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The Aspiration-Attainment Gap of Black Students in the Health Professions

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UNIVERSITY OF MIAMI

THE ASPIRATION-ATTAINMENT GAP OF BLACK STUDENTS
IN THE HEALTH PROFESSIONS

By

Michael Stout

A DISSERTATION

Submitted to the Faculty
of the University of Miami
in partial fulfillment of the requirements for
the degree of Doctor of Education

Coral Gables, Florida

December 2015

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UNIVERSITY OF MIAMI

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THE ASPIRATION-ATTAINMENT GAP OF BLACK STUDENTS
IN THE HEALTH PROFESSIONS

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The Aspiration-Attainment Gap of
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This study investigated the under-representation of Black health care professionals through factors correlated with career attainment. The longitudinal design captured a 10-year period from the 10th grade until approximately age 26. This study represented the first correlational study of early adulthood predictors on health professions attainment. In a recent report by the AAMC (2014a), Black providers remained under-represented within the U.S. health care system. Under-representation of Black physicians correlated with lower cultural competency of care givers, inhospitable racial climate in the field, and an unequal quality of care for Black patients (Kaplan & Greenfield, 1996; Saha, Arbelaez, & Cooper, 2003; Schneider, Zaslavsky, & Epstein, 2002; Taylor & Rust, 1999). Social cognitive career theory (Lent, Brown, & Hackett, 1994) served as a primary theoretical foundation for this secondary analysis of the Education Longitudinal Study of 2002 - 2012 (ELS:2002-2012) data set. Results of this study correlated student aspirations, family structure, test scores, and private school attendance with positive health professions career attainment while male gender and Black race were negatively associated. This study represented the first to utilize longitudinal design to investigate health professions diversity for all health professions degrees in aggregate. The

importance of high educational aspirations for achieving attainment and issues of gender, such as role strain, are discussed along with recommendations for future practice.

DEDICATION

This dissertation is dedicated to my loving wife, Cheri. Her continuous support helped me weather many storms throughout the writing process. Cheerleader, advocate and consoler, she wore many hats and willed me to succeed. I am forever thankful for the pictures she sent of our precious little ones, Brayden and Brooke, which allowed me to be ever-present in thought and spirit, if not in person.

The rigors of doctoral work were often described to me in terms of the sacrifice of the candidate, but it is my loved ones who have endured the greatest hardship. No amount of gratitude can ever repay this debt. To this end, I dedicate my work.

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I am also indebted to my colleagues at Nova Southeastern University, especially my mentor Professor Robert Wagner and administrative leaders Dr. Guy Nehrenz and Dr. Stanley Wilson. They heavily invested in my development and continually challenge me to succeed.

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TABLE OF CONTENTS

	Page
LIST OF TABLES	vii
LIST OF FIGURES	viii
 Chapter	
1 INTRODUCTION	1
Societal Background	2
Professional Background	2
Research Background	4
Problem Statement	5
Significance of the Study	6
Research Design	7
Definition of Key Terms	7
 2 LITERATURE REVIEW	 10
The Role of Aspirations in Degree Attainment	11
Race as a Precollege Characteristic	12
Aspirations for a Graduate-Level Health Professions Degrees	15
Other Variables that Influence Degree Aspirations	19
Family Support	22
Summary: The Aspirations of Black Students	25
Explanations for the Aspiration-Attainment Gap	25
Abstract versus Concrete Aspirations	27
Barriers to the Health Professions	28
Critique of Theory	30
The Economic Perspective: Rational Action and Student Choice	30
Aspiration Process Models	34
The Sociologic Perspective: Social and Cultural Capital	36
Theoretical Framework	39
An Introduction to SCCT	39
An SCCT Approach to the Formation of Health Professions Aspirations	40
Conclusions Based on the Review of Literature	42
 3 METHODS	 44
Study Design	44
Data Source: ELS:2002-2012 overview	45
Sampling	46
Instrument	47

Data	47
The Present Study: Population and Sampling	48
Restricted-Use Data	48
Variables.....	49
Dependent Variables	49
Independent Variables.....	50
Missing Data.....	50
Multiple Imputation.....	51
Analysis.....	51
4 RESULTS	53
Descriptive Analysis of Independent Variables	53
Background Characteristics	53
Precollege Academic Achievement.....	53
Aspiration Variables	54
SES and High School Classification	56
Descriptive Analysis of Dependent Variable	56
Summary of Descriptive Analysis	57
Simple Logistic Regression.....	58
Multiple Logistic Regression	59
Post-estimation Analysis	63
5. DISCUSSION	66
Background Characteristics Correlated with Health Professions Career Attainment.....	66
Aspirations and Health Professions Attainment	68
Capital Theory and Aspirations-Attainment	70
The Aspiration-Attainment Paradox in Health Professions	71
Social Cognitive Career Theory for Health Professions Attainment	72
Limitations	73
Limitations Related to Study Design	73
Implications for Future Practice.....	76
Recommendations for Future Research	79
Conclusions	81
REFERENCES	83
TABLES	95
FIGURES.....	102
APPENDIX A.....	103

LIST OF TABLES

Table	Title	Page
Table 3.1	Missing Data	95
Table 4.1.	Descriptive Statistics – Background Variables	96
Table 4.2.	Descriptive Statistics – Aspirations	97
Table 4.3.	Health Professions Occupations Attained.....	99
Table 4.4.	Simple Logistic Regression Models	100
Table 4.7.	Subpopulation Analysis	101

LIST OF FIGURES

Figure	Title	Page
Figure 1.	Theoretical model.....	102

Chapter 1: Introduction

Several health professions agencies have identified persistent underrepresentation of minority health care professionals, including Black providers (AAMC, 2015; HRSA, 2006). These reports called for continued effort towards achieving diversity which reflects the U.S. population as a means to improving access and quality of care. According to a U.S. Census Bureau population report, Blacks comprised 13.2% of the U.S. population (Colby & Ortman, 2015) while accounting for only 4.2% of the U.S. physician workforce in 2013 (AAMC, 2014a). This rate reflected a downward trend from 6.3% in 2008 (AAMC, 2010). Similar inequities have been found in enrollment data of U.S. health professions colleges and schools (Taylor, Hunt, & Temple, 1990).

At the time of this dissertation, no data existed for degree attainment by a nationally representative sample for health professions in aggregate. The relationship between educational diversity and workforce diversity is assumed to be correlated due high job placement rates (Guerrieri, 2009). This study viewed the problem of diversity in the health professions as an intertwined problem of inadequate diversity in health professions training programs and the resulting workforce. Therefore, career attainment outcomes served as an effective surrogate where degree attainment data proved unavailable. Drawing from the sociology and higher education literature, this dissertation examined the role of race, aspirations, and health professions career attainment. Results

of this study informed on the national issue of health care work force diversity, including the role of higher education in supporting access for under-represented minority students.

Societal Background

The U.S. population is growing more diverse, yet its health care system has failed to achieve similar diversity (Baldwin, Woods, & Mary Copeland, 2006; Smedley, Butler, & Bristow, 2004). Several authors demonstrated the negative impact of the diversity gap on health care services. In these studies, a lack of diversity among health care providers was linked with an unequal quality of care for Black patients (Kaplan & Greenfield, 1996; Saha, Arbelaez, & Cooper, 2003). Smedley et al. (2004) summarized the benefits of maintaining a diverse health care workforce and called for improved policy and practice. First, the authors argued that increasing the number of Black providers would improve access for minority citizens. Second, diversity was shown to improve satisfaction among Black patients. Third, diversity in health professions education was shown to increase the development of cultural competence among health professions students. In turn, cultural competence was shown to improve patient care (Cohen, 1997).

Professional Background

As mentioned above, diversity in the classroom can promote student developmental learning achievement. Gurin, Dey, Hurtado, and Gurin (2002) demonstrated that diversity in college contributed to cognitive growth and identity development, improved campus racial climate (Griffin, Muniz, & Espinosa, 2012),

improved retention and promoted student success (Ume-Nwagbo, 2012). These facts offered compelling evidence that diversity should remain a priority for college leaders in the health professions.

Much of the gains in racial diversity among health professions educational programs was attributed to affirmative action policy. Cohen (1997) supported this assumption citing the increased Black enrollment in medical school from less than 3% to over 6% in the years following affirmative action. Unfortunately, despite this positive impact, these policies have failed to achieve proportionate diversity and have declined in popularity in recent years. And, in some states, they have been prohibited by law. As affirmative action fell out of favor, new policies have been adopted to solve the diversity gap without equivalent success. One example of such policy, the elimination of race-based admissions practices in Texas resulted in alarming drops in under-represented minority enrollment. In an effort to improve the decline in diversity within the state's public university system, the Texas legislature implemented the "Top 10%" plan. And, although diversity gains were made, they failed to achieve levels present under affirmative action (Daugherty, Martorell, & Mcfarlin, 2014; Harris & Tienda, 2010).

In this new era of "race-neutral" admissions policies, several recent studies documented the failures of U.S. medical schools in achieving racial diversity (Baldwin et al., 2006; Griffin et al., 2012; Winkleby, Ned, Ahn, Koehler, & Kennedy, 2009). According to the National Center for Education Statistics (2012), Black enrollment in U.S. graduate schools was 12.6%. However, only 8% of medical school applicants and 7% of medical school new enrollments were Black (AAMC, 2012). This dissertation uncovered a significant shortcoming in the health professions research; much of the

research aimed at health professions diversity issues were descriptive and atheoretical. These studies often failed to draw upon the extant knowledge already present in the higher education literature. Research conducted on educational aspirations, college choice and career attainment provide insight into the barriers and enrollment behaviors which differ by race. By incorporating these factors, the results of this study provided useful information for the development of policies aimed at the successful recruitment and retention of aspiring Black health care professionals.

Research Background

Social cognitive theory of career and academic interest, choice and performance, referred to as social cognitive career theory, (Lent, Brown, & Hackett, 1994) provided the conceptual framework for this study. As the name suggests, Lent et al. (1994) argued that educational choice and career attainment research overlapped considerably. Many of the variables incorporated in the model are also included in Hossler and Gallagher's (1987) three stage model of college choice, Carter's (2002) college students' degree aspirations model, and capital theory (Bourdieu, 1977; Coleman, 1988a; Stanton-Salazar, 1997).

Several studies applied theories of social capital (Coleman, 1988a) and cultural capital (Bourdieu, 1977; Stanton-Salazar, 1997) to explain the persistent inequalities in higher education enrollment. Comprehensive models which incorporated measures of capital explained more of the variance in degree aspirations and choice for minority students (Pascarella, Wolniak, Pierson, & Flowers, 2004; Perna, 2006). These efforts

represented significant advancements in the understanding of what motivated, promoted, or limited Black student enrollment. However, much of the existing health professions literature has yet to incorporate or advance these theories.

Social cognitive career theory intersected the aforementioned educational theories and provided a comprehensive view of academic and career attainment. Specifically, the theory explained how students develop degree aspirations and goals which correlated with degree attainment with respect to internal and external factors. More recently, the focus has shifted towards examining college models for more specific student groups, such as under-represented minority students and graduate students. (Bergerson, 2009; Pitre, 2006). In this respect, the theory incorporated both the student's ability and responsibility for participating in success behaviors while recognizing that equal effort could provide unequal outcomes for different demographic groups or career fields.

Problem Statement

Through an examination of available research, this dissertation identified disparities in the access and quality of health care in the U.S. stemming from racial disparities. These disparities were also present in health professions education programs (Schneider, Zaslavsky, & Epstein, 2002). Within this context, Black students were significantly under-represented. A significant gap in the health professions literature existed pertaining to the health care career aspirations and attainment of Black students. Insufficient data existed to identify whether this under-representation was the result of fewer Black students aspiring to health professions careers or barriers to health professions education. To address these concerns, the following research

questions were offered to inform educational leaders and policy-makers regarding the educational aspirations and achievements of Black students who aspire to entry into the health professions:

1. Is the under-representation of Black health professionals attributable to an inadequate supply of aspirants or a decreased odds of attainment when confounding variables are controlled?
2. Which variables of background characteristics, academic ability, aspirations, parent expectations, socioeconomic status, and school classification correlate with the greatest odds of attainment for health professions careers?
3. Are degree aspirations associated with degree attainment among 10th grade aspirants to health professions degrees?

Significance of the Study

This study served as an important bridge between the fields of health professions and higher education to address educational disparities for Black students. And, the design and theoretical framework represented several novel approaches contributing to the study's significance. First, the study addressed diversity issues for the health professions sector, as opposed to individual professions. Second, the data source included a ten-year longitudinal design and nationally representative sample. This allowed for analysis over the full range of aspiration through to attainment, beginning in the 10th grade when aspirations and college choice are beginning to form until career attainment by age 26. The investigation specifically examined the career outcomes of Black and White health professions aspirants. And, through the application of appropriate statistical controls, it provided greater insight into the correlation of race in the matter of career

aspiration and attainment. The study also demonstrated the utility of applying several stages of social cognitive career theory (Lent et al., 1994) to the health professions.

Research Design

This correlational research study involved secondary data analysis collected from the initial and third-follow-up waves of the Education Longitudinal Study of 2002-2012. The study included eight independent variables including participant's race and one categorical dependent variable: occupation at third follow-up (approximately age 26). This study analyzed the data using logistic regression techniques providing log-odds coefficients and odds ratios. A detailed discussion of the methodology, including all variables, can be found in chapter three.

Definitions of Key Terms

Aspiration. For the purposes of this study, the broadest definition of this term encompassed all psychological terms which included, but were not limited to interests, plans, ambitions, wants, desires, or wishes.

Aspiration-achievement gap. The quantified difference between the aspirations for achievement in education compared to the developmental outcomes realized. Although several types of outcomes are possible (cognitive, moral, psychosocial, etc.), this dissertation refers to the specific, measurable achievement outcomes common in aspiration research, typically test scores, grades or grade point averages.

Aspiration-attainment gap. The quantified difference between the number of individuals who aspired for a specific degree or enlistment into a specific occupation and those who attained that specific outcome.

Aspiration-attainment paradox. The observed phenomenon among Black students that equally high levels of aspiration do not correspond to equally high outcomes. This term has multiple derivations in the research including Attitude-Achievement Paradox (Mickelson, 1990) and Aspiration-Achievement Paradox (Kao & Tienda, 1998). In this work, the outcome of interest was career attainment. Therefore, the term was transformed to Aspiration-Attainment Paradox.

Black. The use of this term resembles the application of “Black” by Buttaro, Battle, and Pastrana (2010) to include self-reported members of the African Diaspora residing in the U.S. which may or may not identify with the term African American. The term does not refer to those of dark skin pigmentation who self-identify as Latino or Latina. This definition served two purposes. First, it was the most inclusive of the individuals of interest within the study population. Second, it mirrored the language of the ELS:2002-2012 race item “Black/African American, non-Hispanic”.

Events per variable (EPV). EPV is calculated by dividing the number of events by the degrees of freedom where events represent the lesser quantity of subjects who experience the outcome compared to those who do not (Austin & Steyerberg, 2014). While utilized as a rule-of-thumb, minimum EPV to maintain model validity commonly ranges from 10 (Peduzzi, Concato, Kemper, Holford, & Feinstein, 1996) to 20 (Austin & Steyerberg, 2014).

Health professions. Defined as careers classified as “health diagnosing and treating practitioners” by the U.S. Bureau of Labor Statistics, Division of Occupational Employment Statistics (2009) using Standard Occupational Classification (SOC) code 29-1000. This excludes occupations classified as “health technologists and technicians”

(code 29-2000). This distinction separated professional fields such as physician, dentist, and nurse from technical careers such dental hygienists, laboratory technicians and paramedics. This division also separated fields which are associated with baccalaureate or higher degree requirements from those which are available through trade school offerings.

White. This term referred to those who self-identify as White or Caucasian. It does not include those with light skin pigmentation who also self-identify as Latino or Latina. This definition mirrored the language of the ELS:2002-2012 race item “White, non-Hispanic”.

Chapter 2: Literature Review

Black student under-representation in the health professions programs has been well documented (Baldwin et al., 2006; Cohen, 1997). These authors described the negative impact on our nation's health care system and championed for increased diversity among schools for the health professions. As previously stated, a significant limitation of these publications included descriptive design and limited or no application of theory. Often, these studies described the effectiveness of pipeline or other preparatory programs at a single institution (Hesser, Cregler, & Lewis, 1998; E. Jackson & McGlinn, 1994; Keith & Hollar, 2012; Winkleby et al., 2009). Situated in the health professions literature, they failed to incorporate higher education research that could contribute to our understanding of the topic. Two established bodies of higher education research, college choice and aspiration-attainment gap, identified many of the barriers under-represented minorities face in pursuit of an undergraduate or graduate degree. However, these publications rarely focused on the health professions. This literature review revealed a significant gap in the literature; no published studies existed that focused on health professions students and demonstrated sound application of theory. Therefore, the factors correlated with the persistent under-representation by Blacks students as they move through aspiration to attainment remained largely unexplained.

This literature review aimed to inform on the degree aspirations of Black students for health professions education and careers. It accomplished this through a thorough search of available literature on Black student aspiration-attainment gap and identified relevant theories and variables. This review grouped the research into four major themes: research that 1) established the relationship between high aspirations and degree attainment, 2) examined the level of career and degree aspirations of Black students, 3)

compared concrete versus abstract aspirations, and 4) investigated the “aspiration-attainment paradox” of Black aspirants. Where applicable, this literature review also included the health professions research that focused on inadequate diversity within health professions education: those which defined the diversity problem and efforts towards resolving it.

The Role of Aspirations in Educational Attainment

In her literature review, Carter (2002) presented several studies that have shown high aspirations positively correlate with college enrollment and degree attainment. In their literature review, Pascarella et al. (2004) commented, “plans or aspirations are typically among the best predictors of actual educational attainment” (p. 229) citing the works of Astin (1977), Pascarella and Terenzini (1991), Tinto (1993), and Whitaker and Pascarella (1994). A review of the empirical research revealed sufficient evidence to support this claim. In their study of 929 high school seniors, Sewell, Haller, and Portes (1969) determined a moderate, positive correlation (correlation coefficient of 0.44) between educational aspirations (defined as planning to attend at least some college) and educational attainment (defined as attending at least some college). Similarly, Carpenter and Western (1983) found high aspirations to positively correlate with increased educational enrollment. In their study, low aspirations had a negative effect that was partially compensated by parental encouragement. Other authors have demonstrated the positive correlation between parental encouragement and student aspirations (Sewell &

Shah, 1968). Whether college enrollment or degree completion represented the dependent variable, these studies found positive correlations between high aspirations and attainment.

Race as a Precollege Characteristic

Several college choice and degree aspiration models identified precollege characteristics including socioeconomic status, family structure, race/ethnicity, age, and gender, precollege achievement, family support, and knowledge of degree and career paths. Many of these precollege variables were found to influence aspiration-attainment gap (Karraker, 1992; Sewell et al., 1969). However, this review of literature focused primarily on research investigating Black race as a precollege characteristic and predictor of aspirations. According to Freeman (1998), a sufficient amount of evidence has determined that, when SES is controlled, Black students have higher educational aspirations than White students. Walpole (2008) found Black students with high SES were more likely to have aspired to or earned a medical degree than those from low SES. These findings added compelling evidence that SES is linked with aspirations and attainment and therefore must be controlled to examine the effects of race.

Karraker (1992) compared the aspirations of Black and White students using a large sample of 4,573 female high school seniors from the National Opinion Research Center National Study. Results of this study found Black status among females portends to a greater likelihood of plans for college enrollment and pursuit of graduate degrees, findings that were supported in other studies that applied SES controls (Hauser & Anderson, 1991; Ross & Kena, 2012). Surprisingly, this relationship between Black status and aspiration was found to be similar for females across all income levels. This

finding was contrary to the aforementioned studies that demonstrated high aspirations only after other background factors, including SES, were controlled. Further inspection of the study's methodology revealed possible sampling bias. Karraker (1992) excluded those who did not live with their mother or another female guardian. The author cited an interest in investigating the contributions of the mother to female students' aspirations as rationale for this decision. However, other studies identified family status or structure as influential in the formation of aspirations (Carter, 2002; Sewell et al., 1969), especially for females (Kao & Tienda, 1998). Karraker (2002) did not address this concern that limited the ability to generalize the study's results. Despite this limitation, this work added to the extant literature that identified high degree aspirations among Black students.

Many health professions degrees are only available at the graduate, doctorate or first-professional degree level. Therefore, studies that involved graduate degree aspirations of Black students were applicable to this literature review. Using the National Educational Longitudinal Study of 1988, Kao and Tienda (1998) found a greater likelihood of graduate school aspirations among Black eighth grade students than their White peers. However, the effect disappeared by the time the students reached the twelfth grade. The authors noted that although a disproportionately high percentage of Black students dropped out of high school before the twelfth grade, those that remained in school maintained graduate degree aspirations as high as White students. Pitre (2006) similarly found college aspirations of Black ninth grade students equal to their White peers when they believed that their high school was preparing them for college.

Pascarella et al. (2004) demonstrated that high aspirations for a graduate degree among Black students continued in the college years. Using a sample of 1,089 students in the third year of undergraduate study, graduate degree aspirations were significantly higher among Black and Hispanic students than White students. This study confirmed previous findings by Hurtado, Inkelas, Briggs, and Rhee (1997); the effect of Black race on odds of making plans for graduate school increased when other variables such as SES were controlled. Contrary to findings from other studies, Black women were only one-tenth as likely as their male counterparts to plan on a graduate degree. Although the authors did not include a clear explanation for these unique results, they apparently controlled for more variables than previous works. Perhaps the positive relationship of female gender to aspirations among Black students in previous studies was the result of inadequate controls. Additional well-designed studies are needed to determine the direction and magnitude aspirations and gender among Black students.

Hauser and Anderson (1991) studied Black degree aspirations over a period of 10 years (1976 until 1986) in search of degree aspirations trends that could explain changes in Black higher education enrollment rates. Using the *Monitoring the Future* survey, their sample included 15,000 to 19,000 high school seniors annually. Despite gains in reading proficiency and high school graduation rates, they found a significant decrease in Black college-going rates overall which worsened when compared to White rates. However, these decreasing odds of college attendance were not related to decreases in aspirations. After controlling for geographic region, urban location, family structure, and parents' education, Black high school seniors had higher aspirations for college and greater odds

of planning for college than White students throughout the study period. Hauser and Anderson's work demonstrated Black students possessed high degree aspirations.

The extended period of time Hauser and Anderson's (1991) research covered provided evidence that these aspirations were not contextually related to a particular U.S. economic or political landscape, but a consistent phenomenon. As shown here, several studies identified Black aspirations at levels equal to or greater than their White peers when SES and other variables were controlled. However, a disproportionately high percentage of Black students in these studies were subject to factors known to be linked to limited aspirations such as low SES (Carter, 1999; Hurtado et al., 1997; Perna, 2004; Walpole, 2008). Perna (2004), citing Hurtado et al., (1997) and Perna (2000), commented that these results "should be interpreted with caution since only a small share of Black women are comparable to White women in terms of all other variables included" (p. 522).

Aspirations for a Graduate-Level Health Professions Degree

As seen in the research presented above, numerous studies determined Black students possess high educational aspirations equal to or greater than their White peers. This literature review found considerably less research focused on aspirations for a graduate degree in the health professions. In order to place the current study in context, the author searched for empirical research that defined the aspiration-attainment gap of Black students in the health professions. Ideally, this would have included descriptive and correlational studies that could provide some estimate of the number of Black students who aspired to health professions occupations. At the time of this literature review, no such study could be found. A search of MEDLINE, CINAHL Plus, and ERIC databases

yielded two anecdotal reports and no peer-reviewed research which clearly defined Black student aspiration-attainment gap for health professions degrees or careers.

In a non-peer reviewed news magazine, Stewart (2001) discussed the success of Xavier University's "pre-med" program. In 2000, this program successfully transitioned more Black students into medical school than any other institution. The article identified 240 pre-med students, of which 73 matriculated into medical school (30.4%). Although this article estimated the medical school aspiration-achievement gap of Black students from one HBCU, it failed to provide detailed information on the 87 other students which went to "science-based graduate and professional schools" (Stewart, 2001, p. 23). Furthermore, this article did not demonstrate any statistical control for the influence of environmental and other factors (such as HBCU classification) on the aspirations and achievements of Xavier students, factors a well-designed study would address.

Barr, Gonzalez, and Wanat (2008) studied premedical degree track departure. In their discussion, they provided an estimate of the medical school aspiration-attainment gap among Stanford University pre-med students. In their introduction, the authors noted that "for every 100 African American, Latino, or Native American freshmen who indicate that they are pre-med, fewer than 50 will apply to medical school" (Barr et al., 2008, p. 503). This statement was without a reference citation and the authors did not clearly state the percentage of Black students that reflected in this statistic. Furthermore, the statement referred to medical school applicants as opposed to enrollees or graduates. Therefore, the scope of this statistic fell short of Black degree attainment thereby limiting its ability to inform on aspiration-attainment gap. The single-institution sample also

limited generalizability of their findings. However, the study provided valuable insight into the role of chemistry coursework in aspiration decline, especially for Black students.

Several studies on degree aspirations included health professions as part of a “professional” career or degree category. These studies grouped health professions with other fields such as law and business thereby inhibiting the ability to draw conclusions specific to the health professions. (Allen, Haddad, & Kirkland, 1984; Hall, Mays, & Allen, 1984; Pascarella et al., 2004; Perna, 2004). In research conducted with the National Study of Black College Students, Allen et al. (1984) and Hall et al. (1984) studied Black students pursuing graduate or “professional” degrees. However, the authors did not provide further details about specific degree fields. Perna (2004) conducted research on a large sample (N = 9,274) students with a bachelor’s degree from the Baccalaureate and Beyond Survey, 1992/93 and a follow-up survey in 1997. Although the authors differentiated between graduate and first-professional degrees, all first-professional degrees including law, medicine, and MBA were grouped together. Although these studies were unable to establish the Black health professions aspiration-attainment gap, a common theme was echoed; Black study participants possessed high career and graduate degree aspirations.

Two studies provided the greatest insight into the research questions of the current study. The first, Walpole (2008), examined the aspirations and attainment of a sample of 365 Black students from four-year institutions. In her study, nineteen (5.2%) participants aspired to a degree in medicine or veterinary medicine while 4% had attained an M.D. degree in the nine-year follow-up study. Although this study clearly demonstrated an

aspiration-attainment gap, it is unclear whether those who failed to attain an M.D. degree pursued another health professions degree such as osteopathic medicine, allied health or nursing.

Antony (1998) provided the second, and perhaps most comprehensive approach, to the issue. The author aimed to test the application of Holland's theory of vocational personalities to medical careers. Utilizing Cooperative Institutional Research Program data, the study performed regression analysis on the background characteristics, academic achievement, and personality types of freshman who declared pre-medical in 1985. Parents' occupation as physicians led to the greatest increase in odds of remaining followed by high school math and science preparation along with high school GPA. This study remained important for two reasons. First, the study applied career theory in its handling of the medical career attainment (an issue addressed further in the critique of theory). Second, the study listed the alternative health professions majors of pre-medical departure students. The study did not investigate a race variable in its analysis and provided coefficients for medicine only, limiting its ability to inform Black students and on other health professions.

In order to achieve diversity within the U.S. health care system, studies that informed on loss of students from the entire health professions pipeline are needed rather than those focusing solely on physicians. Although this review of literature failed to identify any study which adequately defines the Black health professions aspiration-

attainment gap, the available research presented another important theme: Black students who aspire to a health professions degree are not achieving at rates expected by their high degree and career aspirations.

Other Variables that Influence Degree Aspirations

In addition to SES, several other variables were found to affect the aspirations of Black students. In her degree aspirations model, Carter (2002) also included initial aspirations, institutional experiences and external contexts, and academic achievement as direct or indirect influencers of degree aspirations. Kao and Tienda (1998), using NELS data found that Black students with high initial aspirations received higher grades than Black students with lower aspirations. According to Carter's model, initial aspirations would affect academic achievement. In their study, Kao and Tienda's work supported this relationship. Their findings demonstrated a positive relationship between aspirations and academic achievement among Black students. As proposed by Carter's model, academic achievement would also positively influence degree aspirations and attainment. However, a coefficient for the relationship of initial aspirations and degree attainment was not reported by Kao and Tienda (1988) or by Sewell et al. (1969). Therefore, further empirical evidence on the effect of initial aspirations on degree attainment is needed.

Carter's research also demonstrated the influence of institutional experiences on the formation of aspirations (Carter, 1999, 2002). As such, she added institutional experiences along with external-to-campus involvement to the process model. Attending an HBCU increased the odds of planning to pursue a graduate degree (Pascarella et al., 2004). Furthermore, Black students that attended predominantly White institutions

(PWI) also shared high aspirations (K. Jackson & Swan, 1991). Whereas Smith (1988) found attending a large institution had the opposite effect on Black student aspirations (as cited in Carter, 1999).

Other negative effects on aspirations were found in those attending a community college (Dougherty, 1987). Referred to as the “cooling-out effect”, multiple studies have documented the decrease in aspirations which occurred at two-year institutions (Wang, 2012). A thorough review of research regarding community college transfers was beyond the scope of this chapter. However, any study of aspiration decline measured from the freshman year should have incorporated students from all institution types for two important reasons. First, excluding such a large population of college-going students could underrepresent the aspiration-attainment gap if community college students have lower attainment. Second, efforts to improve diversity in the health professions should focus on all under-represented minority students who aspired for entry into the health professions, not just those who begin at four-year institutions.

In addition to the effects of institution size and classification, several studies noted the importance of academic experiences in degree aspirations. Although not explicitly included in Carter’s model, the following studies demonstrated their importance. In the study by Pascarella et al. (2004) described above, the authors listed several factors positively associated with high degree aspirations including full-time status, undergraduate research activity, and effective teaching. More recent studies also noted the significance of effective teaching on degree aspirations including those in the health professions (Hanson, 2013; Sanchez et al., 2013). In a study of 2,474 first-year college students, Cruce, Wolniak, Seifert, and Pascarella (2006) investigated the impact

of good teaching practices as defined by Chickering and Gamson (1987), on student development. Among other outcomes, good teaching practices were positively correlated with educational aspirations.

Adedokun et al. (2012) described the positive relationship between undergraduate research experiences (UREs) and aspirations. In their qualitative study of 25 undergraduate students, they identified three themes in the role of UREs on graduate degree aspirations. UREs with faculty mentors increased STEM career awareness, provided information on career pathways, and increased student credentials. The authors tied increased student credentials specifically to strengthening medical school applications. Although outside the scope of this study, the medical school application process may play a role in aspiration stability as students become increasingly aware of their likelihood of admission.

The positive relationship between UREs and graduate degree aspirations were confirmed for under-represented minorities as well. Strayhorn (2010) noted the positive influence UREs, such as data collections and presentation of findings, had on the graduate degree aspirations of under-represented minorities. Although they failed to achieve statistical significance when demographic controls were applied, the author suggested that sufficient evidence exists to direct UREs programming.

In their review of college impact research, Pascarella and Terenzini (2005) reviewed several studies relating student-faculty interactions to positive developmental and career choice outcomes. The research presented above reflected the findings of student involvement research (Astin, 1999); experiences with effective teaching and participation in UREs represent involvement activities that were associated with higher

graduate degree aspirations. The findings were consistent with the more recent study by Pascarella et al. (2004) that showed increased graduate degree plans with three types of academic and peer involvement. These studies increased our understanding of the importance of student-faculty interaction in both the formation and stability of graduate degree aspirations.

Family Support

Several authors have reported on the importance of family in college student aspirations and success. Two ASHE reports (Bergerson, 2009; Paulsen, 1990) examined the role of family in degree aspirations as part of the college choice theoretical framework. Among the many factors shown to be linked with aspirations, these authors included family size, family income, SES, education level, and encouragement. Although family factors are involved in the degree aspirations of all students, themes presented in these literature reviews suggested they may play an even greater role in the aspirations of students of color. Bergerson (2009) emphasized “the family’s focus on the importance of education” (p. 63) in her chapter addressing college choice for students of color. These publications on college choice paralleled college aspiration research. Sewell et al. (1969) reported strong correlation between significant others’ influence and two types of aspirations: educational aspirations and occupational aspirations. Carter’s (2002) model linked family support as a precollege characteristic to initial aspirations, academic achievement, and degree aspirations.

Buttaro et al. (2010) examined the role of family in the aspiration-attainment gap of black students. Using a sample of 823 self-identified black students in a twelve year longitudinal study beginning in the eighth grade, the authors found parental involvement

decreased aspiration-attainment gap. In other words, participants with parents who frequently checked their homework and attended school meetings had educational attainments that were more closely approximated by their aspirations in the eighth grade. The authors reported these findings as evidence of the benefits of greater levels of social capital on educational attainment. Battle and Alderman-Swain (2005) investigated the impact of single-parent family structure on educational outcomes, where mother only was considered most common. In their study, economic factors, not family structure, influenced outcomes.

Research has also linked family support in the formation and maintenance of aspirations by Black students for a health professions degree. In their qualitative study of ten black medical students, Thomas, Manusov, Wang, and Livingston (2011), reported on the importance of family support for successful medical school admission and graduation. These participants did not view racism as a significant barrier to their success, rather a lack of social support, placing greater importance on family support.

Previous studies demonstrated the potential benefits of family background and involvement in aspiration formation. However, there was some disagreement within the literature regarding the aspirations of parents of Black students. In a study of 177 low-SES residents in New York City, Lorenz (1972) found that Black parents had lower aspirations for college attendance for their children than their White counterparts. In her study, 45% of Whites and 40% of Black participants were identified as having high educational aspirations for their children. However, these results may be somewhat misleading. The authors defined high aspirations as those who “prefer” and “expect” their children to attend college (p. 386). When including those parents who “prefer college and

don't know what to expect" (p. 386), more Black participants indicated a desire for their child to attend college than White participants, 90% versus 88% respectively.

The authors dismissed these results as unrealistic wishes as opposed to aspirations, which were likened more to plans. However, individuals from low-SES may lack the social and cultural capital needed to develop concrete plans for college attendance. Therefore, uncertainty regarding whether their children would attend college seemed likely. Lorenz's findings are reflective of other studies which demonstrated concrete plans, especially when held for longer periods of time, predict goal attainment more frequently than abstract wishing (K. L. Alexander & Cook, 1979; Kao & Tienda, 1998). These findings emphasize the importance of controlling for socioeconomic status when examining the effects of race on aspirations and attainment. The extant literature included few examples which controlled for the variance explained by differences in SES.

The findings by Lorenz (1972) are contrasted by Kao's (2002) study of parental aspirations. In an attempt to address the "great paucity of research on ethnic differences on parental aspirations" (Kao, 2002, p. 89), the authors investigated aspirations using a sample of 19,132 students from the National Education Longitudinal Study. According to the authors, "minority parents have extremely high educational aspirations" (Kao, 2002, p. 85). Furthermore, students were more likely to have high educational aspirations when their parents had high educational aspirations for them, perhaps demonstrating the

intergenerational effects of degree aspirations. This study presented significant methodological improvements in comparison with Lorenz's (1972) work (larger sample size, logistic regression methodology) which strengthened its findings.

Summary: The Aspirations of Black Students

This review of literature identified several studies that supported hypotheses presented in aspirations and college choice models. First, high degree aspirations positively correlated with attainment. Second, Black students possessed high degree aspirations; this became particularly evident after controlling for other factors such as SES (Hurtado et al. 1997; Pascarella et al., 2004; Perna, 2004). Available aspiration and aspiration-attainment models failed to explain why Black degree attainment did not match their high aspirations. This finding echoed the opinion of Bergerson (2009) and Pascarella et al. (2004) who criticized comprehensive process models for obscuring how these processes differ for students of diverse backgrounds. Furthermore, existing research has yet to explore the link between aspirations for health professions degrees (or careers) and degree attainment.

Explanations for the Aspiration-Attainment Gap

There has been little disagreement among researchers regarding the importance of aspirations in degree attainment (Carter, 2002; Kao & Thompson, 2003; Pascarella et al., 2004; Sewell et al., 1969). And, as reflected in the research findings presented earlier Black students possess these high aspirations. However, several studies have shown that Black students achieve less (in terms of grade point averages) and attain less (in terms of degree attainment) than their White counterparts (Mangino, 2010). This led several authors to question the predictive value of aspirations for Black students. As stated by

Goldsmith (2004), “the relatively positive beliefs of Blacks and Latinos will reduce these groups’ gaps in achievement with Whites only if these beliefs improve achievement” (p. 122). The author continued to posit that the association between aspirations and achievement was weaker for minority students, referred to as the “Attitude-Achievement Paradox” (Mickelson, 1990).

Mickelson (1990) provided an in-depth look at the Attitude-Achievement Paradox, later renamed the “Aspiration-Achievement” paradox by Kao and Tienda (1998). The term referenced the failure of aspirations to predict success in Black students and was derived from the work by the anthropologist John Ogbu. Ogbu (1978) identified that Black citizens maintained high educational aspirations and beliefs in education as a route for upward social mobility. However, high aspirations and positive beliefs failed to predict attainment as they did for White citizens. Ogbu’s explanation for this phenomenon centered on the notion that a job ceiling exists for Black citizens. And, awareness of the job ceiling negatively influenced their academic behavior. Offering further explanation of Ogbu’s thesis, Mickelson (1990) added that Black students are aware of the diminished returns on their educational investment and “put less effort and commitment into their schoolwork” (Mickelson, 1990, p. 45). The phenomenon was also observed in the work of Kerckhoff and Campbell (1977). In their longitudinal study, the authors developed models to describe the different factors which predict educational attainment. Their study included 351 White males and 90 black males in middle school

with a follow-up survey 5 years later. The results demonstrated that educational “expectations” do not predict attainment for Black students, whereas it did achieve significance for White students.

At the time of this literature review, two competing themes were present in the literature that could explain the aspiration-achievement paradox: 1) abstract versus concrete educational aspirations related differently to attainment and 2) barriers for Black students inhibited their success. Little research has been conducted on the difference between abstract and concrete aspirations for health professions. This work was largely confined to the K-12 literature. Considerably more publications in the health professions research focused on the identification of barriers to enrollment.

Abstract versus concrete aspirations. In response to the attitude-achievement paradox, Mickelson (1990) argued that these aspirations should be identified as abstract aspirations which are not predictive of achievement. Abstract aspirations are more likened to “wishes” as opposed to concrete “plans” (K. L. Alexander & Cook, 1979; Kao & Tienda, 1998; Mickelson, 1990). According to Mickelson (1990), abstract attitudes reflect the dominant social ideology and do not predict individual behavior. Alternatively, concrete attitudes were “rooted in life experiences” (p. 44) that demonstrated the reality of opportunity (or lack thereof) and diminished economic returns from Black students’ investment in education. The knowledge gained from these experiences serves as the basis for rational decision-making behaviors.

Mickelson (1990) supported these claims through a study of 1,193 of high school seniors. Results of the author’s analysis confirmed that both Black and White students hold concrete and abstract attitudes. Furthermore, abstract attitudes did not correlate with

participants' high-school GPA while concrete attitudes were positively correlated. The author concluded that the paradox was a consequence of study designs which did not accurately assess concrete attitudes. Abstract attitudes are prominent among adolescents originating from a lack of knowledge regarding college admissions processes and financial aid (Kao & Tienda, 1998).

Abstract attitudes have also been found among Black parents. Using data from the National Education Longitudinal Study of 1988, Kao (2002) demonstrated that minority parents maintained high educational aspirations for their children which were positively related to their children's aspirations. However, they were not associated with actual dollars saved for college, a variable used to represent concrete attitudes. Kao's findings were reflective of other studies which demonstrated concrete plans, especially when held for longer periods of time, predict goal attainment more frequently than abstract wishing (K. L. Alexander & Cook, 1979; Kao & Tienda, 1998). Unfortunately, at the time of this literature review, no studies could be found which applied these concepts to health professions degree aspirations.

Barriers to the health professions. The literature offers an alternative explanation for the paradox; Black achievement does not relate to problems with the credibility of aspirations, but to real barriers that Black students encounter along the way. Therefore, aspirations eventually decline as barriers to achievement are encountered (Downey, Ainsworth, & Qian, 2009; Pitre, 2006; Simmons, Black, & Zhou, 1991). Pitre (2006) found educational aspirations of Black students decline when they do not believe that their school is preparing them for college. However, this study did not investigate whether net changes in aspirations correlated with degree outcomes, an important

element when determining the importance of degree aspirations. Other barriers mentioned by Downey et al. (2009) included factors such as SES and family structure.

In a survey of 53 undergraduates aspiring to enroll in medical school and 54 students who departed from the medical career track, Lovecchio and Dundes (2002) identified two barriers as primary reasons for departure: 1) perceived difficulty of the premed curriculum and 2) performance in organic chemistry. Although their study did not focus on variations by race, other descriptive studies of Black medical school aspirants found organic chemistry performance, grade point average, and MCAT score as prominent perceived barriers (Barr et al., 2008; Henry, 2006). One comparative study by Alexander, Chen, and Grumbach (2009) revealed lower grade performance in health professions prerequisite courses among Black students compared to White students. These findings substantiated the concerns of Black students regarding the challenges they may face within the medical school prerequisite curriculum.

A search of extant health professions literature also revealed some evidence of an inhospitable racial climate in the medical profession or medical school as a barrier for Black students. According to Taylor et al. (1990), University of Tennessee College of Medicine received anecdotal reports of Black students withdrawing from school for this reason. In a study by Henry (2006), Black pre-medicine students reported fears of discrimination in their future careers in medicine. Cohen presented an example of race-related barriers in medical school admissions. Until the adoption of affirmative action strategies, under-represented minority admissions into medical school remained flat near

3% despite rising U.S. minority populations. Although these publications lacked the study design to allow generalizability, it demonstrated the need for future research into this issue.

Critique of Theory

Researchers have utilized several different theories to explain the educational aspirations, enrollment behaviors, and attainments of students (Carter, 2002). The most researched and commonly applied theories originated from three major bodies of literature: economic or rational action, psychosocial, and sociologic perspectives. Each approach viewed the college choice and attainment process through different lenses. Perhaps the most salient differences related to their intrinsic versus extrinsic factors and locus of control. The following critique briefly reviewed the major or representative theories aligned with the focus of the present study, including significant strengths and limitations. A review of social cognitive career theory and its application to the present study concluded this section.

The Economic Perspective: Rational Action and Student Choice

Ehrenberg (2004) described the economic perspective of college enrollment as a process by which the student engages in a cost-benefit analysis. In this framework, a person's current opportunities in education are levied against forgone earnings that could be claimed from entering the workforce. This model included a myriad of factors which ultimately result in a rational decision to maximize lifetime earnings. Such factors as age at graduation and likelihood of success are all carefully considered by the baccalaureate. This type of behavior incorporated the economists' view of individuals as actors who behave rationally in order to maximize their benefit as described by rational action theory

(Goldthorpe, 1998). This approach to educational attainment was a central component in much of the student choice research of the 80's and 90's (Bergerson, 2009). As such, it has been applied to both undergraduate (Hossler & Gallagher, 1987) and graduate degree enrollment (Kallio, 1995).

Drawing from marketing literature, student choice research aimed at developing models which could be used to predict enrollment behaviors (D. Chapman, 1981; G. Jackson, 1978; Litten, 1982). Early studies identified factors which influenced enrollment decisions such as background characteristics, influential peers and family members, and prior achievement. Bergerson's (2009) literature review summarized the utility of college choice as a framework for understanding the aspiration-achievement gap: "College choice is a complex construct that incorporates students' college aspirations, their expectations of those aspirations becoming a reality, the beginning of their plans, and the steps taken to actualize those aspirations" (p. 47).

The extant research revealed several individual characteristics that contribute to enrollment behaviors. Higher SES, as measured by parental level of education, and family income has a positive influence on enrollment (Kohn, Manski, & Mundel, 1976). G. Jackson (1978) found that higher academic achievement was also a strong predictor of enrollment. The work of Litten (1982) expanded the list of individual characteristics to include race and gender.

Several authors on student choice proposed process models which incorporated the known influencers (R. Chapman & Jackson, 1987; G. Jackson, 1978; Kohn et al., 1976; Litten, 1982). Hossler and Gallagher's (1987) three-phase model of college choice has received the greatest attention. Drawing heavily from the work of G. Jackson (1982)

and Litten (1982), Hossler and Gallagher based their model on “central characteristics”. At each phase, labeled “Predisposition”, “Search”, and “Choice”, student outcomes were achieved that moved the student either towards enrollment or away to other alternatives.

This literature review focused on the first phase of the model, “Predisposition.” Predisposition overlapped most with the literature on aspirations, contained many of the same variables, and was the most researched. In Hossler and Gallagher’s model, student characteristics interact with three other factors: college characteristics, “significant others”, and educational activities. Although some authors included over a dozen student background characteristics (Litten, 1982), Hossler and Gallagher mentioned only two: SES and educational achievement. Other identified predisposition factors presented in the research included parents’ level of education and parents’ expectations. Hamrick and Stage (2004) found these factors strongly correlated with enrollment aspirations. College preparation was predictive of college enrollment, but research has shown Black students do not have similar access to college preparatory courses (Teranishi, Allen, & Solórzano, 2004).

Hossler and Gallagher (1987) described significant others as parents and peers. However, the research on mentors has produced conflicting results. Black students have reported school counselors as highly important, especially when parental education is low (Litten, 1982). Alternatively, Hamrick and Stage (2004) found mentors to have only indirect effects on other variables of college predisposition. Educational activities, as defined by Hossler and Gallagher, include participation in co-curricular and extra-

curricular activities. Participation in community activities may have a modest influence for White students, but the relationship is weaker for black students. (Hamrick & Stage, 2004).

The second and third phase of Hossler and Gallagher's model were search and choice, respectively. In these phases, the theory described students' interactions with agents of the institution as part of an information gathering process. Although substantial research investigated the search phase for insights into how students gather information and incorporate them into a choice set. However, the major aims of these phases fell outside the scope of the present study.

The economist theories offered several important contributions in choice and attainment research. First, Hossler and Gallagher's three-phase model provided a structural framework that underpinned much of the college choice research (Cabrera & La Nasa, 2000; Hamrick & Stage, 2004; Hurtado & et al., 1997; Kallio, 1995; Pitre, 2006; Van Horn, 2010). And, it continued to support further research in the field (Bergerson, 2009; Domina, 2014; Lei & Chuang, 2010; Pitre, 2006; Samuel & Rican, 2013; Stack, 2010). Second, the model's simplicity remained attractive; described as a "collapsed model" (Bergerson, 2009). Third, and arguably most importantly, this research informed on many of the background characteristics that are now ubiquitous in aspiration and attainment research.

Despite these strengths, a growing number of researchers have expressed concerns over the utility of the model, demonstrating the process contained considerably more complex interactions (Cabrera & La Nasa, 2000; Flint, 1992). The economist view represented a highly internal locus of control, where students, although supported or

constrained by significant others, can access networks and information to influence outcomes. As demonstrated in the alternative theories, these processes may not occur in the absence of sociologic principles. Several studies have demonstrated that these relationships differed among students of color or low socioeconomic background (Cabrera & La Nasa, 2000; Hamrick & Stage, 2004; Hurtado & et al., 1997), a central theme in the current study. These limitations casted significant doubt that models derived from economist theories could adequately inform on the aspirations and attainment of Black students in the health professions.

Aspiration Process Models

While college choice research incorporated aspirations as an influential factor in the college enrollment process, aspirations research views them as an outcome that can predict degree attainment (Carter, 2002). Sewell et al. (1969) presented one of the earliest and most cited works describing the positive relationship between levels of educational aspirations and educational attainment, referred to as the “Wisconsin Model.” Based on status attainment theory (Blau & Duncan, 1967), their model advanced status attainment theory beyond its initial two independent variables, father’s occupational attainment and father’s income. According to Hauser and Anderson (1991), the findings by Sewell et al. have been confirmed by several studies. Carter (1997) credited the work for moving beyond strict adherence to social reproduction and incorporating opportunities which are generated by the actor’s educational aspirations and effort. Sewell et al. (1969) was one

of the earliest works that demonstrated the effect of SES, academic performance, and significant others on aspirations. According to the model, these factors then influenced degree attainment.

Over three decades later, Carter (2002) presented a comprehensive process model of degree aspirations. The model divided factors that influenced aspirations into four categories of variables: precollege characteristics, initial aspirations and goals, institutional experiences and external-to-campus involvement, and academic achievement. Carter's model incorporated many of the variables of aspiration research which have also been shown to predict aspirations. Furthermore, many of these variables were also predictive of graduate school attendance (Hanson, 2013; Pascarella, 1984; Pascarella et al., 2004). The demonstrated interaction between aspiration and eventual attainment, along with sociologic perspectives, adds significant strength to aspiration theories.

Although attractive for the reasons presented above, aspiration models received limited attention in recent years. Early work on status attainment excludes many of the variables demonstrated by later research. Pascarella et al. (2004) criticized Carter's model for its failure to explain the variance among under-represented minority students. Other limitations involved the use of degree aspirations as the model outcome. First, although important and correlated to degree attainment, the model excluded events and interactions affecting the student in the latter stages of attainment. Second, the model did not reflect the bidirectional nature of aspirations and their ability to influence other student

behaviors and achievements. For example, institutional experience which lower degree aspirations would likely negatively correlate with academic achievement. Therefore, the model offered limited usefulness for the present study.

The Sociologic Perspective: Social and Cultural Capital

Social capital. The inability of comprehensive models using the economic perspective to predict the enrollment behaviors of Black and other under-represented minority students led to an increase in popularity of sociologic perspectives (Bergerson, 2009). Beginning in sociology for education literature, social capital theory has spread throughout the social sciences (Perkins, Hughey, & Speer, 2002). Despite the increased popularity of social capital theory in the past two decades, a clear understanding of its definition remained elusive (Pawar, 2006). The term social capital refers to a “variety of entities consisting of social structures that facilitate certain actions by actors” (p. S98) which can aid in the accounting for different outcomes at the level of individual actors (Coleman, 1988a, p. S101). In other words, individuals in various settings could possess an advantage through their relationships and interactions with others in a social system.

According to social capital theory, individual actors are compelled to reciprocate favors and establish mutual trust in a process referred to as bonding (Perkins et al., 2002). These behaviors, or investments, can then be called upon for individual or mutual gains. At the group level, social capital has been operationalized to describe beneficial phenomena such as neighboring and community empowerment (Perkins et al., 2002). However, social capital has also been implicated in perpetuating social inequalities

(Ayios, Jeurissen, Manning, & Spence, 2014). In this application of social capital, members of the racial majority or elite social class have access to networks and resources while others are excluded. Lin (2000) demonstrated that higher levels of socioeconomic status are linked to higher levels of social capital.

In the context of the present study, health professions applicants who possess increased social capital (presumably those in the racial majority) could leverage their relationships to other members of the desired field of study during the admissions process; this example represents the so-called “political connections” advantage in medical school admissions (Henry, 2006). The inclusion of a socioeconomic status variable, with its known connection to social capital, attempted to improve the explanatory power of the model for minority students (Perna, 2004). Other measures of social capital represented in the research included membership in a group, serving as an officer in an organization (Keele, 2005), and private school attendance (Coleman, 1988b).

Cultural capital. The construct of cultural capital, introduced by the work of Bourdieu (1977) in his theory of social reproduction, was also applied to increase the explanatory power of aspiration research (Perna, 2004). Of the many definitions of cultural capital in the literature, Lareau and Weininger (2003), credited DiMaggio (1982) for providing the dominant interpretation as “distinctive cultural traits, tastes, and styles” (p. 189) which are valued by the dominant class. Bourdieu added that cultural capital is passed from parents to their children in an effort to reproduce the social order. In other words, parents endeavored to pass on their advantages to their children to prevent a

downward slide in social class. McDonough (1997) operationalized cultural capital with college knowledge attributes such as knowledge of SAT tutors and timing of the college application (as cited in Lareau & Weininger, 2003).

As seen in the theoretical frameworks presented above, several theories were proposed to explain educational aspirations and attainments. However, none achieved widespread acceptance as a singular framework. More often, researchers applied these theories to aspirations and choice research to improve the explanatory power of their models for students of color. For example, Perna (2004) applied capital theory in her “expanded econometric perspective”. This theoretical framework combined the cost-benefit analysis of the economic perspective with measures of social and cultural capital. Using data collected in the Baccalaureate and Beyond Survey, Perna (2004) found the addition of social and cultural capital measures improved the explanatory power of the model.

Sociologic theories emphasized the dominance of extrinsic support and constraints on the outcomes for the individual. However, several researchers demonstrated the importance of intrinsic factors, such as success behaviors and academic ability, for health professions attainment (Alexander, Chen, & Grumbach, 2009; Barr et al., 2008; Winsor & Tucker, 2013). These studies casted significant doubt that health professions attainments remain exclusively confined to the constraints of the sociologic system. The research on capital theories demonstrated their importance for interpreting

the differential outcomes of minority individuals. However, they failed to demonstrate explanatory power for all of the known correlated factors in academic and career aspirations and attainment. Therefore, this review of research failed to support a theoretical model based solely on capital theory.

Theoretical Framework

Each of the theories mentioned above provided valuable explanations into for the aspiration-attainment gap of Black students. They have also been criticized for their inability to fully address the observed interactions among the variables (Bergerson, 2009; Pascarella et al, 2004). Rational actions do occur in educational and career attainment, but social networks were found to constrain minority actors. Aspirations correlated with these outcomes, but did not fully explain the process which could span across many years (Cabrera, & La Nasa, 2000). Further, aspiration models failed to demonstrate the bidirectional nature of aspirations on success behaviors and vice versa.

Lent et al.'s (1994) social cognitive theory of career and academic interest, choice, and performance (SCCT), including its inclusion of rational decision and sociological perspectives, served as an appropriate theoretical framework for the present study. The theory represented a novel approach towards explaining the process of health professions career attainment, correlations of early background characteristics, rational decision-making and success behaviors, the role of the social network, and bidirectional interactions between aspirations and outcomes.

An Introduction to SCCT

Lent et al. (1994) developed their theory through advancement of Bandura's (1986) social cognitive theory. The interactions between persons, their environment, and

their behavior formed the basic premise of social cognitive theory. Where previous work asserted behavior was the result of interactions between persons and their environment, Bandura suggested behaviors can then influence the other two variables. Bandura presented three main mechanisms for career development: Self-efficacy, outcomes expectations, and goals. The mechanisms are realized through the individual's beliefs or perceptions regarding his or her own abilities, degree of agency, and achievable outcomes: Bandura added these mechanisms were "domain specific", in other words, one's beliefs regarding abilities and opportunity for success depend on the context of the outcome. The basic premise of SCCT remained true to the B-P-E model of social cognitive theory. In other words, "behavior results from interactions between the person and their environment" (Lent, 1994, p. 82). However, Lent et al.'s work extended social cognitive theory to academic and career attainment. In essence, the model accounts for the development of interests or aspirations into goals that guide behaviors. And, the theory temporally divided the "environment" construct that interacts with the person to guide behavior. Lent et al. (1994) described the "background environment" that exists early in the career development process and the "proximal environment" that occurs closer to attainment. SCCT offered greater opportunity to investigate the interactions of variables associated with each of these stages and their contextual environment.

An SCCT Approach to the Formation of Health Professions Aspirations

As presented by Lent et al. (1994), person inputs (background characteristics) and background environment interact with each other to shape learning experiences. In turn, learning experiences contribute to the formation of self-efficacy and outcomes expectations, two of three main mechanisms of social cognitive theory. Prior research

demonstrated significant differences among race and gender combinations with their environment, such as access to college preparatory coursework and significant other support.

Self-efficacy represented a person's own perceived ability to accomplish tasks needed to attain one's goal (Bandura, 1986). In health professions, this could be equivalent to the enrollment and success in prerequisite course work. Success in task performance increases self-efficacy as observing the success of those perceived to be similar to oneself (Bandura, 1997). In this respect, perceived under-representation of Black providers in health professions could lower self-efficacy for Black aspirants while high academic achievement could increase it. Bandura (1986) described outcomes expectations as the perceived results for goal attainment. In this regard, both positive and negative outcomes are possible despite high-quality performance. In Henry's (2006) study of Black post-baccalaureate students, 32% of students anticipated racial and ethnic discrimination in medical school and their future medical practice. In this particular example, nearly all participants reported that they could overcome any barrier demonstrating the relationship between concrete, high self-efficacy and its interaction with outcomes expectations.

The interactions of these factors culminate in the formation of goals, the third mechanism in social cognitive theory. Lent et al. (1994) described both aspirations and plans as goals, the difference depended on the degree of reality and commitment. The difference between aspirations and plans resembled the comparison of abstract versus concrete aspirations presented by Mickelson, (1990). The SCCT model suggests a causal relationship between aspirations goals and actions that is supported or constrained by

proximal environmental influence. In summary, the theory explained that aspirations would correlate with career attainment if social support exists.

The above discussion on theory demonstrated the appropriateness of SCCT as a model for health professions educational and career attainment. SCCT theory encompassed the variables and interactions found in prior research of educational and career aspirations and attainment. As argued by Lent et al. (1994), “models of academic choice and success posit causal mechanisms that are quite similar to those viewed as important to models of career development.” (p. 81). Figure 1 applied the variables of the current study in the framework of an SCCT model.

Conclusions Based on the Review of Literature

The research presented above demonstrated Black students possess educational aspirations equally high or higher than those of their White counterparts. However, this relationship was only seen in studies which controlled for confounding variables such as SES, representing positively correlated environmental supports and constraints. Several authors noted that high aspirations predicted educational attainment. Yet, the extant literature presented conflicting results when applied to Black students leaving some authors to posit that aspirations are not similarly predictive for Black students. Closer examination of these studies revealed inconsistency in the application of statistical controls. This review revealed a significant gap in the aspirations literature: More research is needed to determine the relationship of Black students’ aspirations and attainment. Such research should control for confounding variables that are introduced through social contexts.

A careful inspection of the health professions research yielded limited empirical evidence to explain the diversity gap in the health professions workforce. None of the studies included in this literature review studied the relationship of high aspirations to health professions career attainment. And, these studies did not address the implications of varying degrees of access to social and cultural capital on the educational attainment process. As seen in the descriptive data regarding the physician workforce, disparities in the health professions was not only present in recent years, but worsening. The application of SCCT to health professions attainment represented a novel approach to exploring the under-representation of Black health care professionals.

Chapter 3: Methods

The research presented above demonstrated that educational aspirations are an essential component to degree and career attainment. And, after controlling for the effects of confounding variables, Black students demonstrated high aspirations. However, the literature review found little evidence that could accurately report the health professions aspirations of Black students, leaving the aspiration-attainment gap unexplored.

Therefore, a study of the aspiration-attainment gap of Black students is warranted to address the under-representation of Black health care professionals and this gap in the literature. Thus, the present study aimed to answer the following research questions:

1. Is the under-representation of Black health care professionals attributable to an inadequate supply of aspirants or a decreased odds of attainment when confounding variables are controlled?
2. Which variables of background characteristics, academic ability, aspirations, parent expectations, socioeconomic status, and school classification correlate with the greatest odds of attainment for health professions careers?
3. Are degree aspirations associated with degree attainment among 10th grade aspirants to health professions degrees?

Comparing the aspiration-attainment gap for Black students to White students contributed to the literature by determining if barriers to health professions attainment exist for these students.

Study Design

This study sought to determine the magnitude and direction of relationships of several categorical and continuous independent variable with the categorical dependent

variable of health professions career attainment. For non-experimental research involving two or more independent variables, Lodico, Spaulding, and Voegtle (2010) recommended correlational research design. Correlational research permitted the investigation of independent variables over which the researcher has no control due to practical or ethical reasons (Lappe, 2000). A causal-comparative, quasi-experimental design would be impractical for this dissertation due to the length of time needed to capture aspiration-attainment gaps. Previous aspiration-attainment research utilized longitudinal studies which spanned several years (Carter, 1999; Pascarella et al., 2004; Perna, 2004). Experimental design was also illogical as race, the independent variable of greatest interest in the research questions, cannot be randomly assigned.

Correlational design, although feasible, presented two well-described limitations. First, this design did not permit causal inference of the variables (Lodico et al., 2010). However, this limitation was of little consequence to the purpose of this study. The study sought to establish the relationship between race, aspirations, and attainment in the health professions. As such, the results remained useful to guide program and policy design without causal inference. A second, and more significant limitation, was the possible influence of an unknown confounding variable (Lappe, 2000; Lodico et al., 2010). In an effort to minimize the influence of unknown variables, this study controlled for multiple variables with theoretical and statistical importance.

Data Source: ELS:2002-2012 Overview

This study obtained data from the base year and third follow-up surveys of the Education Longitudinal Study of 2002 (Ingels et al., 2014). The ELS:2002-2012 was “designed to monitor the transition of a national sample of young people as they progress

from 10th grade through high school and on to postsecondary education or the world of work, or both” (Ingels et al., 2014, p. 6). The ELS:2002-2012 represented the fourth study in a series produced by the Secondary Longitudinal Studies program which provides longitudinal data regarding the academic and social experiences of students that can be linked to educational and career outcomes. The eight-year longitudinal study initially surveyed 10th grade students in 2002, the “base year”. Then, follow-up surveys were conducted in 2004, 2006, and 2012.

In its entirety, the base year data collection “consisted of five questionnaires (student, parent, teacher, school administrator, and library media center), two achievement tests (assessments in reading and mathematics), and a school observation form (facilities checklist)” (Ingels et al., 2014, p. 13). The first follow-up included seven questionnaires (student, transfer student, new participant student, homeschool student, early graduate, drop out, and school administrator) and a mathematics achievement test. The second and third follow-up employed a single electronic questionnaire offered through three modalities: self-administered, computer-assisted telephone interview, and computer assisted personal interviews.

Sampling. According to Ingels et al. (2014), the ELS:2002-2012 included two target populations of the study; “schools with 10th grades and sophomores in those schools” (p. 19). Sampling for ELS:2002-2012 occurred in two stages. First, study administrators identified 1,221 eligible public and private schools through a stratified probability proportional to size sampling technique, of which 752 participated (67.6% weighted response rate). In the second stage of sampling, study administrators sampled 19,218 eligible students using a stratified systemic sampling technique. The sampling

method resulted in a nationally representative sample of 15,360 10th grade student participants. This first follow-up data collection included 7 questionnaires offered to eligible base-year participants and participants brought in as a freshened sample. The second follow-up data collection consisted of a single electronic questionnaire offered to eligible first-follow-up participants. The third follow-up data collection fielded all 16,180 eligible members, excluding members from the base year and previous follow-up found to be ineligible. In all, the third follow-up yielded 13,250 individuals (84% weighted and unweighted response rate). Also noteworthy, all representations of sample members were rounded to the nearest 10 members in accordance with security requirements of the Institute of Education Sciences.

Instrument. Surveys designed for the ELS:2002-2012 underwent a rigorous development and review process including panel review and field testing. The base year survey consisted of 98 items administered in a school classroom setting with an approximate completion time of 45 minutes. Standard error was estimated using the Taylor series linearization procedure. A special-purposed software package was employed to account for the complex design. Study design included stratification of schools and clustering of students that resulted in unequal selection probabilities. Reported mean design effects of the base year student questionnaire and third year follow-up were 2.35 and 1.7 respectively. The first follow-up student questionnaire included 65 items. The second follow-up and third follow-up included instrument logic which varied the number of question based on responses.

Data. Data collection methods included paper questionnaires, self-administered online questionnaires, interviews (telephone, web and field). After collection, researchers

utilized software programs “to apply reserve code values where data are missing, clean up inconsistencies” and “fill data where answers are known from previously answered items” (Ingles et al., 2014, p. 57). In addition to reserve codes, weighting and imputation of values were utilized. Proper weighting was determined using statistical and analytical procedures including the Chi-squared automatic interaction detection analysis and the generalized exponential modeling procedure (Ingles et al., 2014).

The Present Study: Population and Sampling.

In order to investigate the aspiration-attainment gap of Black and White aspirants to the health professions, the inclusion criteria for this study was Black or White race. The ELS:2002-2012 researchers coded occupation variables using the two methods: an ELS coding scheme and the Standard Occupational Classification (SOC) System available from the Occupational Information Network (O*NET) database. Those occupations with O*NET-SOC code 29-1XXX represented the family of occupations defined as health related professionals which diagnose and treat disease while excluding technician-type careers. For the purposes of this study, the target population was Black and White 10th grade students attending school in the U.S.

Restricted-use Data

The ELS:2002-2012 restricted-use data file contained the outcome variable with specific for health professions attainment data, F3ONET6CURR coded using the O*NET-SOC code. The public-use data file applied an ELS coding scheme which collapsed all professional occupations, such as physician, lawyer, and scientist, into two categories: those which did and those which did not require an advanced degree. To conduct this study, the researcher obtained a restricted-use data license from the Institute

of Education Sciences (IES). And, in accordance with IES security requirements, this dissertation reports all sample entities rounded to the nearest 10.

Variables

The present study incorporated variables with theoretical importance to the model as presented in the literature. By limiting the number of variables, this approach presented to two distinct advantages: First, it reduces the risk of “over-fitting” the model with too many variables (Peduzzi et al., 1996); a potential problem in such data sets containing thousands of variables. Second, this approach ensured all variables with theoretical importance were included, as opposed to stepwise model building which could eliminate important variables (Field, 2013).

Dependent Variables

As predicted by the theoretical model, health professions career attainment represented the dependent variable. This third follow-up attainment variable represented attainment at approximately age 26. Therefore, differences in required years of training of various professions may influence attainment rates for that specific profession as race-related differences in how quickly students move through the attainment process may exist. Health profession programs included in this study could range from two-year degree requirements (registered nurse) through the doctoral-level for first-professionals (physician). Thus, the duration of this longitudinal study presented some challenges. The third follow-up occurred 10 years after the base-year, high school sophomore cohort entered the study. This time frame could allow attainment for some professions with several years of stop-out or other graduation delays while capturing only on-time

graduation for longer programs of study. Appendix A contained the operational definitions and complete list of coding for all variables.

Independent Variables

The primary variable of interest was race (BYRACE_R) and defined as self-reported Black or self-reported White race. Additional independent variables included background characteristics, pre-college academic achievement, aspirations, SES, and school classification. Background characteristics included gender (BYSEX), family structure (BYFCOMP), and academic ability as measured by the ELS:2002-2012 base-year standardized test composite score (BYTXCSTD). Student aspirations (BYSTEXP) and parent expectations of student educational attainment (BYPARASP) represented aspirations in the model. The ELS 2002-2012 data set included variables for socio-economic status (BYSES1) and high-school classification (BYSCTRL). The composite variable BYSES1 consisted of five equally weighted and standardized variables: father's/guardian's education, mother's/guardian's education, family income, father's/guardian's occupational prestige score, and mother's/guardian's occupational prestige score recorded by standard deviations above and below the mean. High school classification was coded as public or private (including catholic). The incorporation of school classification followed Coleman's (1988b) reference to the advantages of private school attendance in developing social networks.

Missing Data

Nearly all variables contained missing values. Family composition (BYFCOMP) represented the sole exception. The source of missing values included missing responses, non-respondents, answers of uncertainty ("I don't know"), and legitimate skips of survey

items. Calculation of overall missing data yielded 28.2% missing values. Utilizing list wise deletion techniques reduced the sample size to 11,610 cases with 380 reporting current health professions attainment at third-follow-up. Table 3.2 listed the percentage of missing values for all variables.

Multiple Imputation

Multiple imputation using chained equations (MICE) presented two advantages for the current study. First, listwise deletion yielded marginal estimates of EPV. Second, Peugh and Enders (2004) demonstrated multiple imputation as a method to reduce bias introduced by missing data. Since the study involved complex-design survey research, the researcher applied multiple imputation by chained equation as recommended by Manly and Wells (2015). Preparation for the imputation procedure, included setting the data for complex design utilizing the *mi svyset* command with G12 cohort panel weight applied (F3F1PNLWT). Fourteen variables comprised the imputation model with each categorical variable collapsed to eliminate empty cells on cross-tabulation inspection.

The following chained equation model served for imputation ($m = 25$)

```
mi impute chained (regress) BYSES1 BYTXCSTD BYINCOME (ologit)
byparasp BYPARED bystexp (mlogit) byrace_r byfcomp BYSCTRL
(logit) byplang male outcome f3aspir delimit [pweight=F3F1PNLWT],
add (3) rseed (1234) dots force augment
```

The preceding model achieved convergence.

Analysis

The dichotomous categorical dependent variable necessitated logistic regression to assess the probability of attainment (Sainani, 2014). Hosmer, Lemeshow, and Sturdivant (2013) described the goal of logistic regression. In their words, it was

to find the best fitting and most parsimonious, clinically interpretable model to describe the relationship between an outcome (dependent or response) variable and a set of independent (predictor or explanatory) variables.” (p. 1)

The authors noted its similarity to linear regression analysis. However, categorical outcomes cannot be expressed linearly.

The analysis was performed using Stata software version 14. In order to avoid errors in estimating the model parameters, the data was first inspected using cross tabulations of all categorical variables to ensure sufficient counts existed in each cell. Next, simple logistic regression analysis revealed the correlation of each independent variable with the dependent variable. Block entering of model parameters established the final model. The first block of background characteristics, consisting of gender and family structure, entered the model first to account for as much of the variance explained by background variables other than race. Next, test score, SES and high school classification (block entry), parent and student aspirations (block entry), preceded the final variable of interest, race. As the last variable, the effects of race on the other correlations could be observed.

Chapter 4: Results

Prior to building the multiple logistic regression model, descriptive analysis highlighted differences between Black and White sample members by cross-tabulation of independent categorical variables and sample mean, range and standard deviation for continuous variables. The descriptive analysis presented in Tables 4.1, 4.2, and 4.3 included the original non-imputed values for accurate representation of the sample data. Simple logistic regression models of each independent variable included multiply imputed data to improve statistical inferences (Manly & Wells, 2015).

Descriptive Analysis of Independent Variables

Background characteristics. As seen in Table 4.1, the sample contained nationally representative percentages of participants by race and gender attributable to the sampling technique. Differences in family structure were evident. Nearly two-thirds of the White students reported living with both their Mother and Father compared to only one-third of the Black participants. In these cases, Black students reported living with their mother only or their mother and a male guardian to a great degree than White students. This arrangement reflected the more common single-parent family structure for Black families (Battle & Alderman-Swain, 2005). The remaining categories of family structure were largely similar.

Precollege academic achievement. Inspection of the student precollege academic achievement measure revealed an appreciable difference in 10th grade

achievement, with Black students' scores ($M = 45.89$, $SD = 8.63$) falling below the scores of White students ($M = 53.05$, $SD = 9.14$). The impact of these scores must be viewed with caution. At the time of this dissertation, research demonstrating the comparative predictive utility of the ELS base-year test scores in relation to occupational attainment across racial groups was lacking. However, this variable provided insight into the precollege achievement of study participants.

Aspiration variables. Student aspirations and parents' expectations for their 10th grader's educational achievement revealed interesting differences between racial groups. Notably, for both race groups, parents reported higher expectations for educational achievement than their 10th grade students. The expectations reported by parents of Black students were very high with 90% expecting their child to achieve a bachelor's degree or higher. Although slightly lower, Parents of White students also reported high educational expectations with 87% at or above the bachelor's degree (see Table 4.2). Nearly all parents who expected their 10th grader to attend a four-year institution also expected them to complete their degree. Interestingly, the types of degrees expected by parents differed. Parents of White students followed a traditional pyramid of degree attainment rates. They reported a majority of bachelor degree expectations, a lower number of master's degrees, and fewest doctoral or professional degrees. This pattern was not observed among Black parents who expected doctoral degrees at rates much higher than parents of White 10th grade students at the expense of fewer master's degrees. Many health professions careers require master's level degrees, which may suggest a preference for doctoral career expectations or limited knowledge of education requirements by some

health care fields. Overall, these results demonstrated that parents possess very high educational expectations, especially by parents of Black students.

Students' self-reported educational aspirations were lower than the expectations of their parents or guardians with 77% of Black students and 83% of White students aspiring to earn a bachelor's degree or higher. Whereas parents differed greatly in doctoral/professional degree expectations, Black and White students' aspirations were more similar. However, a greater portion of Black students reported they would attend a four-year college, but not complete their bachelor's degree (6%). This occurred at a rate twice that of White students (3%). Students' master's degree aspirations mirrored that of their parents, White students aspired to degrees in a classic pyramid while Black students reported more doctoral/professional degrees than master's degrees.

The base-year, 10th grade, survey included only a composite variable for career aspirations, precluding assessment of health professions career aspirations. The third-wave included the career variable, "expected occupation at age 30" (F3ONET6AGE30) coded using the O*NET-SOC code which provided an assessment of health professions career aspirations at age 26. For this variable, approximately 920 cases in the sample were coded for health professions (18% Black, 82% White). Approximately 200 of these cases were not enrolled in post-secondary education and less likely to reach their goal by age 30, possibly an example of abstract wishes. The remaining 720 cases included sample members who attained a health professions career or aspired to by age 30 and were currently enrolled (15% Black, 85% White). An assessment of aspiration-rate by race revealed similarities between Black (5.4%) and White (5.7%) sample members. Both groups expected to work in the health professions by age 30 and were likely to attain this

goal. For graduate-level careers, White sample members (34%) expected to attain at higher rates than Black (28%) sample members.

SES and High School Classification. The majority of sample members attended public secondary schools, including 88% of Black students and 72% of White students. These rates matched other sources that demonstrated White student enrollment rates in private secondary schools exceeded that of Black students (Goldring, Gray, Bitterman, & Broughman, 2013).

The SES variable in ELS:2002-2012 is a composite of other variables and presented in scaled scores of two standard deviations above and below the mean. Differences existed between the variable scores assigned to Black and White students. On average, White participants possessed higher SES scores ($M = 0.22$, $SD = 0.68$) than Black participants ($M = -0.22$, $SD = 0.67$)

Descriptive Analysis of Dependent Variable

Health professions career attainment represented the dependent variable for the present study. At the conclusion of the 10-year longitudinal data collection of ELS:2002-2012, very few Black students had achieved health care occupation attainment at third follow-up. White sample members attained health professions careers in greater numbers than Black students within the duration of the study. In simple regression analysis of the imputed data ($m = 25$), Black race correlated with a significant decrease in odds of attainment (OR = 0.42; 95% CI [0.28-2.50]; $p < 0.001$).

At third follow-up, Black participants attained only 7.2% of the health professions careers in the sample (5.5% of careers attained by all races), a nearly one fourth that would be expected with equivalent diversity representation. The number of Black sample

members who attained health care careers was below the national workforce participation rate of 8.4%. Of the careers attained by Black sample members, 20 of the 30 careers were below the master's level whereas 340 of 360 careers attained by White participants were at the master's level or above. Males were also under-represented in the outcome variable, obtaining only 16.2% of health professions careers. These results clearly identified both a race and gender attainment gap at age 26, especially for advanced degree professions. Of the health professions careers attained by sample members, 53.4% were registered nurses and reflected the national health professions workforce estimates of 55.5% (HRSA, 2014). These percentages excluded veterinarians, recreational therapists, and exercise therapists for accurate comparison to HRSA data. Table 4.3 contains a complete list of participants' reported current occupations. These participants were coded "1" for the dependent variable.

Summary of Descriptive Analysis

A review of the descriptive analysis provided insights into the similarities and differences among Black and White students in the sample. First, the data was nationally representative with regards to race or gender. However, several variables had significant differences with regards to race. As seen in the tables presented above, Black students were less likely to live with both parents. And, when one parent was the caregiver, it was most likely the mother. Black students achieved lower 10th grade test scores, were of lower socioeconomic status, and possessed less social capital. Most interestingly, parents of Black students maintained very high expectations for their 10th grader, especially for advanced degrees which exceed parents of White 10th graders. Both Black and White students also reported very high educational aspirations, although lower than their

parents. Both Black students and their parents reported doctoral degree aspiration rates higher than master's degrees. However, White participants attained graduate-level careers at rates higher than Black participants. Black and White sample members aspired to health professions careers by age 30 at similar rates.

Simple Logistic Regression Models

Prior to multiple logistic regression analysis, simple logistic regression models determined the magnitude, direction, and significance of correlation coefficients between the independent variables and the dependent variable. Table 4.4 contained the results of these analyses. In order to ensure consistency of inferences with the final model, the simple models utilized the multiply imputed data ($m = 25$). These simple logistic regression models addresses the first research question: Is the under-representation of Black health care professionals attributable to an inadequate supply of aspirants or a decreased odds of attainment when confounding variables are controlled? As described above, Black race correlated with a 58% decrease in the odds ratio of career attainment. Since Black and White sample members reported similar rates of health professions career expectations, the negative correlation of race favored barriers over a paucity of aspirants.

Simple model analysis of all remaining independent variables revealed positive and significant correlations with the dependent variable except male gender (OR = 0.18;

95% CI [0.13-0.63]; $p < 0.001$). High student degree aspirations (M.D., Ph.D., professional degree) correlated with the largest positive odds ratio (OR = 12.92; 95% CI [5.81-28.74]; $p < 0.001$).

Multiple Logistic Regression

The approach to final analysis involved variables in blocks added hierarchically into the model to answer the second research question: Which variables of background characteristics, academic ability, aspirations, parent expectations, socioeconomic status, and school classification correlate with the greatest odds of attainment for health professions careers? The variable blocks entered the model in the following order: background characteristics, academic achievement, aspiration variables, SES and school classification, and race. This approach followed Walpole's (2008) rationale of inputting background variables first. This sequence also served a pragmatic purpose: Background characteristics cannot be modified. Therefore, background characteristics enter first as statistical controls for the other variables. Aspirations and race entered as the final two blocks of the model to observe any changes from aspirations on other predictors as well as the changes in odds ratios when race entered the final model. Table 4.5 and Table 4.6 contained the results of multiple logistic regression analysis.

Table 4.5
Multiple Logistic Regression Model Examining Relationships between Independent Variables and Health Professions Career Attainment

Variable	Coef.	SE								
Male	-1.72***	0.16	-1.77***	0.16	-1.78***	0.16	-1.66***	0.16	-1.63***	0.16
Family Comp	0.69***	0.15	0.50***	0.15	0.46**	0.15	0.52***	0.16	0.46**	0.16
Test Score			0.06***	0.01	0.05***	0.01	0.04***	0.01	0.03***	0.01
SES					0.05	0.11	-0.03	0.11	-0.04	0.11
Other Private					0.44**	0.15	0.39*	0.15	0.38*	0.15
<i>Student Aspirations</i>										
Attend college, 4-year degree complete							0.65	0.44	0.69	0.44
Obtain master's or equivalent							0.97*	0.45	1.01*	0.45
Obtain doctoral or Professional Degree							1.54***	0.44	1.60***	0.45
<i>Parent Expectations</i>										
Attend college, 4-year degree complete							0.41	0.41	0.43	0.42
Obtain master's or equivalent							0.14	0.46	0.19	0.46
Obtain doctoral or Professional Degree							0.70	0.43	0.79	0.43
Black									-0.57*	0.23

Note. $N = 7,790$; Results derived from Multiply Imputed data ($m = 25$); Values rounded to nearest 10 in accordance with IES security requirements; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4.6
Odds ratios of Multiple Logistic Regression Model Examining Relationships between Independent Variables and Health Professions Career Attainment

Variable	Odds Ratio	95% CI	
Male	0.19***	0.14	0.27
Family Comp	1.58**	1.16	2.16
Test Score	1.03***	1.02	1.05
SES	0.96	0.77	1.19
Private High School	1.46*	1.08	1.97
<i>Student Aspirations</i>			
Attend college, 4-year degree complete	1.99	0.83	4.76
Obtain master's or equivalent	2.75*	1.13	6.71
Obtain doctoral or Professional Degree	4.93***	2.05	11.85
<i>Parents Expectations</i>			
Attend college, 4-year degree complete	1.54	0.68	3.49
Obtain master's or equivalent	1.21	0.49	2.98
Obtain doctoral or Professional Degree	2.20	0.94	5.16
Black	0.56*	0.36	0.89

Note. $N = 7,790$. Results derived from Multiply Imputed data ($m = 25$); * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; CI = Confidence Interval.

Both background characteristics were statistically significant: males demonstrated a five-fold decrease in odds of attainment while two-parent families increased odds 58%. And, these correlations remained fairly stable as subsequent blocks entered the model. Precollege academic achievement also achieved significance yielding a small, but important correlation coefficient representing a 6% increase in odds per unit change on a 90-point scale. This odds ratio decreased as more variables entered the model. In the next block, private school attendance correlated with nearly a 50% increase in odds of attainment while socioeconomic status failed to achieve significance.

Upon entering the model, student aspirations above a bachelor's degree positively correlated with the dependent variable. And, the odds ratio increased as aspirations level increased. However, parents' expectations yielded non-significant results. Additionally, the inclusion of aspiration variables diminished the odds ratios of test scores and gender on the outcome. These results addressed the third research question. Are degree aspirations associated with degree attainment among 10th grade aspirants to health professions degrees? In the final model, student aspiration above the bachelor's level correlated with positive attainment while parent expectations failed to achieve significance.

Finally, the addition of race demonstrated a significant decrease in odds of attainment for Black sample members. Once the race variable entered the model, the

correlation coefficients for nearly all significant variables diminished slightly, yet remained significant. The only exception was student aspirations which showed a slight increase in odds ratio.

Post-estimation Analysis

Results of multiple logistic regression analysis demonstrated large and significant negative correlations for both Black race and male gender. In order to determine the correlations of variables for subpopulations, post-estimation analysis included application of the model to the sample delimited first by gender, then repeated by race (see Table 4.7).

When analyzing the sample separated by gender, doctoral aspirations correlated with positive attainment for both male and female students. However, these two sample groups differed among other factors. Family composition and test scores correlated with positive attainment while Black race correlated with negative attainment for female students. For male students, school classification represented the only other significant predictor of attainment. In addition to student aspirations, private school classification was the only other factor associated with a greater odds for attainment (OR = 2.29; 95% CI [1.26-4.16]; $p < 0.007$).

When separated by race, gender was the only significant factor for Black students with male gender associated with a lower odds of attainment. For White students, test scores and student degree aspirations at or above the bachelor's level increased odds for attainment. As with Black students, Male gender decreased odds of attainment for White students. And, the odds ratio was quite small (OR = 0.18; 95% CI [0.13-0.26]; $p < 0.000$). Overall, results of subgroup analysis demonstrated some difference with respect to which factors were significant. However, high degree aspirations were significant for all

subpopulation except Black students. And, gender was the only significant factor for the black student sample group.

The failure of parent aspirations to correlate positively with the dependent variable seemed unintuitive. Therefore, further analysis investigated the interactions between parents' and students' aspirations. Simple logistic regression confirmed the correlation between parent educational expectations and student degree aspirations (see Table 4.8). High educational expectations by parents correlated with an increase in odds of high student aspirations. And, as parents' degree expectations of master's degree or above more than doubled the odds of high student aspirations. Differences in coefficients for master's and doctoral/professional degrees were much smaller than that of all graduate degree expectations with bachelor's degrees.

Table 4.8
Simple Logistic Regression Model Examining Relationships between Student and Parent Aspirations

Student Aspirations	Coef.	SE.	P> T	Ave RVI	Prob>F	Num. Obs	Odds Ratio	95% CI
Parents Asp								
Attend college, 4-year degree complete	1.98	0.11	0.000	0.10	0.000	7790	7.25	5.80 9.06
Obtain master's or equivalent	2.96	0.15	0.000	0.10	0.000	7790	19.60	14.54 26.45
Obtain doctoral or Professional Degree	2.90	0.16	0.000	0.10	0.000	7790	18.09	13.13 24.91

Note. Results derived from Multiply Imputed data (m = 25); CI = Confidence Interval; Values rounded to nearest 10 in accordance with IES security requirements.

Chapter 5: Discussion

The present study aimed to address the issue of health professions diversity through the lens of aspiration-attainment research. Inspection of the study sample demonstrated that Black 10th grade students possessed similarly high degree aspirations as their White peers. And, by age 26, they aspired to health professions careers at similar rates to their White peers. However, these two groups differed greatly in career attainment at third follow-up (age 26). Given the recent data collection and the age of third-wave respondents, the results of the present study pertained to relatively young professionals early in their career. As such, the results reflect emerging trends or persistent phenomena for the next generation of professionals, rather than those pertaining to the existing health care workforce. The following discussion described the confounding variables associated with the aspiration-attainment gap observed among Black and male sample members.

Background Characteristics Correlated with Health Professions Career Attainment

Race represented the variable of interest in this study. And, as predicted by the under-representation of Black providers in the health care professions (AAMC, 2014a; HRSA, 2006), the present study found a negative correlation between Black race and health care career attainment. These results represented an important finding of the present study: The underrepresentation Black health care providers remains a persistent phenomenon among new providers entering the field. This study contributes to previous work by extending beyond research focused solely in individual professions, such as the physician workforce (AAMC, 2014a).

Gender consistently correlated with attainment throughout the model, both in simple and multiple logistic regression. In the study sample, female gender was associated with a 77% increase in odds ratio for career attainment. These results supported publications that described the overall gender-related inequalities among U.S. health care providers, which differed in direction depending on the field. In recent reports, women comprised 32% of the physician workforce but 93% of nurses (AAMC, 2013; HSRA, 2010). These numbers are improving for women physicians, who now make-up 47.8% of matriculating medical school students (AAMC, 2014b). As evident by the results of this study, a gender gap existed among those who recently entered the health professions. This gender gap also reflected the high percentage of nursing careers attained by sample members, a profession that has been associated with a predominately female workforce.

Similar to previous work on family structure and educational outcomes (Wu, Schimmele, & Hou, 2015), families with both parents correlated with an increased odds of attainment for the health professions. These results support previous work that demonstrated the importance of family structure on education and career aspirations and attainment (Carter, 2002; Sewell et al., 1969). However, the correlation was only significant for the female subpopulation, which could be the result from the overrepresentation of women attaining bachelor's-level nursing degrees in the sample. Although over-represented, the number of women and nursing professionals in the sample resemble current workforce data. With many other health professions existing at the graduate level, the relationship between family structures and educational outcomes may weaken as the aspirant aged, progressed through college, or both. Additionally,

males attained a greater proportion of graduate-level professions further emphasizing that family structure correlations may be gender-specific or undergraduate degree specific.

Aspirations and Health Professions Attainment

A review of the extant literature on aspirations demonstrated the significant correlation of aspirations on educational attainment. Researchers demonstrated both the correlation of high aspirations on higher rates of attainment and the opposite relationship for low aspirations. The present model included both student and parent aspirations to investigate their direct or indirect associations with attainment as suggested by Kao (2002) and Walpole (2008). Several studies reviewed in this dissertation presented contradicting findings regarding the correlation of aspirations with attainment for Black students. While some authors found aspiration-attainment gaps (Coleman, 1966), others asserted Black aspirations were overestimated by including abstract wishes along with concrete plans (Mickelson, 1990). Citing the work by several authors (Astin, 1977; Pascarella & Terenzini, 1991; Tinto, 1993; Whitaker & Pascarella, 1994), Pascarella et al. (2004) claimed aspirations “are typically among the best predictors of actual educational attainment.” The present study added to the extant literature by extending aspirations-attainment to the health professions.

The present study correlated educational aspirations in the 10th grade with career attainment. Aspirations were very high for Black and White participants. As 10th grade aspirations increased, the odds ratio of health professions attainment increased as well. For 10th grade students, aspiring to earn a doctoral or professional degree correlated with nearly a five-fold increase in odds of attainment. The odds ratios associated with aspirations were larger than any other factor positively correlated with attainment. This

was true for all subpopulations. For Black sample members, doctoral/professional aspirations were significant to a more liberal ($p < 0.1$) statistic, possibly limited by a low number of Black male achievers in the health professions. Previous research has documented the lower number of black male aspirants in health professions fields (AAMC, 2015; HRSA, 2014), a troubling finding also observed in the present study.

Higher levels of 10th grade college degree aspirations were linked with increased odds for attainment in all subpopulations other than the Black-only delimited sample. Among male participants, odds of attainment were slightly lower for master's level aspirations yet exceptionally high for doctoral/professional aspirations. These results may reflect the trend of male health care professionals to pursue doctorate-level professions. Previous workforce data demonstrated males are over-represented in several of these professions including physician, dentist, optometrist, and chiropractor (HRSA, 2014).

In the present study, parents indeed reported very high college degree aspirations for their children, surpassing their children's own aspirations. These results supported the findings by Kao (2002). And, as the author noted in her 2002 analysis, these parental aspirations correlated with increased student aspiration but failed to predict odds of attainment. Beginning with bachelor's degree expectations, parent expectations correlated with increased student aspirations, representing indirect effects on attainment (OR = 1.98; 95% CI [5.8-9.06]). These findings are consistent with work by Walpole (2008) suggesting an indirect correlation of parent aspirations with student attainment.

Block entry of the aspirations variables reduced the strength of correlation of three significant variables: male gender, test score, and private school classification. And, contrary to Walpole's (2008) findings, student aspirations remained significant with

gender in the model. And, this association was not significantly altered once race entered the model. Aspirations may partly mitigate the negative correlation of male gender and lower test scores. These results reinforce the importance of viewing aspirations as an essential component to career attainment.

As predicted by social cognitive career theory, high aspirations correlated with degree attainment, although not equally. And, although not explicitly described in Figure 1., Lent et al. provided considerable argument, if not evidence, that gender and race-related effects would be present through differing support, constraints, and opportunities. Therefore, the differing odds ratios of aspirations on attainment among subpopulations in the present study support the notion that students with different background characteristics may experience different career outcomes, despite the presence of self-agency. However, the overarching trend was a positive correlation of aspirations with career attainment, consistent with SCCT.

Capital Theory in Aspirations-Attainment

The present study included variables associated with social capital, SES and private school enrollment. Bergerson (2009) described the importance of incorporating capital theory to explain more of the variance for under-represented minority students. However, SES was not significant for the present sample or subpopulations. Results from simple logistic regression analysis of SES with the dependent variable support the findings from Walpole (2008); higher SES correlated with health professions attainment. However, SES in the multiple logistic regression model was not statistically significant and showed almost no correlation.

Contrarily, private school attendance was associated with an increased odds of attainment for the study sample (OR = 1.46; 95% CI [1.08-1.97]; $p < 0.05$) and the male subpopulation (OR = 2.29; 95% CI [1.26-4.16]; $p < 0.05$). Once school classification entered the model, the odds ratio of test scores decreased slightly. Perhaps, relationships developed in private school environments may be leveraged to increase odds of admission to health professions educational programs, beyond what could be explained by test scores. These findings suggest attendance in private schools may partially mitigate barriers related to deficiencies in academic preparation. Further research is needed to accurately describe the interaction of private school attendance, test scores, and career attainment.

Prior research demonstrated capital variables improved model fit in aspiration-attainment models (Pascarella et al. 2004). For the present study, estimations of model fit and variance explained by SES and school classification could not be conducted. As explained by Manly and Wells (2015), measures of model fit currently do not exist for models using multiply imputed data. However, if school classification decreased the importance of test scores, than there may be evidence of support gained through social networks. Pascarella et al.'s recommendation to include such variables in involving under-represented minority students appear to be supported by these findings.

The Aspiration-Attainment Paradox in Health Professions

As previously mentioned, prior research differed on the existence of a Black student aspiration-attainment paradox. While some studies found evidence of the phenomenon, others did not. The present study, sample members reported very high aspirations while controlling for background characteristics. And, as predicted by

Carter's (2002) and Sewell et al. (1969), high aspirations correlated with higher odds of attainment. And, the present study supported Pascarella et al.'s (2004) findings that aspirations are important predictors of attainment. However, although student aspirations were associated with positive odds ratio for attainment, the odds ratios were weaker for Black student career attainment, suggesting an educational aspiration-attainment paradox existed.

Social Cognitive Career Theory for Health Professions Attainment

Prior research applied social cognitive career theory across multiple disciplines and cultures (Leung, 2008). A search of the term within the Institute of Education Sciences ERIC database yielded 159 peer-reviewed publications in the fields of education, career research, but also Information Technology, and Health Science. For example, Rogers, Creed, and Searle, 2009 validated SCCT for use in physician specialty choice. The literature review for this study did not produce any research applying social cognitive career theory to aspirations or attainment in the health professions. Therefore, the present study represented a novel approach to understanding the variables that correlated with attainment.

According to the SCCT model (Figure 1.), student aspirations correlate directly with attainment. Parents' expectations indirectly influence student aspirations through early and proximal environments. These aspects of the model performed well in the current study; student aspirations correlated greatly with attainment while parents' expectations were associated with increased student aspirations.

As presented in chapter one, and discussed above, Black students experienced a low application and matriculation rates for medical school. Prior research demonstrated

Black students matriculate and succeed when support exists, but can be blocked by race-related barriers (Taylor & Rust, 1999). Based on the SCCT model, the existence of proximal environmental barriers for black students could explain differences in student attainment. A specific variable of proximal barriers was not included in the present study. Furthermore, the findings by Taylor and Rust have not been tested with other health professions. Therefore, further research is needed to clearly identify the presence and of proximal environmental barriers and interactions with other factors associated with attainment.

Limitations

The present study design and analysis employed significant effort towards achieving unbiased and applicable results that could inform on health professions diversity. Primary data from ELS 2002-2012 presented the advantages of a national data set, large sample size, and inclusion of aspiration and attainment variables. Studying aspiration-attainment gap longitudinally for a particular field, such as health professions, required a very large data set to ensure sufficient numbers of career attainments in health care. As seen in the review of literature, there remains a paucity of well-designed experimental or correlational studies. The advantages utilizing a nationally representative, longitudinal study such as the ELS: 2002-2012 outweighed the limitations. However, the following limitations should be considered when interpreting the study results.

Limitations Related to Study Design

Employment in the health professions at third follow-up constituted the positive outcome. Lent et al. (1994) described career attainment, including the development of

educational and career aspirations, as a complex process. Since the present study investigated health professions attainment, these findings may not apply to aspirations or attainment for other career fields. Additionally, the present study could not assess the influence of early career aspirations specific to health care, only degree aspirations. The data set included a career aspiration variable in the base-year survey. Unfortunately, health professions were combined with other professional careers such as law. It remains reasonable to assume that 10th grade health professions career aspirations may have a stronger correlation to career attainment, especially for students with less knowledge about the degree requirements for health care fields.

The low career attainment rate of Black students generated other concerns for this study. Black student attainment represented 5.5% of health professions careers attained by all races in the ELS: 2002-2012 data set. All were at the bachelor's level. These results underestimate the representation of Black health care professionals in the national workforce. Recent data shows Black health care professionals comprise 8.3% of all health professionals where 2.2% are at the graduate-level (HRSA, 2014). As previously mentioned, the present study informs on the aspiration-attainment gap among Black students at age 26. Sample members represented providers in the early stages of their career. These results may not provide an accurate representation of gaps associated with the long-standing workforce or those attained through non-traditional pathways such as international graduates or adult learners.

While the attainment rate for Black students in the study was low, the attainment rate for Black males was exceptionally low. This group represented only 1.1% of health care careers attained. The gross under-representation of Black males precluded any

subpopulation logistic regression analysis. Furthermore, Black males were likely small contributors to variable correlations. Therefore, the model may have limited explanatory power for this group. Although the gross under-representation presented challenges in applying study results, it reflected current state of health professions diversity. National data estimates report Black male representation at 1.6% of health care professionals (HRSA, 2014). Therefore, it may not be possible to adequately estimate correlation coefficients for Black male career attainment in the health professions using random sampling techniques.

Although the longitudinal design offered several advantages, this approach excluded many non-traditional students. The increasing percentage of adult learners in degree programs prompted the term “new traditional students” (Jenkins, 2012). These students enter the health professions career pipeline later in life. Therefore, the results of this study may not be generalizable to those who pursue health professions as second careers. Kallio (1993) identified “life stage effects” in how adult learners interact in the college choice process. In light of the apparent differences between traditional and non-traditional students, exclusion of non-traditional in the present study limited its ability to inform on the career attainment of this growing student demographic.

The present study focused on the aspiration-attainment gap of Black and White sample members and excluded other groups from the analysis. However, other racial groups remained under-represented in health professions careers such as Latino/Latina physicians (AAMC, 2014a). Two factors determined the focus on Black aspirants. First, much of the research on aspiration-attainment gap and health professions diversity focused on Black students. Second, this group of students received much of the attention

surrounding diversity policy-making, including affirmative action. As such, these results may not be generalizable to other under-represented minority groups such as Latino aspirants.

A final limitation related to the assessment of goodness-of-fit for models using multiply imputed data. As reported by Manly and Wells (2015), goodness-of-fit models, such as pseudo R^2 , do not apply to multiply imputed data and were not performed. Excluded variables may have correlated to educational and career attainment including prerequisite course grades, entrance exam performance, among many others. The absence of these variables may limit the amount of variance explained by the final logistic regression model. However, assessing model fit was not a major focus of the present study. Rather, the purpose of the present study was to investigate the importance of variables known to correlate with educational and career attainment in the health professions. Although outside the focus of this study, the explanatory power of the model may be limited.

Implications for Future Practice

This dissertation reviewed the negative effects of limited diversity among health care professionals, such as unequal access and treatment for Black patients. Such realities are not consistent with a democratic and equitable society. This study demonstrated high college degree aspirations in 10th grade correlated with increase odds of attainment for both Black and White aspirants. Therefore, early aspirations represent an important avenue for improving the attainment rates for male students, and possibly Black students. Those that attained in this study demonstrated stable aspirations, as evident by their

eventual degree attainment. Therefore, these results illuminate the importance of fostering early career aspirations among underrepresented minority youth.

Parents' expectations in the present study mirrored the findings of Kao (2002); Parents' expectations can contribute through indirect effects. As discussed in the literature review, pipeline programs have been developed to support health professions attainments of Black youth. These programs often failed to incorporate parents into the process. Parents could benefit from programs aimed at increasing awareness of the needs of health professions career aspirants, such as entrance exam preparation and prerequisite coursework. Providing parents with information regarding the opportunities within health professions careers as well as practical steps towards career attainment may improve diversity and gender gaps. Additionally, parental education should inform on how to develop and support their child's academic activities, such as involvement with homework and participating in aspiration generating activities, such as career fairs. In an effort to improve health professions diversity, parents should be included as important participants in career aspirations development.

Socioeconomic status and composite test score were not significantly associated with career attainment for two under-represented subpopulations: Black students and male students. However, academic preparation of minority students from disadvantaged backgrounds is often the aim for diversity programming in health professions (Grumbach, K., & Chen, E., 2006; E. Jackson & McGlinn, 1994). Considering these variables do not correlate with attainment, the success of such programming may be limited. As proposed by SCCT, if higher test scores fail to increased odds of attainment, then aspirations decline. Alternatively, despite high aspiration, limited opportunity structures could

constrain career development and attainment. If poor academic ability were the cause of low attainment, then test score would correlate with an increase in odds of career attainment. Social cognitive career theory provides two explanations for these findings: the influence of proximal barriers for Black students and gender role stereotyping for male students.

Several authors have called for reform of health professions admissions practices as a solution for achieving racial diversity (Smedley et al., 2004; Taylor, 1990). Their recommendations include: 1) reduce over-reliance on standardized test scores to screen applicants 2) increase utilization of qualitative admissions assessments (altruism, cultural diversity, and overcoming barriers) 3) provide adequate training and support on diversity-related issues for admissions committee members. These publications question current admissions practices that have little chance of achieving diversity. They are more likely to create barriers for under-represented minority applicants (Smedley et al., 2004). In the present study, many more Black college students aspired to the health professions at age 26 than attained suggesting a sizable talent loss. Results of the current study provide additional evidence for adopting new inclusive admissions practices and programing initiatives to resolve the leaky pipeline in the health professions. All health care professions were included in the current study. These findings add to the existing research and calls for reform across all health professions.

Nurses comprise a large majority of the health care workforce. And, report the second largest gender gap (HRSA, 2014). However, the size of the nursing profession magnifies the influence of nursing gender inequality on the health professions. Rajacich, Kane, Williston, & Cameron (2013) present several recommendations for recruiting men

into the nursing professions including 1) recruiting and informing younger men 2) and changing the public perception that nursing is primarily a career for women.

Recommendations for Future Research

The large sample size and longitudinal design of the ELS 2002:2012 provided an excellent opportunity for which to study aspirations and attainment for the health professions. At the time of this dissertation, no such analysis could be found in the health professions or higher education literature. Therefore, the present study contributed toward filling this gap in the aspiration-attainment research. However, as previously mentioned, Black students demonstrate slower rates of degree attainment. And, some health professions are associated with on-time attainment near age 26 (physician, dentist) contributing to a possible overestimation of the aspiration-attainment gap. Therefore, a fourth wave data collection at age 30 would incorporate the attainment by individuals who move more slowly in the career pipeline, such as non-traditional students. A more inclusive attainment variable could provide a better approximation of the aspiration-attainment gap in the field.

The present study informed on the aspiration and attainment of Black health care professionals. However, the study design does not inform on the outcomes of those who did not enter the health professions. Considering the importance of aspirations in career attainment, it is reasonable to assume that some participants in the study with high aspirations attained in other, equally beneficial fields. Future studies investigating the outcomes in other professional fields such as law, engineering, and business would add further support to generalize the importance of student aspirations. And, identifying those at risk for cooling out could guide programming.

The correlation of gender on attainment represented another important finding in this study. While previous descriptive research involved specific professions, this study investigated the attainment into all health professions in aggregate. With women having a fivefold increase in odds of attainment, this study detected a significant ongoing gender gap in the health professions. Simpson (2005) studied the effect of role strain on men in female dominated professions such as nursing. Her qualitative research demonstrated role strain influences career choice and departure decisions. One participant described his nursing career conflict as feelings of shame. Future research aimed at addressing role strain in the health professions is needed, especially investigating its effect on black male career choices.

Finally, quantitative, correlational design permitted allowed for large sample sizes and statistical controls of confounding variables. This design yielded important information regarding variables associated with attainment. However, the experiences of the students would provide rich data describing the student's experiences. Future studies incorporating qualitative measures could inform on aspirants who attained and those who did not. Such studies could help in the formulation of future research questions which infer causality. The nature of higher education research often limits the ability to apply experimental research design. In such cases, some authors suggested qualitative research design can aid in determining causality (Denzin, 2009; Maxwell, 2004).

Conclusions

The results of the present study provided support for the three research questions. First, gender and race are highly correlated with health professions outcomes attainment. And, despite proportionate levels of sample members aspiring to a health professions care

by age 30, Black race and male gender were associated with a significant decrease in odds of attainment. Second, student aspirations directly correlated with outcomes while parents' aspirations presented indirect effects. Family structure, test score performance, and school classification also correlated with career attainment. Third, aspirations were associated with the largest increase in odds of attainment. This study confirmed the presence of an aspiration-attainment gap for Black students, even when controlling for confounding variables.

This study revealed alarming decreases in Black, male student attainment in the health professions. A growing area of concern for health professions and higher education (AAMC, 2015). In 2014, Black students comprised only 6.2% of total U.S. medical school enrollment (AAMC, 2014a). Only 10 of 140 non-HBCU affiliated or under-represented serving medical schools achieved Black enrollments greater than 10% (range 10.2% -14.0%). Yet, HBCU continue to demonstrate success in enrolling and graduating Black students in the medical profession. In light of the present study, such enrollment statistics clearly demonstrated a race-related problem in the admissions practices of medical schools. This study demonstrated similar inequities among all health care professions. And, without policy mandates such as affirmative action, the higher education leaders of these institutions bear the responsibility of improving their support of under-represented minority aspirants in the enrollment process. Diversity benefits both the trainee and the communities they intend to serve.

The subject of Black aspirations continues to attract research aimed at understanding its role in educational and career outcomes. Such investigations, including the present study, concluded aspirations correlate with positive outcomes. However, such

findings cannot generate change in of themselves. Health care practitioners, public policy-makers, and higher education leaders must commit to substantial, coordinated, and evidence-based efforts. These efforts should aim to increase aspirations in those who remain under-represented in health professions careers. Further, continuing education on best practices in educational access and outcomes must be directed at the key gatekeepers to these professions. Black students demonstrated high achievement when support existed (Stewart, 2001). Providing support falls primarily on the shoulders of professionals in the field, but must draw from public interest.

Such efforts cannot succeed without sufficient funding, whether public or private, to create enduring programs that serve these potential health care professionals and contribute to their success. Smedley, Butler, and Bristow (2004) appropriately titled their Institute of Medicine report on health professions diversity, *In the Nation's Compelling Interest*. It is incumbent upon all health care stakeholders to support diversity research. Such efforts are needed to inform those with whom diversity remains an elusive, yet achievable target.

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Table 3.1
Percentage of Missing Data for Variables

Variable	Label	No. of Recorded Values	No. of Missing Values to be imputed	No. of Missing Legitimate Skip	Percent Missing Values	Imputed (Y/N)
Third Follow-up Health Professions Career Attainment	F3ONET6CURR	12800	2640	770	21.0%	N
Third Follow-up Health Professions Career Aspiration	F3ONET6AGE30	10930	4590	680	32.5%	N
Third Follow-up Enrollment Status	F3JUNEDSTAT	13180	2560	460	18.6%	N
Race/Ethnicity	BYRACE	15240	650	310	5.9%	Y
Gender	BYSEX	15370	650	180	5.1%	N
Family Composition	BYFCOMP	16200			0.0%	N
Precollege Academic Achievement	BYTXCSTD	15890		310	1.9%	Y
Student's Base-Year Educational Aspiration	BYSTEXP	13790	2100	310	14.8%	Y
Parent/Guardian's Educational Aspiration for Student	BYPARASP	16020	180		1.1%	Y
SES	BYSES1	15240	650	310	5.9%	Y
High School Classification	BYSCTRL	16200			0.0%	Y

Note. Values rounded to nearest 10 in accordance with IE security requirements.

Table 4.1
Background Characteristics of Participants Fielded in the Initial (Base-Year) Wave of the Educational Longitudinal Study 2002-2012 Delimited by Black and White Race

Background Variable	Race			Total
	Other	Black	White	
Sex-composite				
Male	14.9	6.6	28.2	49.7
Female	14.9	6.7	28.8	50.3
Total	29.8	13.3	57.0	100.0
Family composition				
Mother and father	17.5	4.3	37.6	59.5
Mother and male guardian	3.6	1.9	6.7	12.2
Father and female guardian	1.1	0.4	1.8	3.2
Two guardians	0.7	0.4	0.7	1.7
Mother only	5.0	5.3	7.6	17.9
Father only	0.9	0.3	1.7	2.9
Female guardian only	0.4	0.5	0.3	1.2
Male guardian only	0.2	a	0.1	0.3
Lives with student less than half time	0.3	0.2	0.4	0.9
Total	29.8	13.3	57.0	100.0

Note. $N = 15,240$; values represented as percentages; Values rounded to nearest 10 in accordance with IES security requirements; ^a The data suppressed in accordance with IES security requirements; too few sample members.

Table 4.2
Educational Aspirations of Students and Parents Fielded in the Initial (Base-Year) Wave of the Educational Longitudinal Study 2002-2012 Delimited by Black and White Race

Educational aspirations How far in school student thinks will get	Race		Total
	Black	White	
Don't Know	180	760	940
Less than high school graduation	30	50	70
High school graduation or GED only	160	510	670
Attend or complete 2-year college/school	110	550	660
Attend college, 4-year degree incomplete	120	230	350
Graduate from college	730	3,140	3,870
Obtain master's degree or equivalent	320	1,970	2,290
Obtain PhD, MD, or other advanced degree	390	1,470	1,860
Total	2,020	8,680	10,700

How far in school parent wants 10th grader to go

Less than high school graduation	0	0.0	a	a
High school graduation or GED only	80	4.0	270	3.1
Attend or complete 2-year college/school	100	5.0	820	9.4
Attend college, 4-year degree incomplete	20	1.0	70	0.8
Graduate from college	750	37.2	4,100	47.2
Obtain master's degree or equivalent	400	19.6	1,900	21.9
Obtain PhD, MD, or other advanced degree	670	33.3	1,530	17.6
Total	2,020	100.0	8,680	100.0

Note. N = 15,240; %Black and %White refers to in-group response rates; Values rounded to nearest 10 in accordance with IES security requirements;^a The data suppressed in accordance with IES security requirements; too few sample members.

Table 4.3
Health Professions Careers Attainment by Approximate Age equal to 30 Delimited by Black and White Race and Gender

Occupation	Race			Gender		Total
	Black	White	Total	Male	Female	
Dentists or oral and maxillofacial surgeons	0	10	10	10	a	10
Dietitians and nutritionists	0	10	10	0	10	10
Pharmacists	a	30	30	10	20	30
Physician, all specialties	a	30	30	20	10	30
Physician assistants	0	10	10	0	10	10
Occupational or physical therapists	a	30	30	0	30	30
Therapists, all other +	a	10	10	a	10	10
Speech-language pathologists	a	20	20	0	20	20
Veterinarians	0	10	10	0	10	10
Registered nurses+	20	190	210	10	190	200
Advanced nurse practitioners	0	10	10	0	10	10
Chiropractors and other health diagnosing pract.	a	10	10	a	a	10
Total	30 (7.2%)	360 (92.8%)	380	60 (16.2%)	320 (83.8%)	380

Note. + Bachelors or less required for career entry-level as reported by O*NET Online; "Therapist, all other" included radiation, recreation, and respiratory therapists; "other health diagnosing practitioners" included audiologists, optometrists and those coded as other health diagnosing practitioners in the ELS:2002-2012 data set; Values rounded to nearest 10 in accordance with IES security requirements; ^a The data suppressed in accordance with IES security requirements; too few sample members.

Table 4.4
Simple Logistic Regression Models Examining Relationships between Individual Independent Variables and Health Professions Career Attainment

Variable	Coef.	SE	P> T	Ave RVI	Prob>F	Numb.			95% CI	
						Obs	Ratio	Odds		
Male	-1.70	0.16	0.00	0.00	0.00	7,810	0.18	0.13	0.63	
Family Comp	0.66	0.14	0.00	0.00	0.00	7,810	1.94	1.46	0.25	
Test Score	0.06	0.01	0.00	0.00	0.00	7,810	1.06	1.04	2.57	
SES	0.40	0.10	0.00	0.00	0.00	7,810	1.49	1.24	1.80	
Private High School	0.65	0.13	0.00	0.00	0.00	7,810	1.92	1.47	1.07	
Student Aspirations										
Attend college, 4-year degree complete	1.28	0.41	0.00	0.03	0.00	7,790	3.59	1.59	8.11	
Obtain master's or equivalent	1.86	0.41	0.00	0.03	0.00	7,790	6.46	2.86	14.55	
Obtain doctoral or Professional Degree	2.56	0.41	0.00	0.03	0.00	7,790	12.92	5.81	28.74	
Parents Expectations										
Attend college, 4-year degree complete	1.17	0.39	0.00	0.00	0.00	7,810	3.21	1.50	6.89	
Obtain master's or equivalent	1.16	0.41	0.00	0.00	0.00	7,810	3.21	1.42	7.22	
Obtain doctoral or Professional Degree	1.87	0.40	0.00	0.00	0.00	7,810	6.52	2.97	14.31	
Black	-0.88	0.21	0.00	0.00	0.00	7,810	0.42	0.28	2.50	

Note. Results derived from Multiply Imputed data ($m = 25$); Values rounded to nearest 10 in accordance with IES security requirements.

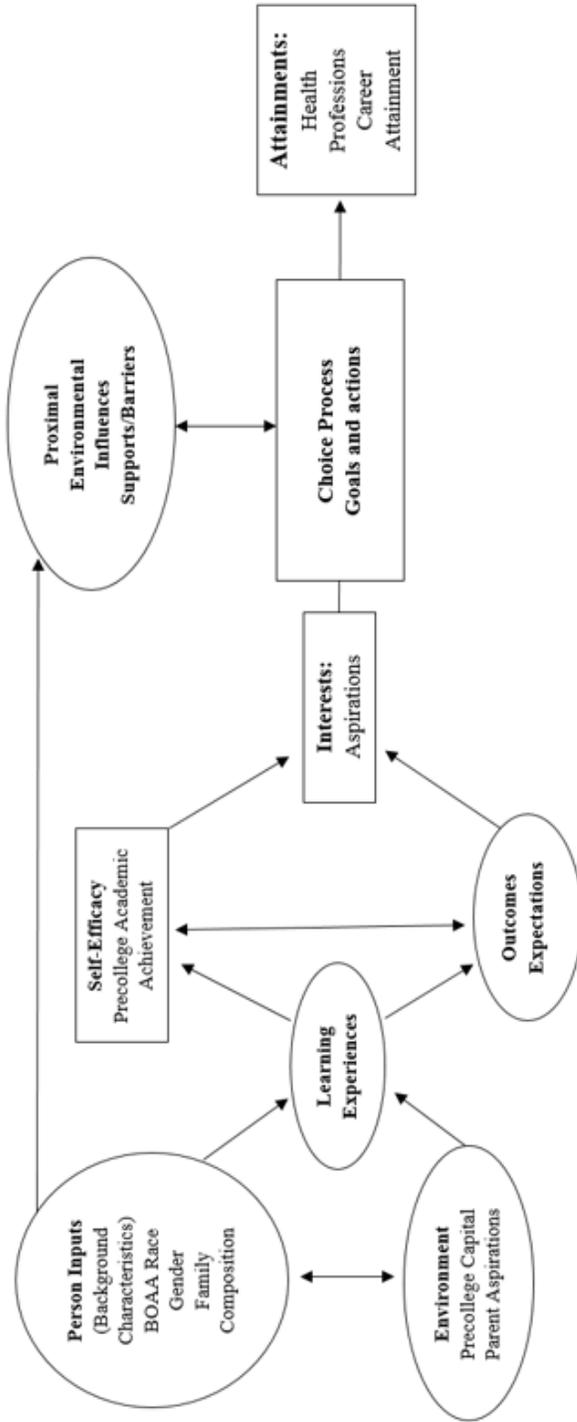
Table 4.7

Multiple Logistic Regression Results Examining Relationships between Independent Variables and Health Professions Career Attainment Separated by Race and Gender

Variable	Gender						Race		
	Male		Female		Black		White		SE.
	Coef.	SE.	Coef.	SE.	Coef.	SE.	Coef.	SE.	
Male	-	-	-	-	-1.05*	0.42	-1.70***	0.18	
Family Comp	0.72	0.48	0.40*	0.17	0.65	0.34	0.44	0.17	
Test Score	0.02	0.02	0.04***	0.01	0.00	0.03	0.04*	0.01	
SES	-0.11	0.25	-0.05	0.12	-0.06	0.39	-0.05	0.11	
Private High School	0.83**	0.30	0.25	0.16	-0.44	0.38	0.41	0.15	
Student aspirations									
Attend college, 4-year degree complete	2.54	1.35	0.46	0.46	-0.43	1.10	0.95*	0.46	
Obtain master's or equivalent	2.38	1.33	0.86	0.47	-0.01	1.08	1.27**	0.48	
Obtain doctoral or Professional Degree	3.77*	1.32	1.31*	0.46	0.73	0.95	1.84***	0.47	
Parents expectations									
Attend college, 4-year degree complete	0.14	1.13	0.47	0.45	-0.49	0.47	0.26	0.42	
Obtain master's or equivalent	-0.46	1.17	-0.27	0.50	0.25	0.56	-0.06	0.45	
Obtain doctoral or Professional Degree	1.04	1.14	0.69	0.47	-	-	0.62	0.43	
BOAA	-0.14	0.36	-0.64*	0.27	-	-	-	-	

Note. Results derived from Multiply Imputed data (m = 25), Male N = 3620, Female N = 4170, Black N = 1140, White N = 6550; Observations rounded to nearest 10 in accordance with IES guidelines; Parent's doctoral/professions degree expectations perfectly predicted the outcome and were omitted; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figure 1. Lent et al.'s (1994) social cognitive career theory applied to health professions academic and career attainment. Variables in the current study are listed below the appropriate construct.



Appendix A: Variable Definitions and Coding

Dependent Variable: Health professions career attainment: Dummy variable (1,0) where third follow-up variable F3ONETCURR coded between 291000 and 292000 were coded 1, all others coded 0.

Background Characteristics

Race: 1 = Black, 0 = White

Gender: 1 = Male, 0 = female

Family Structure: 1 = Both parents, 0 = all others

Precollege Academic Achievement

ELS Composite Tests Score: An individual's composite reading/math score on the 2002 math and reading assessment. Test scores were converted to standardized (T) scores with the $M = 50$, $SD = 10$ (range 0-90).

Aspirations

Student Aspirations: Base-year student response to "As things stand now, how far in school do you think you will get?" response options were 1 = Less than high school graduation, 2 = High school graduation or GED only, 3 = Attend or complete a 2-year school course in a community or vocational school, 4 = Attend college, but not complete a 4-year degree, 5 = Graduate from college, 6 = Obtain a master's degree or equivalent, 7 = Obtain a Ph.D., M.D., or other advanced degree, or don't know. The item was recoded such that 0 = 4-year degree incomplete or below.

Parent Expectations: Base-year parent response to "How far in school do you want your tenth grader to go?" response options were 1 = Less than high school graduation, 2 = High school graduation or GED only, 3 = Attend or complete a 2-year school course in a

community or vocational school, 4 = Attend college, but not complete a 4-year degree, 5 = Graduate from college, 6 = Obtain a master's degree or equivalent, 7 = Obtain a Ph.D., M.D., or other advanced degree, or don't know. The item was recoded such that 0 = 4-year degree incomplete or below.

Variables Associated with Capital

Socioeconomic status: Composite score based on five equally weighted, standardized components: father's/guardian's education, mother's/guardian's education, family income, father's/guardian's occupational prestige score, and mother's/guardian's occupational prestige score. Score ranges from -2 to 2.

School Classification: Base-year type of school attended by the participant taken from institution-level sources and surveys. Coded 1 = Public, 2 = Catholic, 3 = Other private, Recoded 1 = All private, 0 = Public.