who has had most influence on thinking about education after HS	-0.005	0.107		
Count of people student talked to about going to college	0.267	0.160		
9th grader talked to school counselor about going to college	0.264	0.378		
How often discussed applying to college/other schools after high school	0.135	0.209		
How far in school teenager would like to go	0.377	0.187	*	9.07
How far in school parents would like teenager to go	-0.125	0.132		
What students think parents think is most important: continue education	-1.314	0.800		
Importance of academic quality when coosing college	0.338	0.368		
Count of cultural capital activities	-0.016	0.090		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)	0.308	0.346		
School locale (urbanicity)	0.067	0.156		
School type: Regular school (not charter, magnet, or alternative)	1.574	1.194		
% of student body receiving free or reduced-price lunch	0.012	0.011		
% of student body enrolled in Advanced Placement courses	0.027	0.015		
% White students	0.013	0.009		
% of 08-09 seniors who went to 4-year Bachelor's-granting institution	-0.004	0.011		
Average caseload for school's counselors	-0.018	0.073		
% hours spent on college readiness/selection/apply	-0.490	0.187	**	-12.18
School has counselor designated for college selection	0.276	0.840		
School has counselor designated for college applications	-0.114	0.823		
Primary goal of counseling program: college prep.	0.459	0.370		
Composite score of counselor expectations	-0.070	0.184		
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-3.346	1.844		
Variance Component (S.D.)	0.466	0.682	**	
Reliability	0.104			
-2 Log Likelihood	1460.86			

HGLM Results for Undermatch at Admission (n=1,080 students, 540 high schools), continued

	Counseling Resources			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	1.237	0.856		
SES Second Quintile (ref: Highest Quintile)	-0.163	0.632		
SES Third Quintile (ref: Highest Quintile)	0.722	0.494		
SES Fourth Quintile (ref: Highest Quintile)	-0.072	0.456		
Anticipated Funding	-0.585	0.252	*	-14.48
Importance of cost of attendance when choosing college	-0.153	0.249		
Importance of job placement when choosing college	-0.150	0.254		
Importance of graduate school placement when choosing college	-0.019	0.220		
Importance of particular program when choose college	0.167	0.293		
Teen thinks studying in high school rarely pays off later with good job	-0.165	0.208		
Cost of curent college before financial aid for 2013-2014 school year	-0.046	0.015	**	-1.14
Estimated cost of tuition/mandatory fees for college (factor)	0.012	0.098		
Sex	0.341	0.358		
Racial Background: Asian	0.068	0.636		
Racial Background: Black/African American	-1.653	0.918		
Racial Background: Hispanic	-1.008	0.790		
Racial Background: More Than One Race	-0.255	0.755		
First language 9th grader learned to speak is English, Spanish, or other	-0.187	0.265		
Count of college preparation activities	-0.284	0.137	*	-7.08
Has met with high school counselor about college admissions in 2012-2013	0.582	0.404		
Has met with high school counselor about financial aid in 2012-2013 year	0.098	0.319		
Count of having ever participated in a college access program	0.415	0.359		
How many friends plan to attend 2-year community college	-0.001	0.102		
How many friends plan to attend 4-year college	-0.046	0.194		
Person who has had most influence on thinking about education after HS	0.022	0.111		
Count of people student talked to about going to college	0.296	0.168		
9th grader talked to school counselor about going to college	0.229	0.394		
How often discussed applying to college/other schools after high school	0.104	0.215		
How far in school teenager would like to go	0.400	0.197	*	9.60
How far in school parents would like teenager to go	-0.116	0.137		
What students think parents think is most important: continue education	-1.442	0.834		
Importance of academic quality when coosing college	0.282	0.372		
Count of cultural capital activities	-0.014	0.096		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)	0.099	0.373		
School locale (urbanicity)	0.077	0.166		
School type: Regular school (not charter, magnet, or alternative)	1.406	1.209		
% of student body receiving free or reduced-price lunch	0.008	0.015		
% of student body enrolled in Advanced Placement courses	0.033	0.015	*	0.82
% White students	0.015	0.009		
% of 08-09 seniors who went to 4-year Bachelor's-granting institution	-0.005	0.012		
Average caseload for school's counselors	-0.072	0.076		
% hours spent on college readiness/selection/apply	-0.519	0.191	**	-12.89
School has counselor designated for college selection	0.426	0.846		
School has counselor designated for college applications	-0.440	0.824		
Primary goal of counseling program: college prep.	0.418	0.386		
Composite score of counselor expectations	-0.096	0.191		
Count of college information support activities	-0.102	0.354		
Count of financial aid support activities	0.214	0.133		
Count of college entrance exam support activities	-1.013	0.416	*	-24.22
School organizes student visits to colleges	0.893	0.433	*	12.53
School assists students with finding financial aid for college	-0.365	0.694		
School consults with postsecondary reps about requirement/qualifications	0.080	0.913		
Intercept	-3.478	2.079		
Variance Component (S.D.)	0.521	0.722	***	
Reliability	0.107			
-2 Log Likelihood	1479.65			

HGLM Results for Undermatch at Attendance (n=1,000 students, 520 high schools)

	Unconditional Model			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)				
SES Second Quintile (ref: Highest Quintile)				
SES Third Quintile (ref: Highest Quintile)				
SES Fourth Quintile (ref: Highest Quintile)				
Anticipated Funding				
Importance of cost of attendance when choosing college				
Importance of job placement when choosing college				
Importance of graduate school placement when choosing college				
Importance of particular program when choose college				
Teen thinks studying in high school rarely pays off later with good job				
Cost of curent college before financial aid for 2013-2014 school year				
Estimated cost of tuition/mandatory fees for college (factor)				
Sex				
Racial Background: Asian				
Racial Background: Black/African American				
Racial Background: Hispanic				
Racial Background: More Than One Race				
First language 9th grader learned to speak is English, Spanish, or other				
Count of college preparation activities				
Has met with high school counselor about college admissions in 2012-2013 year				
Has met with high school counselor about financial aid in 2012-2013 year				
Count of having ever participated in a college access program				
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-0.652	0.100	***	
Variance Component (S.D.)	0.760	0.872	***	
Reliability	0.428			
-2 Log Likelihood	6765.83			

*p<.05 **p<.01 ***p<.001

HGLM Results for Undermatch at Attendance (n=1,000 students, 520 high schools), continued

	Human Capital: Resources			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	-0.553	0.475		
SES Second Quintile (ref: Highest Quintile)	-0.127	0.313		
SES Third Quintile (ref: Highest Quintile)	0.248	0.255		
SES Fourth Quintile (ref: Highest Quintile)	0.026	0.210		
Anticipated Funding	-0.354	0.125	**	-8.79
Importance of cost of attendance when choosing college				
Importance of job placement when choosing college				
Importance of graduate school placement when choosing college				
Importance of particular program when choose college				
Teen thinks studying in high school rarely pays off later with good job				
Cost of curent college before financial aid for 2013-2014 school year				
Estimated cost of tuition/mandatory fees for college (factor)				
Sex				
Racial Background: Asian				
Racial Background: Black/African American				
Racial Background: Hispanic				
Racial Background: More Than One Race				
First language 9th grader learned to speak is English, Spanish, or other				
Count of college preparation activities				
Has met with high school counselor about college admissions in 2012-2013 year				
Has met with high school counselor about financial aid in 2012-2013 year				
Count of having ever participated in a college access program				
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-0.662	0.117	***	
Variance Component (S.D.)	0.863	0.929	***	
Reliability	0.390			
-2 Log Likelihood	4738.85			

HGLM Results for Undermatch at Attendance (n=1,000 students, 520 high schools), continued

	Human Capital: Benefits & Costs			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	-0.661	0.598		
SES Second Quintile (ref: Highest Quintile)	-0.268	0.367		
SES Third Quintile (ref: Highest Quintile)	0.516	0.290		
SES Fourth Quintile (ref: Highest Quintile)	0.237	0.235		
Anticipated Funding	-0.404	0.144	**	-10.04
Importance of cost of attendance when choosing college	0.126	0.143		
Importance of job placement when choosing college	-0.054	0.163		
Importance of graduate school placement when choosing college	-0.031	0.138		
Importance of particular program when choose college	-0.092	0.155		
Teen thinks studying in high school rarely pays off later with good job	0.192	0.115		
Cost of curent college before financial aid for 2013-2014 school year	-0.033	0.008	***	-0.81
Estimated cost of tuition/mandatory fees for college (factor)	0.035	0.097		
Sex				
Racial Background: Asian				
Racial Background: Black/African American				
Racial Background: Hispanic				
Racial Background: More Than One Race				
First language 9th grader learned to speak is English, Spanish, or other				
Count of college preparation activities				
Has met with high school counselor about college admissions in 2012-2013 year				
Has met with high school counselor about financial aid in 2012-2013 year				
Count of having ever participated in a college access program				
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-0.534	0.134	***	
Variance Component (S.D.)	0.824	0.908	***	
Reliability	0.336			
-2 Log Likelihood	11681910000.00			

HGLM Results for Undermatch at Attendance (n=1,000 students, 520 high schools), continued

	Habitus: Background			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	-0.201	0.565		
SES Second Quintile (ref: Highest Quintile)	-0.182	0.388		
SES Third Quintile (ref: Highest Quintile)	0.661	0.297	*	14.81
SES Fourth Quintile (ref: Highest Quintile)	0.341	0.240		
Anticipated Funding	-0.396	0.149	**	-9.84
Importance of cost of attendance when choosing college	0.154	0.147		
Importance of job placement when choosing college	-0.065	0.168		
Importance of graduate school placement when choosing college	0.039	0.144		
Importance of particular program when choose college	-0.076	0.162		
Teen thinks studying in high school rarely pays off later with good job	0.134	0.117		
Cost of curent college before financial aid for 2013-2014 school year	-0.037	0.009	***	-0.91
Estimated cost of tuition/mandatory fees for college (factor)	0.055	0.098		
Sex	0.284	0.210		
Racial Background: Asian	-0.489	0.481		
Racial Background: Black/African American	-1.597	0.496	**	24.66
Racial Background: Hispanic	-0.954	0.514		
Racial Background: More Than One Race	-0.742	0.384		
First language 9th grader learned to speak is English, Spanish, or other	-0.314	0.217		
Count of college preparation activities				
Has met with high school counselor about college admissions in 2012-2013 year				
Has met with high school counselor about financial aid in 2012-2013 year				
Count of having ever participated in a college access program				
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-0.370	0.409		
Variance Component (S.D.)	0.670	0.819	***	
Reliability	0.273			
-2 Log Likelihood	531489600000.00			

HGLM Results for Undermatch at Attendance (n=1,000 students, 520 high schools), continued

	Social Capital: Sources of College Info.			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	-0.305	0.553		
SES Second Quintile (ref: Highest Quintile)	-0.334	0.395		
SES Third Quintile (ref: Highest Quintile)	0.519	0.303		
SES Fourth Quintile (ref: Highest Quintile)	0.287	0.244		
Anticipated Funding	-0.428	0.151	**	-10.64
Importance of cost of attendance when choosing college	0.146	0.147		
Importance of job placement when choosing college	-0.088	0.169		
Importance of graduate school placement when choosing college	0.066	0.145		
Importance of particular program when choose college	-0.070	0.163		
Teen thinks studying in high school rarely pays off later with good job	0.133	0.117		
Cost of curent college before financial aid for 2013-2014 school year	-0.036	0.009	***	-0.88
Estimated cost of tuition/mandatory fees for college (factor)	0.079	0.091		
Sex	0.288	0.212		
Racial Background: Asian	-0.472	0.487		
Racial Background: Black/African American	-1.645	0.511	**	-25.15
Racial Background: Hispanic	-0.979	0.516		
Racial Background: More Than One Race	-0.778	0.390	*	-14.00
First language 9th grader learned to speak is English, Spanish, or other	-0.325	0.221		
Count of college preparation activities	-0.071	0.088		
Has met with high school counselor about college admissions in 2012-201	0.361	0.241		
Has met with high school counselor about financial aid in 2012-2013 year	-0.240	0.191		
Count of having ever participated in a college access program	0.368	0.229		
How many friends plan to attend 2-year community college				
How many friends plan to attend 4-year college				
Person who has had most influence on thinking about education after HS				
Count of people student talked to about going to college				
9th grader talked to school counselor about going to college				
How often discussed applying to college/other schools after high school				
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-0.431	0.489		
Variance Component (S.D.)	0.676	0.822	***	
Reliability	0.272			
-2 Log Likelihood	200110400000.00			

HGLM Results for Undermatch at Attendance (n=1,000 students, 520 high schools), continued

	Social Capital: Networks			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.489	0.773		
SES Second Quintile (ref: Highest Quintile)	0.163	0.526		
SES Third Quintile (ref: Highest Quintile)	0.882	0.453		
SES Fourth Quintile (ref: Highest Quintile)	0.520	0.359		
Anticipated Funding	-0.456	0.218	*	-11.34
Importance of cost of attendance when choosing college	0.094	0.211		
Importance of job placement when choosing college	-0.198	0.227		
Importance of graduate school placement when choosing college	0.049	0.196		
Importance of particular program when choose college	0.008	0.255		
Teen thinks studying in high school rarely pays off later with good job	0.036	0.185		
Cost of curent college before financial aid for 2013-2014 school year	-0.036	0.011	***	-0.88
Estimated cost of tuition/mandatory fees for college (factor)	-0.022	0.133		
Sex	0.065	0.290		
Racial Background: Asian	-0.274	0.510		
Racial Background: Black/African American	-1.864	0.765	*	-27.22
Racial Background: Hispanic	-0.674	0.609		
Racial Background: More Than One Race	-0.814	0.762		
First language 9th grader learned to speak is English, Spanish, or other	-0.320	0.250		
Count of college preparation activities	-0.115	0.113		
Has met with high school counselor about college admissions in 2012-2013	0.806	0.378	*	17.69
Has met with high school counselor about financial aid in 2012-2013 year	-0.108	0.275		
Count of having ever participated in a college access program	0.234	0.304		
How many friends plan to attend 2-year community college	-0.105	0.089		
How many friends plan to attend 4-year college	-0.152	0.169		
Person who has had most influence on thinking about education after HS	0.156	0.096		
Count of people student talked to about going to college	0.228	0.147		
9th grader talked to school counselor about going to college	0.289	0.325		
How often discussed applying to college/other schools after high school	0.081	0.187		
How far in school teenager would like to go				
How far in school parents would like teenager to go				
What students think parents think is most important: continue education				
Importance of academic quality when coosing college				
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-1.650	0.861		
Variance Component (S.D.)	0.298	0.546	**	
Reliability	0.093			
-2 Log Likelihood	1428.14			

HGLM Results for Undermatch at Attendance (n=1,000 students, 520 high schools), continued

	Cultural Capital: Value of College			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.436	0.761		
SES Second Quintile (ref: Highest Quintile)	0.228	0.536		
SES Third Quintile (ref: Highest Quintile)	0.931	0.452	*	31.20
SES Fourth Quintile (ref: Highest Quintile)	0.551	0.364		
Anticipated Funding	-0.458	0.215	*	-11.39
Importance of cost of attendance when choosing college	0.103	0.220		
Importance of job placement when choosing college	-0.132	0.232		
Importance of graduate school placement when choosing college	-0.021	0.196		
Importance of particular program when choose college	0.079	0.241		
Teen thinks studying in high school rarely pays off later with good job	-0.018	0.183		
Cost of curent college before financial aid for 2013-2014 school year	-0.037	0.011	***	-0.91
Estimated cost of tuition/mandatory fees for college (factor)	-0.053	0.156		
Sex	0.142	0.292		
Racial Background: Asian	-0.315	0.516		
Racial Background: Black/African American	-2.049	0.800	*	-28.81
Racial Background: Hispanic	-0.573	0.600		
Racial Background: More Than One Race	-0.845	0.753		
First language 9th grader learned to speak is English, Spanish, or other	-0.384	0.257		
Count of college preparation activities	-0.186	0.114		
Has met with high school counselor about college admissions in 2012-201	0.708	0.374		
Has met with high school counselor about financial aid in 2012-2013 year	-0.122	0.281		
Count of having ever participated in a college access program	0.213	0.308		
How many friends plan to attend 2-year community college	-0.122	0.090		
How many friends plan to attend 4-year college	0.103	0.170		
Person who has had most influence on thinking about education after HS	0.149	0.098		
Count of people student talked to about going to college	0.227	0.148		
9th grader talked to school counselor about going to college	0.358	0.325		
How often discussed applying to college/other schools after high school	0.098	0.189		
How far in school teenager would like to go	0.444	0.171	*	10.34
How far in school parents would like teenager to go	-0.038	0.118		
What students think parents think is most important: continue education	-0.782	0.787		
Importance of academic quality when coosing college	-0.182	0.317		
Count of cultural capital activities				
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-0.800	1.092		
Variance Component (S.D.)	0.313	0.560	**	
Reliability	0.094			
-2 Log Likelihood	1407.37			

HGLM Results for Undermatch at Attendance (n=1,000 students, 520 high schools), continued

	Cultural Capital: Cultural Knowledge			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.485	0.756		
SES Second Quintile (ref: Highest Quintile)	0.267	0.548		
SES Third Quintile (ref: Highest Quintile)	0.936	0.453	*	21.32
SES Fourth Quintile (ref: Highest Quintile)	0.555	0.364		
Anticipated Funding	-0.457	0.215	*	-11.36
Importance of cost of attendance when choosing college	0.104	0.220		
Importance of job placement when choosing college	-0.140	0.231		
Importance of graduate school placement when choosing college	-0.030	0.199		
Importance of particular program when choose college	0.077	0.240		
Teen thinks studying in high school rarely pays off later with good job	-0.024	0.183		
Cost of curent college before financial aid for 2013-2014 school year	-0.037	0.011	***	-0.91
Estimated cost of tuition/mandatory fees for college (factor)	-0.055	0.159		
Sex	0.130	0.290		
Racial Background: Asian	-0.313	0.516		
Racial Background: Black/African American	-2.068	0.798	**	-28.96
Racial Background: Hispanic	-0.604	0.591		
Racial Background: More Than One Race	-0.873	0.750		
First language 9th grader learned to speak is English, Spanish, or other	-0.392	0.257		
Count of college preparation activities	-0.184	0.113		
Has met with high school counselor about college admissions in 2012-201	0.718	0.376		
Has met with high school counselor about financial aid in 2012-2013 year	-0.118	0.281		
Count of having ever participated in a college access program	0.209	0.308		
How many friends plan to attend 2-year community college	-0.121	0.089		
How many friends plan to attend 4-year college	0.103	0.170		
Person who has had most influence on thinking about education after HS	0.148	0.098		
Count of people student talked to about going to college	0.214	0.144		
9th grader talked to school counselor about going to college	0.366	0.323		
How often discussed applying to college/other schools after high school	0.080	0.190		
How far in school teenager would like to go	0.445	0.171	**	10.36
How far in school parents would like teenager to go	-0.035	0.117		
What students think parents think is most important: continue education	-0.780	0.789		
Importance of academic quality when coosing college	-0.179	0.317		
Count of cultural capital activities	0.039	0.079		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)				
School locale (urbanicity)				
School type: Regular school (not charter, magnet, or alternative)				
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-0.892	1.133		
Variance Component (S.D.)	0.307	0.554	**	
Reliability	0.092			
-2 Log Likelihood	1407.53			

HGLM Results for Undermatch at Attendance (n=1,000 students, 520 high schools), continued

	School Characteristics			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.641	0.735		
SES Second Quintile (ref: Highest Quintile)	0.171	0.538		
SES Third Quintile (ref: Highest Quintile)	0.878	0.449		
SES Fourth Quintile (ref: Highest Quintile)	0.454	0.366		
Anticipated Funding	-0.440	0.214	*	-10.94
Importance of cost of attendance when choosing college	0.163	0.213		
Importance of job placement when choosing college	-0.148	0.232		
Importance of graduate school placement when choosing college	-0.011	0.197		
Importance of particular program when choose college	0.046	0.242		
Teen thinks studying in high school rarely pays off later with good job	0.004	0.183		
Cost of curent college before financial aid for 2013-2014 school year	-0.038	0.011	***	-0.93
Estimated cost of tuition/mandatory fees for college (factor)	-0.039	0.137		
Sex	0.177	0.290		
Racial Background: Asian	-0.333	0.516		
Racial Background: Black/African American	-1.711	0.748	*	-25.80
Racial Background: Hispanic	-0.502	0.586		
Racial Background: More Than One Race	-0.637	0.710		
First language 9th grader learned to speak is English, Spanish, or other	-0.265	0.236		
Count of college preparation activities	-0.153	0.115		
Has met with high school counselor about college admissions in 2012-201	0.653	0.374		
Has met with high school counselor about financial aid in 2012-2013 year	-0.116	0.282		
Count of having ever participated in a college access program	0.164	0.305		
How many friends plan to attend 2-year community college	-0.132	0.091		
How many friends plan to attend 4-year college	0.160	0.173		
Person who has had most influence on thinking about education after HS	0.116	0.095		
Count of people student talked to about going to college	0.177	0.141		
9th grader talked to school counselor about going to college	0.308	0.325		
How often discussed applying to college/other schools after high school	0.157	0.187		
How far in school teenager would like to go	0.473	0.174	**	10.97
How far in school parents would like teenager to go	-0.012	0.118		
What students think parents think is most important: continue education	-0.806	0.779		
Importance of academic quality when coosing college	-0.172	0.317		
Count of cultural capital activities	0.038	0.079		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)	-0.070	0.247		
School locale (urbanicity)	0.234	0.135		
School type: Regular school (not charter, magnet, or alternative)	0.893	0.814		
% of student body receiving free or reduced-price lunch				
% of student body enrolled in Advanced Placement courses				
% White students				
% of 08-09 seniors who went to 4-year Bachelor's-granting institution				
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-2.248	1.519		
Variance Component (S.D.)	0.287	0.535	*	
Reliability	0.086			
-2 Log Likelihood	1390.10			

HGLM Results for Undermatch at Attendance (n=1,000 students, 520 high schools), continued

	School Population			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.699	0.753		
SES Second Quintile (ref: Highest Quintile)	0.105	0.549		
SES Third Quintile (ref: Highest Quintile)	0.900	0.449	*	20.46
SES Fourth Quintile (ref: Highest Quintile)	0.489	0.368		
Anticipated Funding	-0.455	0.215	*	-11.31
Importance of cost of attendance when choosing college	0.149	0.216		
Importance of job placement when choosing college	-0.139	0.234		
Importance of graduate school placement when choosing college	0.019	0.198		
Importance of particular program when choose college	0.037	0.244		
Teen thinks studying in high school rarely pays off later with good job	-0.004	0.183		
Cost of curent college before financial aid for 2013-2014 school year	-0.040	0.011	***	-0.98
Estimated cost of tuition/mandatory fees for college (factor)	-0.024	0.130		
Sex	0.153	0.290		
Racial Background: Asian	-0.286	0.524		
Racial Background: Black/African American	-1.629	0.725	*	-24.99
Racial Background: Hispanic	-0.499	0.638		
Racial Background: More Than One Race	-0.619	0.712		
First language 9th grader learned to speak is English, Spanish, or other	-0.281	0.236		
Count of college preparation activities	-0.165	0.114		
Has met with high school counselor about college admissions in 2012-201	0.668	0.373		
Has met with high school counselor about financial aid in 2012-2013 year	-0.112	0.282		
Count of having ever participated in a college access program	0.196	0.313		
How many friends plan to attend 2-year community college	-0.131	0.092		
How many friends plan to attend 4-year college	0.148	0.174		
Person who has had most influence on thinking about education after HS	0.121	0.095		
Count of people student talked to about going to college	0.175	0.141		
9th grader talked to school counselor about going to college	0.311	0.328		
How often discussed applying to college/other schools after high school	0.160	0.187		
How far in school teenager would like to go	0.463	0.174	**	10.76
How far in school parents would like teenager to go	-0.013	0.117		
What students think parents think is most important: continue education	-0.853	0.775		
Importance of academic quality when coosing college	-0.154	0.314		
Count of cultural capital activities	0.031	0.079		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)	-0.051	0.280		
School locale (urbanicity)	0.255	0.140		
School type: Regular school (not charter, magnet, or alternative)	0.899	0.806		
% of student body receiving free or reduced-price lunch	-0.001	0.010		
% of student body enrolled in Advanced Placement courses	0.016	0.012		
% White students	0.005	0.007		
% of 08-09 seniors who went to 4-year Bachelor's-granting institution	-0.004	0.009		
Average caseload for school's counselors				
% hours spent on college readiness/selection/apply				
School has counselor designated for college selection				
School has counselor designated for college applications				
Primary goal of counseling program: college prep.				
Composite score of counselor expectations				
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-2.309	1.525		
Variance Component (S.D.)	0.278	0.527	*	
Reliability	0.083			
-2 Log Likelihood	1389.28			

HGLM Results for Undermatch at Attendance (n=1,000 students, 520 high schools), continued

	Counseling Norms			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.671	0.806		
SES Second Quintile (ref: Highest Quintile)	-0.032	0.561		
SES Third Quintile (ref: Highest Quintile)	0.892	0.449	*	20.27
SES Fourth Quintile (ref: Highest Quintile)	0.516	0.368		
Anticipated Funding	-0.452	0.219	*	-11.24
Importance of cost of attendance when choosing college	0.141	0.214		
Importance of job placement when choosing college	-0.176	0.237		
Importance of graduate school placement when choosing college	0.012	0.201		
Importance of particular program when choose college	0.086	0.247		
Teen thinks studying in high school rarely pays off later with good job	-0.066	0.181		
Cost of curent college before financial aid for 2013-2014 school year	-0.045	0.012	***	-1.10
Estimated cost of tuition/mandatory fees for college (factor)	-0.017	0.100		
Sex	0.177	0.296		
Racial Background: Asian	-0.388	0.527		
Racial Background: Black/African American	-1.458	0.732	*	-23.18
Racial Background: Hispanic	-0.534	0.638		
Racial Background: More Than One Race	-0.498	0.723		
First language 9th grader learned to speak is English, Spanish, or other	-0.213	0.224		
Count of college preparation activities	-0.172	0.114		
Has met with high school counselor about college admissions in 2012-201	0.688	0.377		
Has met with high school counselor about financial aid in 2012-2013 year	-0.080	0.286		
Count of having ever participated in a college access program	0.267	0.316		
How many friends plan to attend 2-year community college	-0.151	0.093		
How many friends plan to attend 4-year college	0.132	0.175		
Person who has had most influence on thinking about education after HS	0.121	0.096		
Count of people student talked to about going to college	0.204	0.143		
9th grader talked to school counselor about going to college	0.319	0.334		
How often discussed applying to college/other schools after high school	0.103	0.188		
How far in school teenager would like to go	0.526	0.182	**	12.11
How far in school parents would like teenager to go	-0.006	0.119		
What students think parents think is most important: continue education	-0.801	0.785		
Importance of academic quality when coosing college	-0.114	0.319		
Count of cultural capital activities	0.032	0.081		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)	-0.502	0.308		
School locale (urbanicity)	0.144	0.139		
School type: Regular school (not charter, magnet, or alternative)	1.210	0.782		
% of student body receiving free or reduced-price lunch	0.000	0.010		
% of student body enrolled in Advanced Placement courses	0.015	0.012		
% White students	0.006	0.007		
% of 08-09 seniors who went to 4-year Bachelor's-granting institution	-0.003	0.010		
Average caseload for school's counselors	-0.136	0.065	*	-3.35
% hours spent on college readiness/selection/apply	-0.426	0.171	*	-10.59
School has counselor designated for college selection	1.088	0.787		
School has counselor designated for college applications	-0.397	0.759		
Primary goal of counseling program: college prep.	0.745	0.327	*	16.54
Composite score of counselor expectations	0.181	0.176		
Count of college information support activities				
Count of financial aid support activities				
Count of college entrance exam support activities				
School organizes student visits to colleges				
School assists students with finding financial aid for college				
School consults with postsecondary reps about requirement/qualifications				
Intercept	-2.787	1.531		
Variance Component (S.D.)	0.246	0.496		
Reliability	0.071			
-2 Log Likelihood	1390.75			

HGLM Results for Undermatch at Attendance (n=1,000 students, 520 high schools), continued

	Counseling Resources			
Variable	Coefficient	SE	Sig	Δ-p
Student-Level Predictors of Undermatch				
SES Lowest Quintile (ref: Highest Quintile)	0.721	0.812		
SES Second Quintile (ref: Highest Quintile)	-0.116	0.568		
SES Third Quintile (ref: Highest Quintile)	0.872	0.460		
SES Fourth Quintile (ref: Highest Quintile)	0.469	0.372		
Anticipated Funding	-0.480	0.222	*	-11.93
Importance of cost of attendance when choosing college	0.160	0.215		
Importance of job placement when choosing college	-0.182	0.239		
Importance of graduate school placement when choosing college	0.000	0.202		
Importance of particular program when choose college	0.021	0.249		
Teen thinks studying in high school rarely pays off later with good job	-0.060	0.184		
Cost of curent college before financial aid for 2013-2014 school year	-0.045	0.012	***	-1.10
Estimated cost of tuition/mandatory fees for college (factor)	-0.014	0.103		
Sex	0.124	0.301		
Racial Background: Asian	-0.485	0.542		
Racial Background: Black/African American	-1.317	0.733		
Racial Background: Hispanic	-0.644	0.640		
Racial Background: More Than One Race	-0.506	0.716		
First language 9th grader learned to speak is English, Spanish, or other	0.176	0.224		
Count of college preparation activities	-0.134	0.114		
Has met with high school counselor about college admissions in 2012-2013	0.640	0.378		
Has met with high school counselor about financial aid in 2012-2013 year	0.068	0.282		
Count of having ever participated in a college access program	0.256	0.319		
How many friends plan to attend 2-year community college	-0.137	0.094		
How many friends plan to attend 4-year college	0.150	0.180		
Person who has had most influence on thinking about education after HS	0.148	0.097		
Count of people student talked to about going to college	0.225	0.146		
9th grader talked to school counselor about going to college	0.307	0.339		
How often discussed applying to college/other schools after high school	0.080	0.188		
How far in school teenager would like to go	0.500	0.186	**	11.55
How far in school parents would like teenager to go	0.005	0.122		
What students think parents think is most important: continue education	-0.791	0.788		
Importance of academic quality when coosing college	-0.116	0.320		
Count of cultural capital activities	0.041	0.083		
School-Level Predictors of Undermatch				
Private Control (Reference: Public)	-0.705	0.326	*	-17.43
School locale (urbanicity)	0.134	0.144		
School type: Regular school (not charter, magnet, or alternative)	1.255	0.807		
% of student body receiving free or reduced-price lunch	-0.001	0.011		
% of student body enrolled in Advanced Placement courses	0.019	0.012		
% White students	0.009	0.007		
% of 08-09 seniors who went to 4-year Bachelor's-granting institution	0.000	0.010		
Average caseload for school's counselors	-0.175	0.067	**	-4.32
% hours spent on college readiness/selection/apply	-0.451	0.171	**	-11.21
School has counselor designated for college selection	1.171	0.786		
School has counselor designated for college applications	-0.637	0.760		
Primary goal of counseling program: college prep.	0.694	0.327	*	15.54
Composite score of counselor expectations	0.184	0.180		
Count of college information support activities	0.074	0.312		
Count of financial aid support activities	0.199	0.103		
Count of college entrance exam support activities	-0.973	0.388	*	-23.66
School organizes student visits to colleges	0.339	0.363		
School assists students with finding financial aid for college	-0.340	0.576		
School consults with postsecondary reps about requirement/qualifications	0.279	0.866		
Intercept	-2.942	1.844		
Variance Component (S.D.)	0.243	0.493	*	
Reliability	0.068			
-2 Log Likelihood	1399.24			

References

Adelman, C. (1999). Answers in the Tool Box. Academic Intensity, Attendance Patterns, and Bachelor's Degree Attainment. Washington, D.C.: U.S. Department of Education.

Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college.* Washington, D.C.: U.S. Department of Education.

Agresti, A., & Finlay, B. (2008). *Statistical methods for the social sciences* (4th ed.). Upper Saddle River, NJ: Prentice Hall, Inc.

Allensworth, E. M., & Easton, J. Q. (2007). What Matters for Staying On-Track and Graduating in Chicago Public Highs Schools: A Close Look at Course Grades, Failures, and Attendance in the Freshman Year. Research Report. *Consortium on Chicago School Research*.

Alon, S., & Tienda, M. (2005). Assessing the "mismatch" hypothesis: Differences in college graduation rates by institutional selectivity. *Sociology of education*, *78*(4), 294-315.

American School Counselor Association. (2005). *The ASCA National Model: A framework for school counseling programs (2nd edition).* Alexandria, VA: ASCA.

American School Counselor Association. (2010). *State School Counseling Legislation.* Retrieved from: http://www.schoolcounselor.org/content.asp?pl=325&sl=133&contentid=538

American School Counselor Association. (2016). *Student-to-School-Counselor Ratio 2013-2014*. Retrieved from https://www.schoolcounselor.org/asca/media/asca/home/Ratios13-14.pdf.

Anderson, G. M., Alfonso, M., & Sun, J. C. (2006). Rethinking cooling out at public community colleges: An examination of fiscal and demographic trends in higher education and the rise of statewide articulation agreements. *Teachers College Record, 108*(3), 422-451.

Astin, A. W. (1993). *What matters in college?: Four critical years revisited* (Vol. 1). San Francisco: Jossey-Bass.

Atkinson, D. R., Jennings, R. G., & Liongson, L. (1990). Minority students' reasons for not seeking counseling and suggestions for improving services. *Journal of College Student Development*.

Attewell, P. (2001). The winner-take-all high school: Organizational adaptations to educational stratification. *Sociology of Education, 74*, 267-295.

Auwarter, A. E., & Aruguete, M. S. (2008). Counselor perceptions of students who vary in gender and socioeconomic status. *Social Psychology of Education*, *11*(4), 389-395.

Avery, C. (2010). *The effects of college counseling on high-achieving, low-income students*. Cambridge, MA: National Bureau of Economic Research.

Avery, C., & Hoxby, C. M. (2004). Do and should financial aid packages affect students' college choices?. In *College choices: The economics of where to go, when to go, and how to pay for it* (pp. 239-302). University of Chicago Press.

Bailey, M. J., & Dynarski, S. M. (2011). Inequality in postsecondary education. In G. Duncan, & R. Murnane (Eds.), *Whither opportunity?: Rising inequality, schools, and children's life chances* (pp. 117-132). New York, NY: Russell Sage Foundation.

Baker, T. L., & Velez, W. (1996). Access to and opportunity in postsecondary education in the United States: A review. *Sociology of Education*, 82-101.

Bankston, C. L., III, & Caldas, S. J. (1996). Majority African American schools and social injustice: The influence of de facto segregation on academic achievement. *Social Forces, 75*(2), 535-555.

Bastedo, M. N., & Flaster, A. (2014). Conceptual and methodological problems in research on college undermatch. *Educational Researcher*, 0013189X14523039.

Baum, S., & Lapovsky, L. (2006). *Tuition discounting: Not just a private college practice*. New York, NY: The College Board.

Becker, G.S. (1962). Investment in human capital: A theoretical analysis. *Journal of Political Economy* 70(5): 9–49.

Belasco, A. S. (2013). Creating college opportunity: School counselors and their influence on postsecondary enrollment. *Research in Higher Education,54*(7), 781-804.

Belasco, A. S., & Trivette, M. J. (2015). Aiming low: Estimating the scope and predictors of postsecondary undermatch. *The Journal of Higher Education,86*(2), 233-263.

Bettinger, E., Long, B. T., & Oreopoulos, P. (2009a). Increasing Postsecondary Enrollment among Low-Income Families: A Project to Improve Access to College Information and Financial Aid: The FAFSA H&R Block Experiment. *Harvard University*.

Bettinger, E. P., Long, B. T., Oreopoulos, P., & Sanbonmatsu, L. (2009b). The Role of simplification and information in college decisions: Results from the H&R Block FAFSA Experiment. National Bureau of Economic Research Working Paper Series, No. 15361. Washington DC: National Bureau of Economic Research. doi: 10.3386/w15361

Bonilla-Silva, E. (2006). *Racism without racists: Color-blind racism and the persistence of racial inequality in the United States* (Second ed.). Lanham, MD: Rowman & Littlefield Publishers.

Boswell, D., & Carr, B. (1988). Secondary School Counselors' Perceptions of Their Duties: A Comparison of Small, Medium, and Large Schools. *Contemporary Education*, *59*(4), 227.

Bourdieu, P. (1986). The forms of capital. In J. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241-258). New York, NY: Greenwood Press.

Bourdieu, P., & Passeron, J. C. (1977). *Reproduction in education, society, and culture.* (Second ed.). Thousand Oaks, CA: Sage Publications.

Bowen, W. G., & Bok, D. (1998). *The shape of the river: Long-term counsequences of considering race in college and university admissions*. Princeton, NJ: Princeton University Press.

Bowen, W. G., Chingos, M. M., & McPherson, M. S. (2009). *Crossing the finish line: Completing college at America's public universities.* Princeton, NJ: Princeton University Press.

Bowen, W. G., Kurzweil, M. A., Tobin, E. M., & Pichler, S. C. (2005). *Equity and excellence in American higher education*. Charlottesville, VA: University of Virginia Press.

Bridgeland, J., & Bruce, M. (2011a). *2011 National Survey of School Counselors: Counseling at a Crossroads*. New York, NY: College Board Policy & Advocacy Center. Retrieved from http://media.collegeboard.com/digitalServices/pdf/nosca/11b_4230_NarReport_BOOKLET_WEB_111104.pdf

Bridgeland, J., & Bruce, M. (2011b). School counselors: Literature and landscape review. The state of school counseling in America. *College Board Advocacy & Policy Center*. Retrieved from http://media.collegeboard.com/digitalServices/pdf/advocacy/nosca/counselors-literature-landscape-review.pdf

Bridgeland, J., & Bruce, M. (2012). *2012 National Survey of School Counselors True North: Charting the Course to College and Career Readiness*. New York, NY: College Board Advocacy & Policy Center. Retrieved from http://media.collegeboard.com/digitalServices/pdf/nosca/true-north.pdf

Brown, M. K., Carnoy, M., Currie, E., Duster, T., Oppenheimer, D. B., Shultz, M. M., & Wellman, D. (2003). *Whitewashing race: The myth of a color-blind society.* Berkeley and Los Angeles, CA: University of California Press.

Bryan, J., Moore-Thomas, C., Day-Vines, N. L., & Holcomb-McCoy, C. (2011). School counselors as social capital: The effects of high school college counseling on college application rates. *Journal of Counseling & Development*, *89*(2), 190–199. http://doi.org/10.1002/j.1556-6678.2011.tb00077.x

Buchmann, C. (2009). Gender inequalities in the transition to college. *Teachers College Record, 111*(10), 2320-2346.

Burton, N. W., & Ramist, L. (2001). Predicting success in college: SAT studies of classes graduating since 1980. New York, NY: College Board Advocacy & Policy Center. Retrieved from http://research.collegeboard.org/sites/default/files/publications/2012/7/researchreport-2001-2-predicting-college-success-sat-studies.pdf

Cabrera, A. F., & La Nasa, S. M. (2000a). Understanding the college-choice process. In A. Cabrera & S. La Nasa (Eds.), *Understanding the college choice of disadvantaged students: New directions for institutional research* (pp. 5-22). San Francisco, CA: Jossey-Bass Inc.

Cabrera, A. F., & La Nasa, S. M. (2000b). Understanding the college-choice process. In A. Cabrera & S. La Nasa (Eds.), *Overcoming the tasks on the path to college for America's disadvantaged (*pp. 31-43). San Francisco, CA: Jossey-Bass Inc.

Cabrera, A. F., & La Nasa, S. M. (2001). On the path to college: Three critical tasks facing America's disadvantaged. *Research in higher education*, *42*(2), 119-150.

Carey, J.C., & Harrington, K. M. (2010a). *Nebraska school counseling state evaluation*. Amherst, MA: Center for School Counseling Outcome Research and Evaluation. Retrieved from http://www.education.ne.gov/cared/PDFs/NSCEFullReport.pdf

Carey, J.C., & Harrington, K. M. (2010b). *Utah comprehensive counseling and guidance program evaluation report*. Amherst, MA: Center for School Counseling Outcome Research and Evaluation. Retrieved from http://schools.utah.gov/cte/documents/guidance/publications/Research_UtahSchoolCounselingEvaluation.pdf

Carnevale, A. P., & Van Der Werf, M. (2017). *The 20% solution: Selective colleges can afford to admit more Pell Grant recipients.* Georgetown University Center on Education and the Workforce. Retrieved from https://cew.georgetown.edu/cew-reports/pell20/.

Carrell, S. E., & Hoekstra, M (2010). *Are school counselors a cost-effective education input?* Unpublished manuscript, Department of Economics, Univeristy of California, Davis. Retrieved from http://www.econ.ucdavis.edu/faculty/scarrell/counselors_input.pdf.

Catsiapis, G. (1987). A model of educational investment decisions. *The Review of Economics and Statistics*, 33-41.

Choy, S. P., Horn, L. J., Nuñez, A. M., & Chen, X. (2000). Transition to college: What helps at-risk students and students whose parents did not attend college. In A. Cabrera & S. La Nasa (Eds.), *Overcoming the tasks on the path to college for America's disadvantaged (*pp. 45-63). San Francisco, CA: Jossey-Bass Inc.

Clark, B. R. (1960). The" cooling-out" function in higher education. *American journal of Sociology*, 569-576.

Clark, B. R. (1980). The "cooling out" function revisited. *New directions for community colleges*, *1980*(32), 15-31.

Clinedinst, M., Koranteng, A., & Nicola, T. (2015). *State of college admission.* Alexandria, VA: National Association for College Admission Counseling. Retrieved from http://www.nacacnet.org/research/research-data/Documents/2015SoCA.pdf

Coker, K., & Schrader, S. (2004). Conducting a school-based practicum: A collaborative model. *Professional School Counseling*, *7*(4), 263-267.

Colby, S. L., & Ortman, J. M. (2014). *Projections of the size and composition of the U.S. population; 2014 to 2060* (P25-1143). Washington, DC: U.S. Census Bureau. Retrieved from https://www.census.gov/content/dam/Census/library/publications/2015/demo/p25-1143.pdf

Coleman, J. S. (1988). Social capital in the creation of human capital. *American journal of sociology*, S95-S120.

College Board. (2008, December). *Coming to our senses: Education and the American future*. Retrieved from https://professionals.collegeboard.com/profdownload/coming-to-oursenses-college-board-2008.pdf.

Corwin, Z. B., Venegas, K. M., Oliverez, P. M., & Colyar, J. E. (2004). School counsel: How appropriate guidance affects educational equity. *Urban Education*, *39*(4), 442–457. http://doi.org/10.1177/0042085904265107

Cruce, T. M. (2009). A note on the calculation and interpretation of the delta-p statistic for categorical independent variables. *Research in Higher Education*, *50*(6), 608-622.

DeNavas-Walt, C., Proctor, B. D., & Smith, J. (2007). *Income, poverty and health insurance coverage in the United States: 2006* (U.S. Census Bureau current population report, pp. 60-233). Washington, D.C.: U.S. Government Printing Office. Retrieved from https://www.census.gov/prod/2007pubs/p60-233.pdf

DesJardins, S.L., and Toutkoushian, R.K. (2005). Are students really rational? The development of rational thought and its application to student choice**.** In J.C. Smart (ed.), *Higher Education: Handbook of Theory and Research* (Vol. 20, pp. 191–240). Dordrecht, The Netherlands: Kluwer Academic Publishers.

DeVellis R.F. (2003). *Scale development: Theory and applications* (2nd ed.). Thousand Oaks, CA: Sage.

Dika, S.L., & Singh, K. (2002). Applications of social capital in educational literature: A critical synthesis. *Review of Educational Research* 72: 31–60.

Dillon, E. W., & Smith, J. A. (2013). *The determinants of mismatch between students and colleges* (No. w19286). National Bureau of Economic Research.

DiMaggio, P. (1982). Cultural capital and school success: The impact of status culture participation on the grades of U.S. high school students. *American Sociological Review, 47*(2), 189-201.

Dynarski, S. M., & Scott-Clayton, J. (2006). The cost of complexity in federal student aid: Lessons from optimal tax theory and behavioral economics. *National Tax Journal, 59*(20): 319 -356.

Dynarski, S. M., & Scott-Clayton, J. (2007). *College grants on a postcard: A proposal for simple and predictable federal student aid*. Washington, DC: The Brookings Institute.

Ellwood, D.T., and Kane, T.J. (2000). Who is getting a college education? Family background and the growing gaps in enrollment. In S. Danziger and J. Waldfogel (eds.), *Securing the Future: Investing in Children from Birth to College* (pp. 283–324). New York: Russell Sage Foundation.

Emirbayer, M., & Mische, A. (1998). What is agency? 1. *American journal of sociology*, *103*(4), 962-1023.

Engberg, M. E., &; Gilbert, A. J. (2014). The counseling opportunity structure: Examining correlates of four-year college going rates. *Research in Higher Education, 55*(3), 219-244.

Engberg, M. E., & Wolniak, G. C. (2010). Examining the effects of high school contexts on postsecondary enrollment. *Research in Higher Education, 51*(2), 132-153.

Espenshade, T. J., Hale, L. E., & Chung, C. Y. (2005). The frog pond revisited: High school academic context, class rank, and elite college admissions. *Sociology of Education, 78*, 477-498.

Farmer-Hinton, R. L., & McCullough, R. G. (2008). College counseling in charter high schools: Examining the opportunities and challenges. *The High School Journal*, *91*(4), 77-90.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). Thousand Oaks, CA: SAGE Publications Inc.

Freeman, K. (1997). Increasing African Americans' participation in higher education: African American high-school students' perspectives. *The Journal of Higher Education, 68*(5), 523-550.

Freeman, K. (2005). *African Americans and college choice: The influence of family and school*. Albany, NY: SUNY Press.

Fry, R. (2004). *Latino youth finishing college: The role of selective pathways.* Pew Hispanic Center. Retrieved from http://files.eric.ed.gov/fulltext/ED485329.pdf.

Gándara, P. (1993). *Choosing higher education: The educational mobility of Chicano students*. Berkeley, CA: California Policy Seminar.

Gándara, P. (1995). *Over the ivy walls: The educational mobility of low-income Chicanos*. Albany: State University of New York Press.

Gándara, P. (2002). Meeting common goals: Linking K-12 and college interventions. In W. Tierney & L. Hagedorn (Eds.), *Increasing access to college: Extending possibilities for all students* (pp. 113-134). New York, NY: SUNY Press.

Gándara, P., & Bial, D. (2001). Paving the way to higher education: K-12 interventions for underrepresented students. *Washington, DC: National Center for Educational Statistics*.

Geiser, S., & Santelices, V. (2006). The role of Advanced Placement and honors courses in college admissions. In P. Gandara, G. Orfield, & C. L. Horn (Eds.), *Expanding Opportunity in Higher Education: Leveraging Promise*. Albany, NY: SUNY Press.

Gibbons, M., Borders, L., Wiles, M., Stephan, J., & Davis, P. (2006). Career and college planning needs of ninth graders—as reported by ninth graders. *Professional School Counseling*, *10*(2), 168-178.

Giddens, A. (1979). *Central problems in social theory.* Berkeley and Los Angeles, CA: University of California Press.

Giddens, A. (1984). *The constitution of society: Outline of the Theory of Structuration*. Berkeley and Los Angeles, CA: University of California Press.

González, K. P., Stoner, C., & Jovel, J. E. (2003). Examining the role of social capital in access to college for Latinas: Toward a college opportunity framework. *Journal of Hispanic Higher Education*, *2*(2), 146-170.

Goodwin, R. N. (2015). *College counseling dosage and postsecondary academic match expectations of at-risk students*. (Doctoral dissertation). Retrieved from ProQuest LLC (UMI Number: 3712348).

Hagedorn, L. S., Tibbetts, K., Moon, H. S., & Lester, J. (2003). *Factors contributing to college retention in the Native Hawaiian population.* Paper presented at the Kamehameha Schools Research Conference, Honolulu, HI.

Hagedorn, L. S., & Tierney, W. G. (2002). Introduction: Cultural capital and the struggle for educational equity. In W. Tierney & L. Hagedorn (Eds.), *Increasing access to college: Extending possibilities for all students* (pp. 15-34). New York, NY: SUNY Press.

Hart Research Associates. (2012). *The College Board 2012 National Survey of School Counselors and Administrators: Report on Survey Findings: Barriers and Supports to School Counselor Success*. New York, NY: College Board Advocacy & Policy Center. Retrieved from http://media.collegeboard.com/digitalServices/pdf/nosca/Barriers-Supports_TechReport_Final.pdf

Hawkins, D. (2003). *The State of College Admissions*. Alexandria, VA: National Association for College Admission Counseling.

Hays, S. (1994). Structure and agency and the sticky problem of culture. *Sociological theory*, *12*, 57-57.

Hearn, J.C. (1988). Attendance at higher-cost colleges: Ascribed, socioeconomic, and academic influences on student enrollment patterns. *Economics of Education Review* 7: 65–76.

Hearn, J. C. (1991). Academic and nonacademic influences on the college destinations of 1980 high school graduates. *Sociology of Education, 64*(3), 158–171.

Hearn, J. C., & Holdsworth, J. M. (2004). Federal student aid: The shift from grants to loans. In E. St. John, & M. Parsons (Eds.), *Public funding of higher education: Changing contexts and new rationales* (pp. 40-59). Baltimore, MD: The Johns Hopkins University.

Hearn, J. C., & Holdsworth, J. M. (2005). Cocurricular activities and students' college prospects: Is there a connection. In W. Tierney, Z. Corwin, & J. Colyar (Eds.), *Preparing for college: Nine elements of effective outreach,* (135-154). Albany, NY: State University of New York Press.

Heller, D. E. (1997). Student price response in higher education: An update to Leslie and Brinkman. *Journal of higher education*, 624-659.

Heller, D. E. (2006). State support of higher education: Past, present, and future. In D. Priest, & E. St. John (Eds.), *Privatization and public universities* (pp. 11-37). Bloomington, IN: Indiana University Press.

Hill, C. B., & Winston, G. C. (2010). Low-income students and highly selective private colleges: Geography, searching, and recruiting. *Economics of Education Review, 29*(4), 495–503.

Hill, D. H. (2008). School strategies and the "college-linking" process: Reconsidering the effects of high schools on college enrollment. *Sociology of Education, 81*(1), 53-76. doi: 10.1177/003804070808100103

Hilmer, M. J. (1998). Post-secondary fees and the decision to attend a university or a community college. *Journal of Public Economics, 67*(3), 329-348.

Holcomb-McCoy, C., Lee, V., Bryan, J., & Young, A. (2011). Ensuring college access for all: A call to the school counseling profession. *Counseling Today,53*(8), 42-43.

Horn, L., & Kojaku, L. K. (2001). *High school academic curriculum and the persistence path through college persistence and transfer behavior of undergraduates 3 years after entering 4-year institutions*. Collingdale, PA: Diane Publishing.

Horvat, E. M. (2001). Understanding equity and access in higher education: The potential contribution of Pierre Bourdieu. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 16, pp. 158-171). New York, NY: Agathon Press.

Hossler, D., Braxton, J., & Coopersmith, G. (1989). "Understanding Student College Choice." *Higher Education: Handbook of Theory and Research,* V, 231-288.

Hossler, D., & Gallagher, K. S. (1987). Studying student college choice: A three-phase model and the implications for policymakers. *College and University, 62*(3), 207-21.

Hossler, D., Schmit, J., and Vesper, N. (1999). *Going to College: How Social, Economic, and Educational Factors Influence the Decisions Students Make*. Baltimore: Johns Hopkins University Press.

Hossler, D., and Stage, F.K. (1992). Family and high school experience influences on the postsecondary educational plans of ninth-grade students. *American Educational Research Journal* 29: 425–451.

Hobson v. Hansen, 269 F. Supp. 401 (D.D.C 1967).

House, R. M., & Hayes, R. L. (2002). School counselors: Becoming key players in school reform. *Professional School Counseling, 5*, 249-256.

Howard, T. C. (2010). *Why race and culture matter in schools: Closing the achievement gap in America's classrooms*. New York, NY: Teachers College Press.

Howell, J., & Smith, J. (2011). *Getting into college: A cross-cohort examination of college preparations by lower-income students.* (The CollegeKeys Compact™ Policy Brief). New York, NY: The College Board.

Hox, J. J. (2010). *Multilevel analysis: Techniques and applications* (2nd ed.). New York, NY: Routledge.

Hoxby, C. M. (2004). *Achievement in charter schools and regular public schools in the United States: Understanding the differences*. Cambridge, MA: Harvard University.

Hoxby, C. M., & Avery, C. (2013). *The missing" one-offs": The hidden supply of high-achieving, low income students* (No. w18586). National Bureau of Economic Research

Hoxby, C. M., & Turner, S. (2013a). *Expanding college opportunities for high-achieving, low income students*. Stanford, CA: Stanford Institute for Economic Policy Research. Retrieved from http://siepr.stanford.edu

Hoxby, C. M., & Turner, S. (2013b). Informing students about their college options: A proposal for broadening the expanding college opportunities project. *The Hamilton Project, Discussion Paper, 3*. Retrieved from http://www.brookings.edu/~/media/research/files/papers/2013/06/26-expanding-college-opportunity-hoxby-turner/thp_hoxbyturner_final.pdf

Hugo, E. (2004). *Rethinking counseling for college: Perceptions of the school and counselor roles in increasing college enrollment* (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses. (Order No. 3149817).

Hurtado, S., Inkelas, K. K., Briggs, C., & Rhee, B. S. (1997). Differences in college access and choice among racial/ethnic groups: Identifying continuing barriers. *Research in Higher Education*, *38*(1), 43-75.

Hurwitz, M., & Howell, J. (2014). Estimating causal impacts of school counselors with regression discontinuity designs. *Journal of Counseling & Development, 92*(3), 316-327. doi: 10.1002/j.1556-6676.2014.00159.x

Hurwitz, M., Pender, M., Howell, J., & Smith, J. (2012). The Role of High Schools in Students' Postsecondary Choices. Retrieved from http://research.collegeboard.org/sites/default/files/publications/2014/9/research-role-high-schools-students-postsecondary-choices.pdf

Hutchinson, R. L., and Reagan, C.A. (1989). Problems for which seniors would seek help from school counselors. *The School Counselor*. 36, 271-280.

Ingels, S.J., Pratt, D.J., Herget, D.R., Burns, L.J., Dever, J.A., Ottem, R., Rogers, J.E., Jin, Y., and Leinwand, S. (2011). *High School Longitudinal Study of 2009 (HSLS:09). Base-Year Data File Documentation* (NCES 2011-328). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Ingels, S. J., Pratt, D. J., Herget, D. R., Dever, J. A., Fritch, L. B., Ottem, R., Rogers, J. E., . . . Leinwand, S. (2013). *High School Longitudinal Study of 2009 (HSLS:09) base year to first follow-up data file documentation* (NCES 2014-361). Washington, D.C.: National Center for Education for Statistics, Institute of Education Sciences.

Ingels, S. J., Pratt, D. J., Herget, D. R., Bryan, M., Fritch, L. B., Ottem, R., Rogers, J. E., . . . Wilson, D. (2015). *High School Longitudinal Study of 2009 (HSLS:09) 2013 update and high school transcript data file documentation* (NCES 2015-036). Washington, D.C.: National Center for Education for Statistics, Institute of Education Sciences.

Jarsky, K. M., McDonough, P. M., & Nunez, A.-M. (2009). Establishing a college culture in secondary schools through P-20 collaboration: A case study. *Journal of Hispanic Higher Education, 8*(4), 357-373.

Johnson, J., & Rochkind, J. (2009). With Their Whole Lives Ahead of Them: Myths and Realities about Why So Many Students Fail to Finish College. *Public Agenda*.

Johnson, J., & Rochkind, J. (2010). Can I get a little advice here? How an overstretched high school guidance system is undermining students' college aspirations. *Public Agenda*. Retrieved from http://files.eric.ed.gov/fulltext/ED508672.pdf

Kalmijn, M., & Kraaykamp, G. (1996). Race, cultural capital, and schooling: An analysis of trends in the United States. *Sociology of education*, 22-34.

Kane, T.J. (1999). *The Price of Admission: Rethinking How Americans Pay for College*. Washington, DC: Brookings Institution Press.

Kane, T., & Rouse, C. (1999). The community college: Educating students at the margin between college and work. *Journal of Economic Perspectives, 13*, 63-84.

Kanter, M., Ochoa, E., Nassif, R., & Chong, F. (2011). *Meeting President Obama's 2020 College Completion Goal* [PowerPoint slides]. Retrieved from http://www.ed.gov/news/speeches/meeting-president-obamas-2020-college-completion-goal

Kao, G., and Tienda, M. (1998). Educational aspirations of minority youth. *American Journal of Education* 106: 349–384.

Kaufman, J., & Gabler, J. (2004). Cultural capital and the extracurricular activities of girls and boys in the college attainment process. *Poetics, 32*(2), 145-168.

Kena, G., Musu-Gillette, L., Robinson, J., Wang, X., Rathbun, A., Zhang, J., … Dunlop Velez, E. (2015). *The condition of education 2015* (NCES 2015-144). Washington, DC: National Center for Education Statistics, U.S. Department of Education. Retrieved from http://nces.ed.gov/pubs2015/2015144.pdf

King, J. E. (2004). *Missed opportunities: Students who do not apply for financial aid* (American Council on Education Issue Brief). Washington, DC: American Council on Education.

Kitsuse, J. I., & Cicourel, A. V. (1963). A note on the uses of official statistics. *Social problems*, *11*(2), 131-139.

Kucsera, J., & Orfield, G. (2014). *New York State's Extreme School Segregation: Inequality, Inaction and a Damaged Future*. Los Angeles, CA: The Civil Rights Project, UCLA.

Lapan, R., & Harrington, K. (2010). Paving the Road to College: How School Counselors Help Students Succeed. *Center for School Counseling Outcome Research (NJ1)*.

Lareau, A., & Horvat, E. (1999). Moments of social inclusion and exclusion: Race, class, and cultural capital in family-school relationships. *Sociology of Education,* 72(1), 37-53.

Lamont, M., & Lareau, A. (1988). Cultural capital: Allusions, gaps and glissandos in recent theoretical developments. *Sociological theory*, *6*(2), 153-168.

Lee, V. E., & Ekstrom, R. B. (1987). Student access to guidance counseling in high school. *American Educational Research Journal*, *24*(2), 287-310.

Leslie, L. L., & Brinkman, P. T. (1988). *The Economic Value of Higher Education. American Council on Education/Macmillan Series on Higher Education*. New York, NY: Macmillan Publishing.

Lin, N. (2001). Social capital: A theory of social structure and action. New York: Cambridge University Press.

Logan, J. R., Minca, E., & Adar, S. (2012). The geography of inequality: Why separate means unequal in American public schools. *Sociology of Education, 85*(3), 287-301. doi: 10.1177/0038040711431588

Lombana, J. H. (1985). Guidance accountability: A new look at an old problem. *The School Counselor*, 32, 340- 346.

Long, B.T. (2004). How have college decisions changed over time? An application of the conditional logistic choice model. *Journal of Econometrics* 121: 271–296.

Long, M. C., Conger, D., & Iatarola, P. (2012). Effects of High School Course-Taking on Secondary and Postsecondary Success. *American Educational Research Journal, 49*(2), 285-322. doi: 10.3102/0002831211431952

Long, B. T., & Kurlaender, M. (2009). Do community colleges provide a viable pathway to the baccalaureate degree? *Educational Evaluation and Policy Analysis, 32*(1), 30-53.

Lubienski S. T., Lubienski C. (2006). School sector and academic achievement: A multilevel analysis of NAEP mathematics data. American Educational Research Journal, 43, 651–698.

McLachlan, G. J., & Krishnan, T. (1997). Wiley series in probability and statistics. *The EM Algorithm and Extensions, Second Edition*, 361-369.

MacLeod, J. (1987). *Ain't No Makin' It: Leveled Aspirations in a Low-Income Neighborhood*. Boulder, CO: Westview Press.

Manski, C.F., and Wise, D. (1983). *College Choice in America*. Cambridge: Harvard University Press.

McClafferty, K. A., McDonough, P. M., & Nuñez, A.M. (2002). What is a college culture? Facilitating college preparation through organizational change. Retrieved from http://eric.ed.gov/?id=ED471504

McDonough, P. M. (1997). *Choosing colleges. How social class and schools structure opportunity.* Albany, New York: State University of New York Press.

McDonough, P. M. (2005a). Counseling and college counseling in America's high schools. *State of College Admission*, 107–121.

McDonough, P. M. (2005b). Counseling matters: Knowledge, assistance, and organizational commitment in college preparation. In W. Tierney, Z. Corwin, & J. Colyar (Eds.), *Preparing for college: Nine elements of effective outreach*, (69-87). Albany, NY: State University of New York Press.

McDonough, P. M., & Gildersleeve, R. E. (2006). All else is never equal: Opportunity lost and found on the P-16 path to college access. In C. Conrad & R. Serlin (Eds.), *The SAGE handbook for research in education: Engaging ideas and enriching inquiry* (pp. 59-77). Thousand Oaks, CA: SAGE Press.

McDonough, P., Nuñez, A.-M., Ceja, M., & Solórzano, D. G. (2003). *A model of Latino college choice.* Paper presented at the annual meeting of the Association for the Study of Higher Education, Portland, OR.

McDonough, P., Nuñez, A.-M., Ceja, M., & Solórzano, D. G. (2004). *Building models of Latino/a's college choice.* Paper presented at the annual meeting of the American Educational Research Association, San Diego, CA.

McDonough, P.M., Ventresca, M. and C. Outcalt. (2000). Field of Dreams: Organizational Field Approaches to Understanding the Transformation of College Access, 1965-1995. *Higher Education: Handbook of Theory and Research*. Vol. XIV, 371-405.

McLachlan, G.J., & Krishnan, T. (1997). *The EM algorithm and extensions*. Wiley, New York.

McPherson, M. S., & Schapiro, M. O. (1998). Part III & IV: Merit Aid. In M. McPherson, & M. Schapiro (Eds.), *The student aid game: Meeting need and rewarding talent in American higher education* (pp. 54-131). Princeton, NJ: Princeton University Press.

Melguizo, T. (2009). Are community colleges an alternative path for Hispanic students to attain a bachelor's degree? *Teachers College Record, 111*(1), 90-123.

Minner, S., & et al. (1995). *Completing university degrees: Barriers for Native Americans*. U.S.; Arizona.

Moles, O. C. (1991). Guidance programs in American high schools: A descriptive portrait. *The School Counselor*, 163-177.

Monks, J. (2009). The impact of merit-based financial aid on college enrollment: A field experiment. *Economics of Education Review*, *28*(1), 99–106.

Morrow, V. (1999). Conceptualising social capital in relation to the well-being of children and young people: A critical review. *The Sociological Review, 47*(4), 744-765.

Mundel, D. S. (2008). What do we know about the impact of grants to college students. *The effectiveness of student aid policies: What the research tells us*, 9-38.

NACAC (2008). *Counseling trends survey.* Alexandria, VA: National Association for College Admission Counseling. Retrieved from http://www.nacacnet.org/research/publicationsresources/marketplace/documents/08stateofadmission.pdf

NACAC (2010). *School counselors contribute to college access and success.* Alexandria, VA: National Association for College Admission Counseling. Retrieved from http://www.nacacnet.org/issues-action/TakeAction/Documents/PolicyBrief_CounselorsContributeCollegeAccessSuccess_2015.pdf

No Child Left Behind Act of 2001, 20 U. S. C. § S 6301. (2002).

Noeth, R. J., & Wimberly, G. L. (2002). *Creating seamless educational transitions for urban African American and Hispanic students*. Washington, DC: ACT Policy Report. Retrieved from http://www.act.org/research/policymakers/pdf/2181.pdf

Noguera, P. A. (2013). Foreword: Beyond the postracial society. In D. Carter Andrews & F. Tuitt (Eds.), *Contesting the myth of a 'post racial' era* (pp. ix-xii). New York, NY: Peter Lange Publishing, Inc.

Oakes, J., & Guiton, G. (1995). Matchmaking: The dynamics of high school tracking decisions. *American Educational Research Journal, 32*(1), 3-33.

Omi, M., & Winant, H. (2015). *Racial formation in the United States* (Third ed.). New York, NY: Routledge.

Orfield, G., Kucsera, J., & Siegel-Hawley, G. (2012). *E Pluribus…separation: Deepening double segregation for more students.* Los Angeles, CA: Civil Rights Project/Proyecto Derechos Civiles, UCLA.

Paisley, P. O., & Hayes, R. L. (2003). School counseling in the academic domain: Transformations in preparation and practice. *Professional School Counseling*, *6*(3), 198-204.

Paisley, P. O., & McMahon, G. (2001). School counseling for the 21st century: Challenges and opportunities. *Professional School Counseling, 5*(2), 106-115.

Parsad, B., Alexander, D., Farris, E., Hudson, L., & Greene, B. (2003). *High school guidance counseling* (NCES Report No. 2003-015). Washington, D.C.: U.S. Department of Education, National Center for Education Statistics. Retrieved from http://eric.ed.gov/?id=ED480381

Pascarella, E. T., & Terenzini, P. T. (1991). How college affects students. *Findings and Insights from Twenty Years of Research. San Francisco: Jossey-Bass*.

Pathways to College Network. (2010). *Cost Perceptions and College-Going for Low-Income Students*. Pathways to College Network.

Paul, F. G. (2002). Bridging paradigms: A profession in transition. *Oakland, CA: University of California Office of the President*.

Paulsen, M.B. (2001). The economics of human capital and investment in higher education. In M.B. Paulsen and J.C. Smart (eds.), *The Finance of Higher Education: Theory, Research, Policy, and Practice* (pp. 55–94). New York: Agathon Press.

Peet, M. R. (2006). *We make the road by walking it: Critical consciousness, structuration, and social change*. (Doctoral dissertation). Retrieved from ProQuest LLC (UMI Number: 3208310).

Pérez, P. A., & McDonough, P. M. (2008). Understanding Latina and Latino college choice: A social capital and chain migration analysis. *Journal of Hispanic Higher Education, 7*(3), 249-265.

Perna, L. W. (2000). Differences in the decision to enroll in college among African Americans, Hispanics, and Whites. *Journal of Higher Education, 71*(2),117-141.

Perna, L.W. (2004a). The key to college access: A college preparatory curriculum. In W. Tierney, Z. Corwin, and J. Colyar (Eds.), *Preparing for college: Nine elements of effective outreach* (pp. 113–134). Albany, NY: State University of New York Press.

Perna, L.W. (2004b). Understanding the decision to enroll in graduate school: Sex and racial/ethnic group differences. *The Journal of Higher Education* 75(5): 487–527.

Perna, L. W. (2006). Studying college access and choice: A proposed conceptual model. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 21, pp. 99-157). Netherlands: Springer.

Perna, L.W. (2005). The key to college access: A college preparatory curriculum. In W. Tierney, Z. Corwin, and J. Colyar (Eds.), *Preparing for college: Nine elements of effective outreach* (pp. 113–134). Albany, NY: State University of New York Press.

Perna, L. W. (2008). Understanding high school students' willingness to borrow to pay college prices. *Research in Higher Education, 49*(7), 589-606.

Perna, L. W. (2010). Toward a more complete understanding of the role of financial aid in promoting college enrollment: The importance of context. In J.C. Smart (Ed.), *Higher education: Handbook of theory and research: Vol. 25* (pp. 129-179). The Netherlands: Springer.

Perna, L. W., & Armijo, M. (2014). The persistence of unaligned K-12 and higher education systems: Why have statewide alignment efforts been ineffective? *The ANNALS of the American Academy of Political and Social Science, 655*(1), 16-35.

Perna, L. W., & Kurban, E. R. (2013). Improving college and access and choice. In L. Perna & A. Jones (Eds.), *The state of college access and completion: Improving college success for students from underrepresented groups* (pp. 10-33). New York, NY: Taylor & Francis.

Perna, L. W., Rowan-Kenyon, H. T., Thomas, S. L., Bell, A., Anderson, R., & Li, C. (2008). The role of college counseling in shaping college opportunity: Variations across high schools. *The Review of Higher Education, 31*(2), 131-159. doi: 10.1353/rhe.2007.0073

Perna, L.W., & Titus, M. (2004). Understanding differences in the choice of college attended: The role of state public policies. *Review of Higher Education* 27(4): 501–525.

Perna, L.W., & Titus, M. (2005). The relationship between parental involvement as social capital and college enrollment: An examination of racial/ethnic group differences. *The Journal of Higher Education* 76(5): 485–518.

Peterson, T. (1985). A comment on presenting results of logit and probit models. *American Sociological Review, 50*(1), 130–131.

Pham, C., & Keenan, T. (2011). Counseling and college matriculation: Does the availability of counseling affect college-going decisions among highly qualified first-generation college-bound high school graduates. *Journal of Applied Economics and Business Research, 1*(1), 12–124.

Plank, S. B., & Jordan, W. J. (2001). Effects of information, guidance, and actions on postsecondary destinations: A study of talent loss. *American Educational Research Journal, 38*(4), 947-979. doi: 10.3102/00028312038004947

Planty, M., Hussar, T., Snyder, T., Provasnik, S., Kena, G., Dinkes, R., KewalRamani, A., …Kemp, J. (2008). *The condition of education 2008* (NCES 2008-031). Washington D.C.: National Center for Education for Statistics, Institute of Education Sciences.

Portes, A. (1998). Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology,* 24, 1-24.

Powell, A.G. (1996). *Lessons from Privilege. The American Prep School Tradition*. (First ed.). Cambridge, MA: Harvard University Press.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods*, 2nd ed. Thousand Oaks, CA: Sage.

Reardon, S. F., Grewal, E. T., Kalogrides, D., & Greenberg, E. (2012). Brown fades: The end of court-ordered school desegregation and the resegregation of American public schools. Journal of Policy Analysis and Management, 31(4), 876-904.

Robinson, K. J., & Roksa, J. (2016). Counselors, information, and high school college-going culture: Inequalities in the college application process. *Research in Higher Education*, 1-24.

Roderick, M. (2006). Closing the Aspirations-Attainment Gap: Implications for High School Reform. A Commentary from Chicago. *MDRC*.

Roderick, M., Coca, V., Moeller, E., & Kelley-Kemple, T. (2013). The Challenge of Senior Year in Chicago Public Schools. In The University of Chicago Consortium on Chicago School Research (Ed.), From High School to the Future. Chicago, IL.

Roderick, M., Coca, V., & Nagaoka, J. (2011). Potholes on the road to college: High school effects in shaping urban students' participation in college application, four-year college enrollment, and college match. *Sociology of Education, 84*(3), 178-211. doi: 10.1177/0038040711411280

Roderick, M., Nagaoka, J., Allensworth, E. M., Coca, V., Correa, M., & Stoker, G. (2006). A First Look at Chicago Public School Graduates' College Enrollment, College Preparation, and Graduation from Four-Year Colleges *From High School to the Future*. Chicago, IL: Consortium on Chicago School Research.

Roderick, M., Nagaoka, J., Coca, V., & Moeller, E. (2009). Making hard work pay off: The road to college for students in CPS's Academically Advanced Programs *High School to the Future*. Chicago, IL: Consortium on Chicago School Research

Roderick, M., Nagaoka, J., Coca, V., Moeller, E., Roddie, K., Gilliam, J., & Patton, D. (2008). *From high school to the future: Potholes on the road to college*. Chicago, IL: Consortium on Chicago School Research.

Rodriguez, A. (2013). *Unpacking the black box: Estimating the high school-level effects of undermatching among underrepresented students*. (Doctoral dissertation). Retrieved from Publicly accessible Penn dissertations. (Paper 794).

Rosenbaum, J. E. (1976). Making Inequality; the Hidden Curriculum of High School Tracking. New York, NY: John Wiley & Sons.

Rosenbaum, J. E., Miller, S. R., & Krei, M. S. (1996). Gatekeeping in an era of more open gates: High school counselors' views of their influence on students' college plans. *American Journal of Education*, 257-279.

Rothstein, R. (2004). *Class and schools: Using social, economic, and educational reform to close the Black-White achievement gap.* New York, NY: Teachers College Press.

Rouse, C.E. (1994). What to do after high school: The two-year versus four-year college enrollment decision. In R.G. Ehrenberg (ed.), *Choices and Consequences: Contemporary Policy Issues in Education* (pp. 59–88). New York: IRL Press.

Rowe, F.A. (1989). College students' perceptions of high school counselors. *The School Counselor*. 36, 260-264.

Russell, D. (2002). In search of underlying dimensions: The use (and abuse) of factor analysis in *Personality and Social Psychology Bulletin. Personality and Social Psychology Bulletin, 28*(12), 629-1646.

Savitz-Romer, M. (2008). The urban challenge. *ASCA School Counselor*,*46*(2), 13-19.

Savitz-Romer, M. (2012a). *Professional College knowledge: Re-envisioning how we prepare our college readiness workforce*. Arlington, VA: National Association for College Admission Counseling.

Savitz-Romer, M. (2012b). The gap between influence and efficacy: College readiness training, urban school counselors, and the promotion of equity. *Counselor Education and Supervision, 51*(2), 98–111.

Schmitt, C. M. (2015). *Documentation for the Restricted-Use Barron's Admissions Competitiveness Index Data Files: 1972, 1982, 1992, 2004, and 2014 (*NCES 2015-333). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, D.C.

Seftor, N. S., Mamun, A., & Schirm, A. (2009). *The impacts of regular Upward Bound on Postsecondary outcomes 7-9 years after scheduled high school graduation.* Washington, D.C.: U.S. Department of Education.

Smith, D. (2015). *Diversity's promise for higher education: Making it work* (Second edition). Baltimore, MD: Johns Hopkins University Press.

Smith, J., Hurwitz, M., Howell, J., & Pender, M. (2012). A Review of the Causes and Consequences of Students' Postsecondary Choices. Retrieved from http://research.collegeboard.org/sites/default/files/publications/2014/9/literature-causes-consequences-students-postsecondary-choices.pdf

Smith, J., Pender, M., & Howell, J. (2013). The full extent of student-college academic undermatch. *Economics of Education Review*, *32*, 247-261.

Stage, F.K., and Hossler, D. (1989). Differences in family influences on college attendance plans for male and female ninth graders. *Research in Higher Education* 30(3): 301–315.

Stanton-Salazar, R. D. (1997). A social capital framework for understanding the socialization of racial minority children and youths. *Harvard Educational Review, 67*(1), 1-41. doi: http://dx.doi.org/10.17763/haer.67.1.140676g74018u73k

Stanton-Salazar, R. D. (2011). A social capital framework for the study of institutional agents and their role in the empowerment of low-status students and youth. *Youth & Society, 43*(3), 1066-1109.

Stanton-Salazar, R. D., & Dornbusch, S. M. (1995). Social capital and the reproduction of inequality: Information networks among Mexican-origin high school students. *Sociology of Education, 68*(2), 116-135.

St. John, E. P. (1994). Assessing tuition and student aid strategies: Using price-response measures to simulate pricing alternatives. *Research in Higher Education, 35*(3), 301-335.

St. John, E.P., and Noell, J. (1989). The effects of student financial aid on access to higher education: An analysis of progress with special consideration of minority enrollments. *Research in Higher Education* 30: 563–581.

St. John, E. P., & Wooden, O. S. (2006). Privatization and federal funding for higher education. In D. Priest & E. St. John (Eds.), *Privatization and public universities* (pp. 38-64). Bloomington, IN: Indiana University Press.

Stevenson, D. L., Schiller, K. S., & Schneider, B. (1994). Sequences of opportunities for learning. *Sociology of Education*, 184-198.

Stone, C. B., & Dahir, C. A. (2006). *The transformed school counselor*. Boston, MA: Houghton Mifflin Company.

Swail, W. S., & Perna, L. W. (2002). Pre-college outreach programs: A national perspective. In W. Tierney & L. Hagedorn (Eds.), *Increasing access to college: Extending possibilities for all students* (pp. 15-34). New York, NY: SUNY Press.

Teranishi, R. T. (2010). *Asians in the ivory tower: Dilemmas of racial inequality in American higher education*. New York, NY: Teachers College Press.

Teranishi, R. T., Ceja, M., Antonio, A. L., Allen, W. R., & McDonough, P. M. (2004). The college-choice process for Asian Pacific Americans: Ethnicity and socioeconomic class in context. *The Review of Higher Education, 27*(4), 527-551.

Terenzini, P.T., Cabrera, A.F., and Bernal, E.M. (2001). *Swimming Against the Tide: The Poor in American Higher Education*. Report No. 2001-1. New York, NY: College Entrance Examination Board.

Tibby, E. R. (1965). Let's educate the educators. *ACAC Journal.* 11, 35-38.

Tierney, W. G., Bailey, T., Constantine, J., Finkelstein, N., Farmer Hurd, N., Max, J., and Tuttle, C. C. (2009). Helping students navigate the path to college: What high schools can do. (NCEE Publication No. 2009-4066). U.S. Department of Education.

Tierney, W. G., & Venegas, K. M. (2009). Finding money on the table: Information, financial aid, and access to college. *The Journal of Higher Education, 80*(4), 363-388.

Tinto, V. (1993). Building Community. *Liberal Education, 79*(4), 16-21.

United States Department of Education. (2010a). *A blueprint for reform: The reauthorization of the Elementary and Secondary Education Act.* Retrieved from https://www2.ed.gov/policy/elsec/leg/blueprint/blueprint.pdf.

United States Department of Education. (2010b). *College- and career- ready standards and assessments: Reathorizing the Elementary and Secondary Education Act.* Retrieved from: https://www2.ed.gov/policy/elsec/leg/blueprint/faq/college-career.pdf

United States Department of Education. (2011). *Elementary and secondary education budget history tables: Education department budget history table.* Retrieved from http://www2.ed.gov/about/overview/budget/history/edhistory.pdf

United States Department of Education (2014). *U.S. Department of Education awards nearly $15 million in elementary and secondary school counseling grants.* Retrieved from: http://www.ed.gov/category/program/elementary-and-secondary-school-counseling-program

Venezia, A., & Kirst, M. W. (2005). Inequitable opportunities: How current education systems and policies undermine the chances for student persistence and success in college. *Educational Policy, 19*(2), 283-307.

Wellman, J. W. (2002). *State policy and community college: Baccalaureate transfer.* Washington, D.C.: Institute for Higher Education Policy.

Whang Sayson, H. (2015). *Threats in the frog pond: A multilevel analysis of college enrollment and completion.* (Doctoral dissertation). Retrieved from ProQuest LLC (UMI Number: 3708068).

Wilson, B., and Rossman, G. (1993). *Mandating academic excellence: high school responses to state curriculum reform*. New York: Teachers College Press.

Wolniak, G. C., & Engberg, M. E. (2007). The effects of high school feeder networks on college enrollment. *The Review of Higher Education, 31*(1), 27-53.

Yun, J. T., & Moreno, J. F. (2006). College access, K-12 concentrated disadvantage, and the next 25 years of educational research. *Educational Researcher, 35*(1), 12-19.