ACADEMICALLY GIFTED, POOR AFRICAN AMERICAN MALE UNDER-GRADUATES IN ENGINEERING: PERCEPTIONS OF FACTORS CONTRIBUTING TO SUCCESS IN A HISTORICALLY BLACK COLLEGE AND UNIVERSITY AND A PREDOMINANTLY WHITE INSTITUTION CONTEXT

A Dissertation

by

ALONZO MARTICE FLOWERS III

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2011

Major Subject: Educational Administration

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Approved by:

Chair of Committee,	Fred Bonner
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ABSTRACT

Academically Gifted, Poor African American Male Undergraduates in Engineering: Perceptions of Factors Contributing to Success in a Historically Black College and University and a Predominantly White Institution Context. (August 2011)

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Chair of Advisory Committee: Dr. Fred Bonner

Research focusing on the academic and social experiences of academically gifted, poor, African American male college students has been limited. Recent findings on college persistence stress the role of institutions of higher education in providing educational opportunities. However, research on academically gifted, poor, African American males indicates that this student population has had limited access to these opportunities. Academically gifted, poor, African American males in higher education encounter social and institutional factors that guide the directionality of their educational experience, particularly in engineering disciplines. This study explores perceptions of academically gifted, poor, African American male undergraduate students engineering as a major disciplines in order to identify factors that contribute to academic and social development. Based on participants' responses, seven categories emerge to identify aspects of the participants' experiences in college: (a) self-perceptions, (b) financial obstacles, (c) engineering as a major, (d) family influence and support, (e) peer relationships, (f) relationships with faculty, and (g) the students' perceptions of the institution. Based on the findings, it was concluded that institutions of higher education must understand the various factors (e.g., peer and faculty support, institutional

congruence) that influence the academic and social integration of academically gifted, poor, African American male students. Specifically, these institutions must recognize the importance of family involvement, mentoring, and increased financial support for academically gifted, poor, African American male students.

DEDICATION

This dissertation is dedicated to the two most influential men in my life, Alonzo E. Flowers Sr. and William B. Tate. Mr. Alonzo E. Flowers—a father, an activist, and a man unlike any other. In your memory, I take from you the ability to love unconditionally and the drive to always succeed. Mr. William B. Tate—the heart of our family and a true gentleman, in your memory, I take from you the sheer determination to want to change the world. This dissertation is the first step to meeting that goal. While you both were not able to see me obtain my doctoral degree, I have always felt your presence in times of stress and happiness. Thank you for looking over me!

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I would never have been able to finish my dissertation without the guidance of my dissertation chair, the support from friends, and understanding from my family and wife. I would like to express my deepest gratitude to my advisor, Dr. Fred Bonner, for his excellent guidance and patience. I would also like to thank the members of my dissertation committee, Dr. Chance Lewis, Dr. Kelli Peck-Parrott, and Dr. Christine Stanley, who have generously given their time and expertise to better my work. Additionally, my thanks and appreciation goes to my BFF (*Best Friend Forever*) Rosie Banda, who has been there for me every step of this crazy process. I would also like to thank my mother and three sisters for always encouraging me to strive for the best. Many friends have helped me stay sane through these last four years. Their support and care helped me overcome setbacks and stay focused on my graduate study. I greatly value their friendship and I deeply appreciate their belief in me. I especially want to thank Leticia Duncan, Ann Eaton, Bridget Perez, and Nick Zuniga (*Eagle!!!*) for their constant love, friendship and support. Finally, I would like to thank my wife and puppies, Lena, Kylie and Daisy Flowers who have supported me unconditionally throughout these last four years. *THANK YOU ALL*! I am grateful for all the love and support I have gotten throughout this wonderful process.

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CHAPTER I

INTRODUCTION TO THE STUDY

While society has always been intrigued by people who are deemed to embody gifted traits and qualities, determining the criteria for giftedness has always been a multi-layered, teacher-driven process that reflects narrow perceptions of high achievers (Bonner, 2000; Fries-Britt, 1997), which often does not acknowledge the influences of poverty and other socioeconomic factors. Moreover, the terms *giftedness* and *poverty* both embed a social and cultural meaning; as a result, these terms are often classified on opposite ends of the spectrum. In addition to affecting students' learning and development, the narrow social constructions of the terms innately rob certain people of the opportunity to be identified as gifted (Jackson & Moore, 2006). Hence, these terms, often defined by the majority culture, create a discourse on giftedness and poverty that overlooks the potential of academically gifted, poor, African American males. This research study focuses on academically gifted, poor, African American males majoring engineering disciplines.

The experiences of academically gifted, poor, African American males in higher education encompass a multitude of institutional and social factors. These factors tend to guide (perhaps dictate) the direction that gifted African American males take as they pursue postsecondary degrees in engineering disciplines. Research (Anderson, 2008; Bonner, 2010b; Cuyjet, 2006; Harper, 2004, 2009; Morris, 2002) focusing on the effects of campus climates on college students, particularly high-achieving African American males, is an emerging area of study within the field of higher education. The literature on the academic development of African American males consistently labels this

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This dissertation follows the style of the *Journal of Higher Education.*

subpopulation as being educationally at risk, which often makes their presence in gifted programs almost nonexistent (Bernal, 2002; Ford, Harris, Tyson, & Trotman, 2002; Harper, 2004).

Poverty, as an intersecting factor, further contributes to the at-risk label that is assigned to African American males. "The effects of poverty can be so debilitating that a child's life chances can literally be determined by a number of environmental and cultural factors such as the quality of prenatal care, housing, and food available to their mothers" (Fashola, 2005, p. 59). Moreover, poverty is considered to be an important factor in school failure (Orfield & Lee, 2005; Rothstein, 2004). According to Western, Kleykamp, and Rosenfeld (2004), high school dropout rates are higher for students from low-income backgrounds, and male students who drop out are 5 to 20 times more likely to be incarcerated than men who attend college.

While national reports strongly reinforce the well-known and unfortunate reality that African American males face challenging barriers as they strive to achieve academic success, research in this area is growing (Whiting, 2006b). However, research that has explored the personal and academic experiences of academically gifted, poor, African American males as they navigate through engineering disciplines in higher education is limited. Exploring the lived experiences of these students can lead to understanding the social-emotional turmoil that academically gifted but poor African American males experience as they navigate their college journey.

Problem Statement

The problem addressed by this study was, *What are the perceptions of academically gifted, poor, African American male undergraduate students engineering as a major disciplines who attend a Historically Black Colleges and University (HBCU) or a predominantly White institutions (PWI) regarding the factors that contribute to*

their academic success? The study focuses on the interactions between the participants and their collegiate environments.

Purpose of the Study

The purpose of the study was to explore the perceptions of academically gifted, poor, African American male undergraduate students who are engineering as a major disciplines to identify the factors that contribute to their academic success.

Research Questions

Over the past decade research focusing on the academic and social experiences of academically gifted, poor, African American male college students has been limited. Recent findings on college persistence stress the integral role that institutions play in providing educational opportunities for all students; however, the research on gifted African American males indicates otherwise (Barr, 2000; Graham & Gisi, 2000). A review of the literature identifies significant gaps in the lived experiences of gifted poor African American male college students. As a result, four research questions were generated from the literature in an attempt to identify the factors that contribute to the educational experiences of academically gifted, poor, African American college males engineering as a major disciplines. These four research questions guided this study.

1. What are the academic and social factors that influence academically gifted, poor, African American males' collegiate experiences in engineering?

2. How do academically gifted, poor, African American male college students in engineering disciplines conceptualize the notion of giftedness? How do their conceptualizations derive from concepts found in mainstream literature regarding giftedness?

3. How do academically gifted, poor, African American male college students conceptualize their experiences in attending a PWI or HBCU?

4. What implications does being academically gifted and being from impoverished backgrounds have for African American males who major in engineering disciplines?

Conceptual Framework

Conceptually, the notions of academic and social integration and connectedness are equally important when exploring issues concerning gifted poor African American male students (Bonner, 2010b; Harper, 2006). The extent of students' racial identity development and levels of self-efficacy influences the level of integration into postsecondary environments (Harper, 2004). The variety of theories used as the framework for this study emphasize the interrelatedness of Sternberg's (2003) triarchic theory of intelligence and Tinto's (1993) student integration model, as well as Whiting's (2006b) scholar identity model as frameworks that have constructed perceptions of academically gifted, poor, African American male students attending PWIs and HBCUs. Figure 1 illustrates the integration of these theories to serve as the conceptual framework for this study.

Historically, the definition of giftedness was based on a hegemonic construct, failing to recognize social, cultural, and/or economic indicators (Bonner, 2010b). According to some educators, the problem of identifying minority gifted students is more a problem of how to integrate the information from a set of multiple criteria into the screening and identification process (Baldwin, 1980; Eby, 1983; Frasier, 1989; Renzulli, 1981). Bonner (2000) contended that "giftedness is defined, shaped and adjudged in a societal milieu and is not something merely inside a person's head" (p. 656). Sternberg (1985) illustrated multiple means for understanding extraordinary levels of intelligence in his triarchic theory of intelligence.

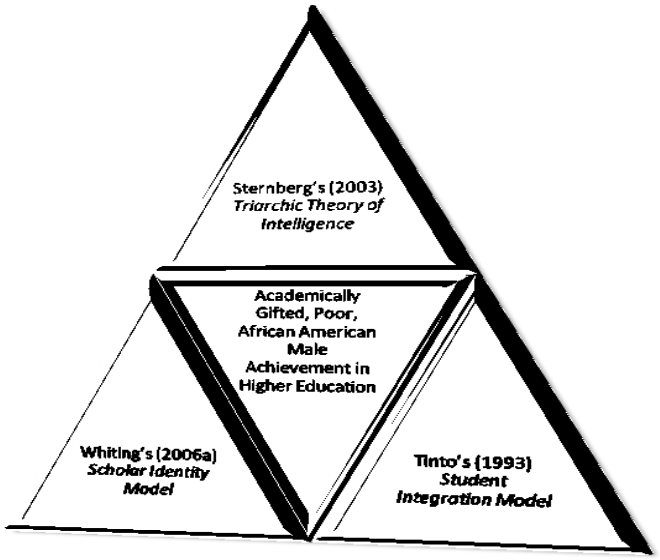

Figure 1. Consulted literature.

Sternberg's Triarchic Theory of Intelligence

Sternberg's (1985) triarchic theory of intelligence outlines intelligence based on one's internal world, one's experience with tasks or situations, and one's external world. Sternberg used the triarchic theory to explain exceptional intelligence, such as giftedness and levels of retardation in children. The triarchic theory is a general theory of human intelligence that focuses on analogies and syllogistic reasoning. For instance, in a study that involved adults and children solving simple analogies, Sternberg found that the youngest children solved problems differently from older children; Sternberg theorized that this happened because the younger children had not yet developed the ability to discern higher-order relationships. Applying this theory, defining giftedness becomes an individualized and holistic process that requires examination of multiple congruous factors that affect the development of academic abilities.

Tinto's Student Integration Model

Research by Tinto contributes to the theoretical framework of this study. According to Tinto (1993), African American students face unique challenges in academic development and social integration into PWIs. Tinto's model suggests that students' personal background characteristics, their educational and occupational goals, their commitment to their goals and to the institution, and the degree of academic and social involvement and investment in the institution interact to predict whether the students will leave the institution before completing a degree program. Tinto's model comprehensively accounts for the interaction between an individual's characteristics and the institutional conditions that impact integration. Thus, Tinto's theory explores personal as well as environmental components that affect students' integration into college environments.

Whiting's Scholar Identity Model

Gifted African American males find that their identity development, particularly their racial identity development, influences their achievement, motivation, and attitudes toward school (Grantham & Ford, 2003). Whiting's (2006b) scholar identity model examines how gifted African American males construct their self-perception, their self-concept, and their racial identity in relation to their perceptions of themselves as students. Their identity is further defined by interaction between the school environment and several internal characteristics, such as self-efficacy, self-awareness, and masculinity. "Establishment of a positive identity for the African American male student is significant in that it serves as the foundation upon which the student can develop some sense of agency and in turn determine where he 'fits' within the academy" (Bonner & Bailey, 2006, p. 28). Establishing a coherent sense of one's self is an essential part of the collegiate experience. For academically gifted, poor, African American males, the

college experience is a multifaceted process that requires a psychological evaluation of the multiple forces that affect their academic success in higher education.

Significance of the Research

Not since the mid-1950s has the United States faced such a serious shortage of skilled workers in STEM disciplines (Morris, 2002; Wallace & Pedersen, 2005). It is important for the nation to reinvigorate these professional areas of study in order to remain competitive globally. As a result, over the past several years the federal and state governments, educators at all levels, and the American business community have directed the nation's attention toward the declining state of STEM. According to Wallace and Pedersen (2005), student performance in STEM subjects is dismal in the lower grades and declines further as students advance in their school careers.

Student interest in pursuing STEM degrees has declined significantly compared to the historical U.S. benchmark. For instance, fewer than 6% of high school seniors in 2005 planned to pursue engineering college degrees, down 36% from a decade earlier (Wallace & Pedersen, 2005).

> Included among those who abandon science majors and underperform in science and quantitative courses are African American students with high scholastic aptitude tests (SAT) scores, impressive high school grade point averages (GPAs), and success in high school honors math and science courses. (Maton & Hrabowski, 2004, p. 547)

Furthermore, the literature reports a correlation between technological growth and the situations accruing in the inner cities. As minority populations continue to grow, increasing their participation in STEM disciplines will be critical to the health of a growing economy and a competitive edge globally. Therefore, one of the most critical areas of focus should be minority students who show extraordinary potential in science and engineering.

The case studies for this study were conducted at University PWI and University HBCU (pseudonyms). To ensure protection of the participants' identities, the real names

of the universities were not used. While the institutions differ in enrollment size and demographics of students, as well as other measures, their similar geographic locations and their common land grant status provided a base for comparison of student profiles when examining factors of poverty. While information gathered from this study could be beneficial to other land grant institutions, the overall implications in these case studies are not designed to represent every land grant institution of higher education in the United States.

The purpose of drawing implications from the findings of the study was to provide for transfer of insight rather than generalization of information to similar institutions. The particular context of the study will serve as a guide to deciding what information is significant and transferable to the context of other institutions. Nevertheless, the data may be used to develop more academic and financial support services for academically gifted, poor, African American male college students, as well as to facilitate academic bridge programs for African American males pursuing engineering degrees. This study was designed to examine poverty and its effects on completion of college by African American males in engineering disciplines. One of the goals was to enhance universities' awareness of the effects of poverty and how these effects linger despite college student success.

Researcher's Relationship to the Problem

Over the past nine years I have amassed critical work experience in secondary and postsecondary settings, both as a classroom instructor and as an administrator. Each of these positions has afforded the opportunity to advance my ideas not only about the importance of quality teaching but also about what constitutes quality learning for diverse student populations across the P-20 continuum. The emphasis in my research agenda comes primarily from secondary experiences in environments in which African

American male students lacked exposure to equitable opportunities to learn. These experiences led me to the realities regarding the frequent disconnection that occurs when students move from the secondary level to the postsecondary level. This disconnection results primarily from inequitable funding of the K-12 system, which creates an unbalanced starting point for African American male students who do not attend schools comparable to those of their more affluent counterparts. Another disconnection occurs at the level of mentoring and guidance that students receive at the secondary level, compared to the lack of mentoring and engagement that they often experience in college and university contexts.

Through an exhaustive literature review and extensive data collection process, I reaffirm and extend the findings of researchers (Bonner, 2001a, 2010b; Chubin, 2002, Hrabowski, 2003a; Maton & Hrabowski, 2004; National Science Foundation [NSF], 2002; Palmer, Davis, & Hilton, 2009) that this demographic is understudied in both the gifted and STEM arenas. Jackson (2003) predicted that over the next 10 to 20 years the science and technology workforce in the United States would be retiring at record rates and that there would not be enough people in the "pipeline" to replace them. One population that could meet this need in STEM disciplines is that of academically gifted, poor, African American males. Like many other groups who are marginalized in socioeconomic status (SES), generational status, and race and ethnicity, this cohort has critical obstacles to overcome; however, by investing in an asset approach as opposed to a deficit-based approach regarding their educational experiences, it is possible to identify ways in which academically gifted, poor, African American males can contribute to the STEM work force in meaningful ways.

Definition of Terms

Academically Gifted/Academic Giftedness

Gifted behavior occurs when there is interaction among three basic clusters of human traits: above-average general and/or specific abilities, high levels of task commitment (motivation), and high levels of creativity. (Renzulli, 1978). For this study, the notion of academically giftedness is extended to African American males who exhibit Scholar Identity (Whiting, 2006b) qualities. The Scholar Identity developed by each of the following characteristics: (a) self-efficacy, (b) future orientation, (c) willingness to make sacrifices, (d) internal locus of control, (e) self-awareness, (f) need for achievement greater than need for affiliation, (g) academic self-confidence, (h) racial identity, and (i) masculinity. Further, giftedness is also designation includes students with a grade point average (GPA) of 2.8 to 4.0 on a 4.0 scale (based on engineering rigor) and have attained junior to senior status in engineering (Bonner, 2010b).

Gifted and Talented

Persons who are identified as professionally qualified by virtue of outstanding abilities and capacity for high performance. Gifted and talented children require differentiated educational programs and/or services beyond those normally provided by the regular school program in order to realize their contribution to self and society (Marland, 1972).

High-Achieving Students

Students who have a GPA of 3.0 to 4.0 on a 4.0 scale and have attained junior or senior status (Bonner, 2001a; Harper, 2004).

Historically Black Colleges and Universities (HBCUs)

Institutions of higher education in the United Sates that were established before 1964 with the intention of serving the Black community. There are currently 105 historically HBCUs in the United States, including public and private, 2-year and 4-year institutions, medical schools, and community colleges. Roebuck and Murty (1993) asserted that HBCUs, unlike other colleges, are united in a mission to meet the educational and emotional needs of Black students. They suggested that there is also a general level of satisfaction and camaraderie among Black students at Black schools that is not found among Black students on predominantly White campuses.

Poverty

The original definition of poverty provided a range of income cutoffs or thresholds adjusted by such factors as family size, gender of the family head, number of children under 18 years old, and farm/nonfarm residence (U.S. Census Bureau, 2010b). The term *low-income individual*, as used in this study, refers to a person whose family's taxable income from the preceding year did not exceed 150% of the federally designated poverty level, calculated by family size and taxable income. The U.S. Department of Health and Human Services (USDHHS) designates variations in income level by state of residence. Furthermore, poverty for the participants of this study is defined base on situational issues within their environments.

Predominantly White Institutions (PWI)

Institutions of higher education with more than half of the student population being Caucasian (U.S. Department of Education [USDOE], 2008).

STEM

This acronym for science, technology, engineering, and mathematics is commonly used by policy advocates and government officials. The term also includes

behavioral and social sciences such as sociology, economics, psychology, and political science (Green, 2007). The term is commonly used in relation to the nation's economic competitiveness and the related need for education programs in support of future generations (Morrison, 2005).

Success

Success is viewed as a phenomenon that could be experienced by anyone who is willing to work toward personal goals. According to Bonner (2010b), factors such as "ambition, determination, self-confidence, and wisdom were all cited as perquisites for achieving success" (p. 134).

Trustworthiness

Essentially, trustworthiness is used to judge the quality of research and to describe the associated procedures in the research process. Trustworthiness is defined as the quality of an investigation and its findings that make it noteworthy to audiences (Lincoln & Guba, 1985).

Delimitations

According to Creswell (2003), delimitations are factors that constrict the scope of a study and restrict the researcher from claiming that the findings are true for other populations within similar contexts. The aim of this study was to understand the experiences of academically gifted, poor, African American males as they navigate undergraduate STEM degree programs. The findings of this study cannot account for the general perceptions of all African American males nor for perceptions of African American males who are considered to be gifted, nor to all academically gifted, poor, African American males in STEM. Because the purpose of qualitative research is not to generalize findings or implications, the data generated by the participants in this study are contextualized to the individual lived experiences of the participants.

Limitations

Gay (1992) indicated that limitations are those characteristics of design or methodology that set parameters on the application or interpretation of the results of the study. According to Gay, "a limitation is some aspect of a study that the researcher knows may negatively affect the result, or generalizability of the results, but over which he probably has no control" (p. 108). It was recognized by the researcher that the interviewed students may have had distinct perceptions that may have had an impact on their college experiences.

The first limitation of this study was that the definitions of *academically gifted* and *poverty* were socially constructed from positions of the Office of Health and Human Services and other educational researchers. Therefore, in designing the study, it was necessary to be mindful of both the constructed definitions and the participants' interpretations of those terms. For that reason, the socially constructed definitions of the terms were applied in Chapter I and the participants' definitions of the terms were applied in Chapter IV.

The second limitation associated with the study was the range of participants. Since the focus of the study was academically gifted, poor, African American males majoring in engineering disciplines, certain students were not selected to participate. Although students from engineering disciplines were the target population, not all engineering academic departments were represented. A high percentage of the students who participated in the study were engineering majors because this department was the only one willing to provide students to participate. Thus, other interested students may have been overlooked because their names were not provided by their academic departments or because they did not meet the participant criteria (i.e., GPA, race/ethnicity, SES).

The third limitation arises from the inquiry method selected for the study, which included qualitative in-person interviews and emailed self-reflection questions. The interviews were conducted in the study rooms at each institution's library. While the study rooms were located in a private area of the library, they were also cramped and uninviting. Considering the study room accommodations and the fact that it was the first time the participants and researcher had met face to face, these environmental and social factors might have made the participants nervous or uncomfortable. These conditions may have affected participants' responses, which could have affected the findings. In addition, the use of self-reflection questions pertaining to the participants' experiences in the interview may have resulted in limitations.

The self-reflection questions were emailed to the participants 2 weeks after the interview. This method was limiting for two reasons. First, within those 2 weeks, participants may have forgotten parts of the interview conversation. Second, this method limited the participants' ability to articulate what they really wanted to say. For instance, some of the participants indicated that they were better at expressing their thoughts through conversation rather than the written word. This led to the conclusion that email correspondence may not be a beneficial way to collect reflective data.

Organization of the Dissertation

Chapter I presents the problem statement, the purpose of the study, the research questions, the conceptual framework of the study, the significance of the study, the researcher's role in the study, operational definitions of terms, and the delimitations and limitations of the study. Chapter II presents a review of the literature relevant to the problem. Chapter III describes the methodology used in the study, including the research design and data collection and analysis procedures. Chapter IV presents the findings and Chapter V presents conclusions and recommendations for future research.

CHAPTER II

REVIEW OF RELATED LITERATURE

Closing the achievement gap between African American males and other student populations remains one of the most pressing educational issues in the United States (Bonner, 2010b; Noguera, 2003). African American men in college are faced with a difficult and unique challenges that may inhibit their academic success (Bailey & Moore, 2004; Noguera, 2003) and subsequent graduation. According to Noguera, African American men represented in 2003 the exact same percentage of all students who were enrolled in colleges in 1976. Of approximately 15 million undergraduate students in the United States, less than 5% are Black men (USDOE, 2006). In 2004, African American males account for only 6.1% of bachelor's degrees awarded in science and engineering, compared 66.9% for their White counterparts (NSF, 2006). As a result, the enrollment and persistence of African American males in engineering programs remains one of the most urgent issues in higher education. In order for the United States to remain globally competitive and move forward technologically, there must be a continuous reproduction of gifted and talented citizens with new and fresh ideas. As the demands for technology innovation increase and the demographic trends in the work place change, it is vital that African American male college students have the resources to gain skills to participate in the technologically advanced marketplace (Jackson & Moore, 2006; Jackson & Moore, 2008).

Disparities in African American male achievement in engineering disciplines have been attributed to numerous factors, including but not limited to low expectations, inadequate resources, poverty, poor performance in mathematics and science classes in high school, inadequate parental support, and lack of positive mentors (Bonner, 2010b; Hrabowski, 2003b; Hrabowski & Pearson, 1993). While scholars have studied the causes

associated with the absence of African American males on college campuses (Fashola, 2005; Lee, 2005; Polite, 1999), a majority of studies have tended to focus on the impact of cultural and environmental factors on these students' educational experiences (Davis, 1994; Moore, 2006).

Considering the importance of improving educational opportunities for African American males in engineering disciplines, it is crucial to examine the complexities of African American males' educational experiences. To frame this study, it is imperative to examine the definition of *giftedness* and how students' conceptualizations of their abilities affect their academic development and persistence. The purpose of this literature review is to provide a historical and conceptual understanding of the complex educational experiences of African American males. This literature review illustrates the linkages among poverty, culture, academic giftedness, and two distinct institutional types (i.e., HBCUs and PWIs) in relation to the African American male college experience. The factors assessed for this study are derived from research on giftedness (Bonner, 2001b, 2010; Borland, Schnur, & Wright, 2000; Ford, 2003; Fries-Britt, 1998; Grantham, 2004b; Harper, 2004), research on STEM (Babco, 2001; Hines, 1997), research on student development (Cokley, 2001; Flowers, 2004; Fries-Britt, 2000, 2002; Harper, 2004, 2006), and research on college institutional types (Gerald, 1999; Morris, 2002). To understand the academic experiences of African American male college students, this literature review presents a brief exploration of the foundations of higher education for this student population.

The Foundations of Higher Education for African Americans

The historical context of the African American experience in education is steeped in a context that cannot be disregarded when examining academically gifted, poor, African American males. In the United States, the educational experiences of African

American males consist of academic disparities, inequality of opportunity, and unjustified treatment based on race and SES. According to Lucas (1994), the primary purpose of higher education was originally to produce a learned clergy. Over time, higher education also became a social institution for the elite who had the financial means to attend. For African American males, educational opportunities were initially nonexistent. Fortunately, with the founding of HBCUs, these institutions served as the educational remedy to the social injustices that African Americans faced in higher education. According to Roebuck and Murty (1993), HBCUs are "Black academic institutions established prior to 1964 whose principal mission was, and still is, the education of Black Americans" (p. 3). HBCUs served as "islands of hope" where African American college students could learn without feelings of inferiority (Lucas, 1994).

HBCUs were created as academic safe havens for African Americans looking for educational opportunity. A large majority of HBCUs were founded after the *Plessy v. Ferguson* decision in 1886. Fleming (1984) noted that "the majority of Black public colleges then evolved out of states desires to avoid admitting Blacks to existing White institutions" (p. 5). After the Civil War, principal types of higher education institutions took form, including agricultural colleges, institutes of technology, research universities, and colleges for women (Thelin, 2004). Public policy, critical social legislation, and court decisions set the pace for the expansion of education for African Americans. For example, Congressman Justin Morrill of Vermont contended that the country needed education for the industrial classes, those who were engaged in the productive economy. As a result, in 1862 he sponsored the Morrill Land Grant Act, which gave each state land to support a college that would teach agriculture and the mechanical arts without excluding other scientific and classical studies (Thelin, 2004).

According to Thelin (2004), the Morrill Act had two profound effects. First, it created a nationwide network of state-sponsored colleges and universities. Second, the Act stated that both practical and academic subjects must be taught, to include both liberal and agricultural arts. The Hatch Act of 1887 increased the efforts of the Morrill Act by providing federal funds to states to create university-sponsored agricultural experiment stations. The Second Morrill Act in 1890 sought to extend access to higher education by providing additional endowments for all land grant institutions but prohibiting distribution of money to states that made distinctions of race in admissions. In addition, states that provided a separate land grant institution for African Americans were eligible to receive increased funding from the federal government (Thelin, 2004). Regardless of these funding levels *then* and *now*, African American males continue to lag behind in all levels of educational attainment (Moore, 2006).

Even though some provisions were made historically, there are still numerous limitations in access, funding, and opportunity for academically gifted, poor, African American male college students (Davis, 1994). For instance, prior to the 1970s, African Americans' participation in STEM academic programs and professional communities was virtually nonexistent (Babco, 2001). African American males were not effectively recruited and retained in research-driven institutions of higher education (Moore, 2006). A significant portion of African American students who earned degrees in STEM received them from HBCUs (Babco, 2001; Hines, 1997; Hurtado, 1992). The historical development of higher education in the United States has been and continues to be influenced by racial, social, economic, and cultural influences. These influences have a direct effect on the academic outcomes of academically gifted, poor, African American males (Bonner, 2001a; Cross & Burney, 2005).

African Americans Males, Education, and Giftedness

Today, education is viewed as society's major vehicle for social and collective progression (Cross, 2007). According to Lee (1996), "Black males encounter formidable challenges to their educational development and many of them experience a serious stifling of achievement, aspiration, and pride in school systems throughout the country" (p. 5). "Ever since Edward Jones and John Brown Russwurm became the first Black American college graduates in 1826, Black participation in American higher education has been determined by the changing status of Blacks in the society" (Willie & Cunnigen, 1981, p. 177). The social status of African Americans in this country continues to be influenced by this student population's ability to obtain access to higher education opportunities. According to Levin, Belfield, Muennig, and Rouse (2007), African American males between ages 26-30 had on average 0.72 fewer years of education than their White male counterparts.

The experience of academically gifted, poor, African American males in higher education encompasses a variety of institutional and social factors. These factors tend guide and even dictate the directions that academically gifted, poor, African American males take as they pursue their postsecondary degrees in engineering disciplines (Bonner, 2010b; Cross, 2003; Fashola, 2005). Developing understanding of the status of the academically gifted African American male in poverty is vital to any discussion pertaining to his academic development. Within the context of higher education, gifted studies of African American males continue to be limited to particular scholars (Bonner, 2001b, 2010a; Borland et al., 2000; Ford, 2003; Fries-Britt, 1998; Grantham, 2004b; Harper, 2004, 2006, 2008), and the term *gifted* remains an untapped identifier of the African American student.

While these areas of research have provided a foundation for examining the experiences of African American male college students, the research in this field fails to capture the nuances (i.e., cultural, social, and economic distinctions) within this student population. Thus, understanding the experiences of academically gifted African American males in poverty has become a vital area of research. According to Fries-Britt (1997), "The majority of research on intelligence is conducted on the White middle class; research on gifted minorities in general and gifted blacks in particular is insufficient" (p. 67). The challenge involved in re-defining the term *giftedness* is extremely complex because the term holds social value. In fact, giftedness is a reflection of what society believes it to be; consequently, what it means to be gifted changes over time (Sternberg & Davidson, 1986).

Giftedness

Historically, cultures have recognized, rewarded, and encouraged what they defined as giftedness and gifted behavior, depending on what was valued by that particular culture during that time period. Societies throughout the world have long held various ideas of how the term *gifted* is codified. For instance, early societies valued people who excelled in military skills (Spartans), academics and physical fitness (Athenians), and engineering (Romans). Early Chinese culture recognized child prodigies and nurtured their gifts as much as possible, bringing them to the imperial court to honor their skills and abilities. According to Colangelo and Davis (2003), the Chinese believed that children from all social classes had the right to be educated and that students should be differentiated based on ability. This section on giftedness provides an overview of giftedness and the theorists who study this concept. The section also outlines various definitions of giftedness and the implications for academically gifted African American males.

While giftedness has been valued across time throughout different cultures, there is not one distinct way in which to define or measure this term (Colangelo & Davis, 2003). For example, during the European Renaissance period, multiple views of intellectual abilities existed. Any and all intellectuals were highly valued, including artists, architects, and writers. Giftedness had a social value; those who were considered gifted based on their performance were sought and rewarded (Colangelo & Davis, 2003; Witty, 1951).

Defining Giftedness

The initial research on giftedness was based on educational theory that used intelligence testing as the sole method of measuring students' abilities (Cross, 1999). Contemporary researchers such as Gardner (1985), Renzulli (1986), and Sternberg (2003) have sought to examine students' ability to solve problems and think creatively as a means of defining giftedness.

As the literature on giftedness progresses, the traditional definitions of giftedness have evolved, focusing on a wide range of capacities, including intellectual, artistic, creative, and leadership ability (Bonner, 2010a; Ford & Harris, 1995; Sternberg & Davidson, 1986). The definition of giftedness has been shaped and influenced by a combination of applied research and federal mandates. In 1972 the Deputy Officer of the Office of Education, Sidney Marland, pronounced that the identification of gifted and talented children would be based on outstanding abilities of high achievement.

> Gifted and talented children are those identified by professionally qualified persons, who by virtue of outstanding abilities are capable of high performance. These are children who require differentiated educational program and/or services beyond those normally provided by the regular school program in order to realize their contribution to self and society. (Marland, 1972, para. 1)

Students were identified as gifted and talented if they were determined to have one or a combination of the abilities mentioned above. Six years later, an extension of the term was created by the Gifted and Talented Children's Act of 1979. The Act

broadened the notion of giftedness by including "potential" giftedness as a measure of identifying untapped abilities in students. In other words, the characteristics that determined one's giftedness were no longer defined by the traditional assessments used to measure intelligence.

Despite a change in the definition of giftedness, the term did not increase cultural diversity in gifted programs because the primary measurement scales utilized to assess intelligence remained traditional in nature.

> Giftedness consists of the interaction among three basic clusters of human traits—the clusters being above-average general abilities, high levels of task commitment, and high levels of creativity. Gifted and talented children are those possessing or capable of developing this composite set of traits and applying them to any potentially valuable area of human performance. (Renzulli, 1986, p. 73)

Renzulli (1986) surmised that giftedness should be further defined by one's "potential." As noted in the literature, defining the term *giftedness* is a complex task that is compounded by factors such as gender, race, culture, ethnicity and socioeconomic status. While society has always been intrigued by people who are deemed to embody gifted traits, the method to determine giftedness remains a complex process (Fries-Britt, 1997). The USDOE (1993) took the position that indicators of gifted and talented status should include cultural and socioeconomic factors and various levels of ability. The Department also stated that the definition should include the student's age and respective experiences in environments. This definition offers a broader notion of what constitutes gifted qualities in diverse populations of students.

Gifted Education Theorists

As seen through the works of early scholars (Hollingworth, 1942; Sternberg, 1985, 1996; Terman, 1925; Thurstone, 1938), the traditional definitions of giftedness regard cognitive measures and so-called objective criteria, such as intelligence tests, as primary indicators of ability. However, in the work of more contemporary scholars

(Colangelo & Davis, 2003; Gardner, 1993; Nielsen, 2002; Renzulli, 1978) focusing on classifying giftedness traits, there has been a growing consensus that there are different levels in identifying intelligence and giftedness. In other words, "Individuals differ from one another in their ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought" (Neisser et al., 1996, p. 77). It is important to recognize the variety of theorists who have contribute to defining the concept of giftedness.

Sir Francis Galton (1822-1911). The term *gifted children* was first used in 1869 by Francis Galton through his examination of students with high abilities in the sciences (Renzulli, 1986). In his book *Hereditary Genius* (1869), Galton encouraged a system of eugenics, which is the systemic pairing of genetically similar individuals (Watson, 1978). Galton assumed that intelligence was inherited via biological constructs. He aimed to measure the rate of prominence of traits of giftedness in children who came from illustrious families in comparison to their peers from the general population. He referred to adults who demonstrate exceptional talent in particular areas, such as the "gifted chemist." Currently, intelligence is considered to be a process of thinking, analyzing, reasoning, and problem solving; however, in Galton's era, intelligence was related to a person's level of sensation. Galton contended that measures of intelligence could be used to investigate individual differences. Galton assumed that individual differences might be due to information perceived from the senses; therefore, the more versatile the stimuli, the higher the level of intelligence (Watson, 1963).

Alfred Binet (1857-1911) and Theodore Simon (1873-1961): Stanford-Binet IQ Test. During the early 1900s, Alfred Binet and Theodore Simon were commissioned by the French government to develop a test to identify children who were intellectually

deficient and eligible for assignment to special education programs. Binet and Simon created the Stanford-Binet Intelligence Test, which measured cognitive abilities as a means to determine intelligence, specifically to assess normal students and "dull" students (Fries-Britt, 1997). While the assessment failed, the intelligence test introduced the concept of *mental age*. Essentially, the concept of mental age measured and compared the intelligence of children with that of their peers to determine whether they were ahead of or behind the "typical" intellectual stage (Colangelo & Davis, 1991). Other researchers have revised the test several times (Riverside Publishing, 2004). In addition to assessing normal intelligence, the current version, Stanford-Binet 5, accurately assesses level of functioning (Riverside Publishing, 2004). Despite continued criticism of the validity of the Stanford-Binet, many psychologists posit that is one of the most valid instruments to gauge intelligence.

Charles Spearman (1863-1945). In the early 1900s, British psychologist Charles Spearman described a concept that he referred to as *general intelligence* or the *g factor*. After using a statistical technique known as factor analysis to examine mental aptitude tests, Spearman concluded that scores on these tests were remarkably similar. As a result of using factor analysis, Spearman posited that it would be possible to identify clusters of tests that measure a common ability. In addition, Spearman discovered that people who score high on IQ or mental ability tests usually scored higher on other types of tests and people who scored lower generally had lower scores on other tests. Spearman concluded that all mental tests are positively correlated and that there must be some common variable or factor that produces this positive correlation (Spearman, 1904).

Louis L. Thurstone (1887-1955). Thurstone, a psychologist, established a different method of examining the concept of intelligence. Instead of viewing

intelligence as a single, general ability, Thurstone's theory focused on seven primary mental abilities: verbal comprehension, reasoning, perceptual speed, numerical ability, word fluency, associative memory, and spatial visualization (Thurstone, 1938). Thurstone's notion for measuring intelligence and academic attitudes was used as an essential framework for developing aptitude assessments for both the U.S. Army and American institutions of higher education.

Leta Hollingworth (1886-1936). Hollingworth (1942) posited that the potential to be gifted was inherited. She claimed that providing a nurturing home and school environment was important in the development of that potential. In 1926 she published *Gifted Children, Their Nature and Nurture*, and the term *gifted* has since been used to refer to children of high potential. According to Hollingworth's work, in order for a child to be deemed gifted, the child must demonstrate an exceptional talent in a particular academic area. Hollingworth advocated that children be evaluated based on abilities rather than disabilities. She contended that paying attention to children's strengths is a vital part of helping them to learn and develop. Hollingworth ushered in a time when multiple definitions of giftedness existed, particularly in terms the ability to adapt to the environment and to learn from experience (Sternberg & Davidson, 1986).

Lewis Terman (1877-1956). Terman (1925) expanded Galton's view of gifted children by using IQ as an indicator of giftedness. Terman began a groundbreaking longitudinal study of gifted children at Stanford University, called the Stanford Studies of Genius (Kitano & Kirby, 1986). Terman identified children with IQs of 140 or more as gifted (Terman, 1925).

> Terman's work began with the identification of subjects through use of the Stanford Binet IQ score (above 140). From exhaustive study of those subjects he reported characteristics of the gifted or geniuses in all areas of development—mental, social, emotional, and physical. His findings contradicted the existing myths about the tendency of the gifted toward illness, insanity, and other compensatory forms of weakness and presented the image of the gifted as generally superior on all developmental dimensions. (Whitmore, 1980, p. 13)

While Terman's research provided a new frame in which to examine giftedness, it also provided the research world with a new set of misconceptions concerning giftedness. Mainly, he suggested that the notion that giftedness is exclusively assessed through standardized testing procedures. This approach led to debate about whether the Stanford-Binet and other similar IQ assessments are biased against economically disadvantaged and culturally different children (Eby & Smutny, 1990).

1957: Sputnik effect. The launch of Sputnik caught the world's attention and the American public school system and federal government off guard. The results of Sputnik caused the United States to focus quickly on science education for gifted students because the Russians were perceived as being ahead of the Americans in the space race. As Tannenbaum (1979) noted, there was a "total talent mobilization" in the United States immediately after the Sputnik launch (p. 12). It was at this time that acceleration and ability grouping became popular, the focus intensified on math and science, and efforts were made to identify gifted students from minority backgrounds. With Sputnik came a renewed interest in identifying and educating the brightest minds.

Raymond Cattell (1905-1998). Cattell designed a series of intelligence tests that were widely utilized, improving on the tests developed by Binet. Cattell was best known for personality tests, such as the Children's Personality Questionnaire, the Clinical Analysis Questionnaire, and the Eight State Scales. Cattell also designed nonverbal tests and presented a theory of fluid and crystallized intelligence that is now widely applied as a means to measure intelligence. According to Cattell (1966), intelligence can be fluid or crystallized. He posited that fluid intelligence allows people to learn new things, regardless of past experience, while crystallized intelligence allows people to solve problems based on previous experience or past knowledge.

Joseph Renzulli (1936-). One of the most influential models of giftedness was devised by Joseph Renzulli, a professor of educational psychology at the University of Connecticut. His research has focused on identification and development of creativity and giftedness in young people and on organizational models and curricular strategies for total school improvement. According to Renzulli's three-ring model of giftedness (1978), three basic traits characterize successful, outstanding individuals: (a) above-average but not necessarily superior general ability, (b) high level of task commitment or intrinsic motivation, and (c) creativity. According to Renzulli (1978, 1986), the giftedness characterizes creative production and serves as part of the rationale for his three-ring conception of giftedness (Renzulli, 1978, 1986). Figure 2 illustrates this Renzulli's three-ring conception of giftedness.

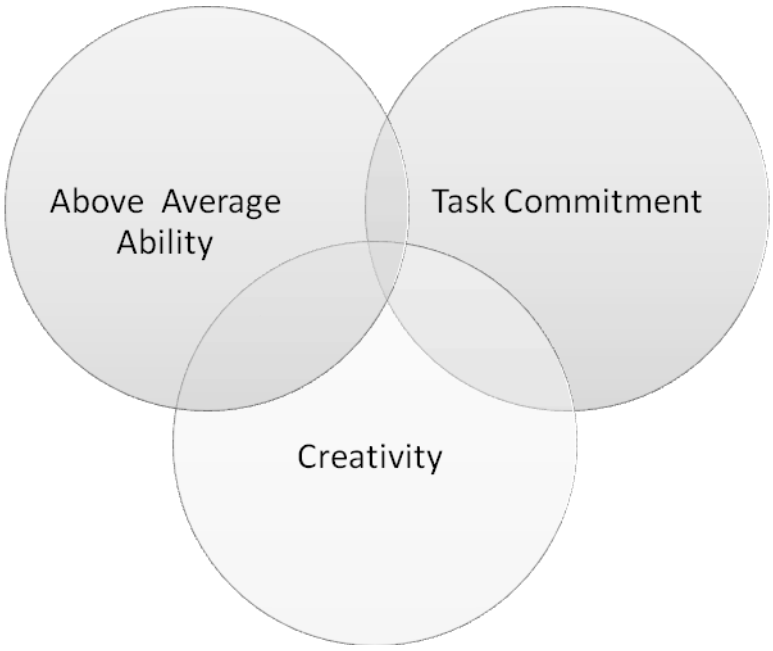

Figure 2. Renzulli's three-ring conception of giftedness. From "The Three-Ring Conception of Giftedness: A Developmental Model for Creative Productivity," by J. S. Renzulli, pp. 53-92 in R. J. Sternberg & J. Davidson (Eds.), *Conceptions of Giftedness*, New York, NY: Cambridge University Press.

Howard Gardner (1943-). Gardner's theory of multiple intelligences (1983) describes intelligence as a multifaceted notion that extends beyond academic intelligence and IQ. Gardner's theory expanded the concept of intelligence to include such areas as music, spatial relations, and interpersonal knowledge, in addition to mathematical and linguistic ability. Gardner (1983) argued that there is both a biological and cultural basis for the multiple intelligences. Because different cultures value different types of intelligences, one's cultural context plays an essential role in the formation of intelligence. The cultural value placed upon one's ability to perform certain tasks provides the motivation to acquire skills in those areas (Gardner, 1983).

Robert Sternberg (1949-). Sternberg's (1985) definition of giftedness is more elaborate than other conceptualizations of giftedness, as it seeks to expand the notion of intelligence to include social factors. Sternberg, in his definition of giftedness, explained the importance of environmental factors in the development of intelligence. Specifically, he indicated that the types of environmental factors that gifted students encounter have different effects on their definition of academic success. Sternberg outlined the development of intelligence in his triarchic theory of intelligence model, which is subdivided into three factors, each having a particular role in the development of intelligence. Sternberg outlined his intelligence model based on his negative experiences with traditional IQ measurements. He realized that traditional IQ measurements failed to consider cultural and environmental variables in their encapsulation of giftedness. According to Sternberg (2007), intelligence is a combination of cognitive and noncognitive skills; it is not based on one single construct. Sternberg defined intelligence as skills that enable people to achieve at a high level. According to Sternberg, one's level of achievement is influenced by social and cultural contexts; however, it is vital that one capitalize on one's strengths and compensate for, or correct, one's weaknesses

(Sternberg, 1985). The triarchic theory of intelligence includes the following descriptors: (a) *analytical intelligence*—the ability to complete academic, problem-solving tasks, such as those used in traditional intelligence tests; (b) *creative or synthetic intelligence*—the ability to deal successfully with new and unusual situations by drawing on existing knowledge and skills; and (c) *practical intelligence*—the ability to adapt to everyday life by drawing on existing knowledge and skills (Figure 3).

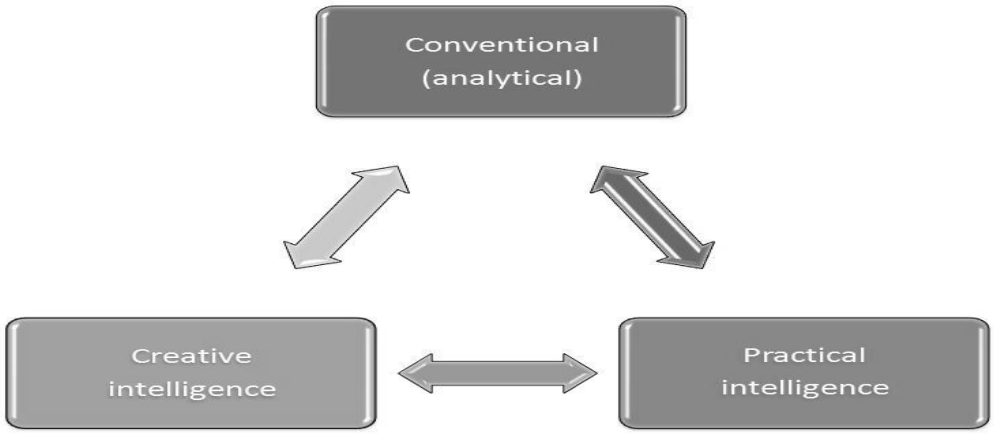

Figure 3. Sternberg's triarchic theory of intelligence. From *Beyond IQ: A Triarchic Theory of Human Intelligence,* by R. Sternberg, 1985, Cambridge, UK: Cambridge University Press.

Sternberg's model is supported by Ford's (1996) assertion that "such unidimensional instruments as intelligence and achievement tests do not reliably measure a multidimensional construct like intelligence, but multidimensional assessment can increase the probability of doing so" (p. 32). Bonner (2010a) contended that African Americans' performance outcomes on intelligence assessments, along with predefined characteristics of gifted students based on psychometric measures, are some of the reasons African American students go unidentified in gifted programs. Sternberg and Davidson (1986) stated that IQ or standardized tests work only for some of the people

some of the time, not for all of the people all of the time, and that some of the assumptions about tests are, at best, correct only for a segment of the tested population and, at worst, correct for none at all.

Identification of Gifted African American Males

One of the shortcomings in the identification of African American males in gifted programming is the difficulty associated with how giftedness is defined within the context of society and education. Sternberg (2007) reported, "Different cultures have different concepts of what it means to be gifted. But in identifying children as gifted, we often only use our own conception, ignoring the cultural context in which the children grew up" (p. 160). Several scholars (Bonner, 2001a; Ford, 1994, 2004; Ford & Grantham, 2003; Ford, Tyson, Howard, & Harris, 2000; Gardner, 1983; Hilliard, 1976; Renzulli, 1981; Sternberg, 1985) have provided empirically grounded evidence reaffirming the need to embrace a more inclusive set of practices in the identification process.

One of the first steps in seeking a means by which to expand the definition of giftedness was initiated by legislative mandate. Commissioner of Education Sydney Marland (1972) published the first formal definition of giftedness, reporting that minority children were being served inadequately. In 1993 the U.S. Office of Educational Research and Improvement (OERI) sought to expand the definition of giftedness in a report titled *National Excellence and Developing Talent*. According to the report,

> Children and youth with outstanding talent perform or show the potential for performing at remarkably high levels of accomplishment when compared with others of their age, experience, or environment. These children and youth exhibit high performance capacity in intellectual, creative, and/or artistic areas, and unusual leadership capacity, or excel in specific academic disciplines. They require services or activities not ordinarily provided by the school. Outstanding talents are present in children and youth from all cultural groups, across all economic strata, and in all areas of human endeavor. (p. 19)

Ford (1996) stated that the "assessment of giftedness should include both quantitative and qualitative strategies to assist gifted programs and selection processes in becoming more inclusive of potentially gifted students, particularly those from underrepresented groups" (p. 526). While studies of academically gifted African American males have been framed in the context of secondary schooling, it is vital that the research community expand its scholarly efforts. Many of the experiences of academically gifted poor African Americans males are parallel to those of other gifted minority groups. They face issues concerning both academic and social integration in college environments. Interactions between internal (psychological) and external (social and institutional) factors may trigger responses that affect the academic and social development of academically gifted African American male college students. Moreover, because of their identification as gifted, African American males are likely to encounter race hostility and stereotyping both from within the African American community and outside (Bonner & Bailey, 2006).

Underachievement by African American Males

The research concerning academic achievements of African American males in the collegiate environment tends to be focused on the concept of underachievement (Fries-Bitt, 1998; Harper, 2005). According to Flint (2002), underachievement is an amorphous concept with complex causes and effects that are difficult to identify or alter. Thus, the various characteristics and experiences that make a student an individual also contribute to underachievement status. Reis and McCoach (2000) posited that certain students have distinct characteristics and descriptors that identify them as underachieving gifted students.

> Attempting to define overarching psychological constructs to describe gifted underachievers is virtually impossible. . . . Synthesizing the hypothesized characteristics of gifted underachievers becomes a nearly impossible task, and legitimate questions exist regarding the utility of such a list. For each personality trait common to gifted underachievers, there are many other underachieving gifted

> students who do not exhibit that trait. In addition, students who are not underachievers may exhibit one or several of these characteristics. Often, the lists of common personality traits contradict one another. Even the research on common characteristics in underachieving gifted students is often inconsistent. (p. 158)

The problems associated with underachievement by academically gifted African American males can be attributed to several factors, including overinclusion of African American males in special education (Arnold & Lassmann, 2003; Fine, 2002; Kearns, Ford, & Linney, 2005; Shealey & Lue, 2006; Skiba, Poloni-Staudinger, Gallini, Simmons, & Feggins-Azziz, 2006), social and educational misalignment, narrowly defining the term *gifted*, and their underrepresentation in gifted and talented programs (Bonner, 2000, 2001a; Bonner & Jennings, 2007; Ford, Grantham, & Bailey, 1999; Ford et al., 2002; Grantham, 2004b; Grantham & Ford, 2003; Morris, 2002; Shaunessy, Karnes, & Cobb, 2004).

For academically gifted, poor, African American males, the notion of underachievement continues to elicit common themes throughout the literature (Bonner, 2001b, 2010a; Grantham, Frasier, Roberts, & Bridges, 2005). For instance, many studies have attempted to link underachievement with such personality traits as poor self-regulation, control, and organizational skills; perfectionism; depression; self-efficacy; psychic overexcitability; extreme sensitivity; and stubbornness (Reis & McCoach, 2000). In Fries-Britt's (1998) article "Moving Beyond Black Achiever Isolation*"* she examined the experiences of gifted African American students attending a predominantly White university. The purpose of the study was to explore, through extensive interviews, the academic, social, and racial experiences of gifted African American students participating in the Meyerhoff Program. The aim for the Meyerhoff Program was to increase minority representation in engineering programs. For academically gifted African American males in her study, the notion of self-concept was different than that of their White counterparts. Fries-Britt reported that external factors

(i.e., peer influence, family support, and connection to the university) influenced the African American students' sense of giftedness and contributed to their overall experience of underachievement.

Factors such as family structure and SES have also been described as potential indicators of underachievement (Reis & McCoach, 2000). Ford (1992) suggested that a combination of psychological, social, and cultural forces is attributable to the problem of underachievement. Nevertheless, the potential links between each of these traits and underachievement in gifted African American males warranted individual examination into each of these areas. The issues associated with underachievement continue to be problematic, affecting the retention of this student population in gifted programming (Grantham, 2004b). To better understand the issues related to academically gifted African American male college students and underachievement, it is important to examine two critical issues that these students confronted prior to their collegiate experiences: lack of individual motivation and the notion of deficit thinking.

> Lack of motivation to excel is usually a result of a mismatch between the student's motivational characteristics and opportunities provided in the classroom. Students are typically highly motivated when (1) the social climate of the classroom is nurturing, (2) the curriculum content is relevant to the students' personal interests and is challenging, and (3) the instructional process is appropriate to the students' (4) natural learning style. (Whitmore, 1980, p. 423)

According to Cooley, Cornell, and Lee (1991), gifted African American students have the challenge of integrating their racial identification into their self-concept; thus, this student population must consider what it means to have been identified *as gifted* and what it means to be an *African American male.* According to one of the participants in Fries-Britt's (1998) study, "This lack of contact throughout school with other African Americans who were academically talented formed an image for students that they were alone and belonged to a small 'minority' of African American students who had high academic ability" (p. 563). The most influential theories currently proposed to account

relatively low academic performance by African American males focused on three areas: (a) student attitudes, (b) social organization of schools, and (c) masculine identity (Cook & Ludwig, 1998). Some of the research focusing on students' academic attitudes centers on student resistance and cultural opposition to schooling and achievement (Cook & Ludwig, 1998; Fordham, 1996; MacLeod, 1995).

A multifaceted approach is necessary to address the problem of underachievement by academically gifted African American males (Fries-Britt, 1998). The first step is for educators to move beyond the notion of deficit thinking with regard to African American males' academic performance. Ford et al. (2002) provided evidence of seven major symptoms of deficit thinking:

> a. Traditional IQ-based definitions, philosophies, and theories of giftedness;
>
> b. Identification practices and policies that have a disproportionately negative impact on Black students (e.g., a reliance on teacher referral for initial screening);
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> c. A lack of training aimed at helping educators in the area of gifted education;
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> d. A lack of training aimed at helping teachers understand and interpret standardized test results;
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> e. Inadequate training of teachers and other school personnel in multicultural education;
>
> f. Inadequate efforts to communicate with Black families and communities about gifted education; and
>
> g. Black students' decisions to avoid gifted education programs. (p. 54)

Student underachievement will remain a problem for academically gifted African American males until educators focus more attention on the racial, cultural, and socioeconomic factors that contribute to this issue. According to Ford et al. (2000), the more educators attempt to understand the complexities associated with students' cultural backgrounds, the more gifted students of color will achieve in the classroom.

Underachievement is perceived through the perceptions of the observer. In such a context, subjective judgments about the value of particular accomplishments or ways of

learning are made (Reis & McCoach, 2000). As a result, a social value is placed on a single method of defining achievement or underachievement (Davis, G., & Rimm, 1998). Too often in academic research, African American male students are studied in the context of underachievement. In particular, African American males are the focal point in studies on dropout rates, special education programming, and low academic performance in school. Consequently, members of this population remain underexamined in research highlighting high academic achievement and education for gifted students (Reis & McCoach, 2000). Reis and McCoach contended that diverse students face unique barriers to achievement and that different subcultures' definitions of achievement may be different from the one created by the dominant group. Thus, it is vital to examine achievement and giftedness thorough multiple lenses. More research studies such as those by researchers Banda, Flowers, and Booker (2010), Haycock (2001), and Renchler (1993) are needed to focus exclusively on factors that influence or even hinder student achievement, particularly factors such as poverty or SES.

Poverty and Theories of Poverty

Historically, class inequities have been embedded in the social norms that have shaped the context of the entire schooling experience (Apple, 2004). As a result, middle-class families are often able to maneuver their students through the education process in a way that increases the likelihood for higher achievement (Brantliner, 2003). In 2008 it was estimated that 35.2 million young adults were living at, near, or below the poverty level (U.S. Census Bureau, 2010b). According to the Bureau, African Americans and Hispanics have the highest rates of poverty of any race or ethnic group. The study of poverty and inequality has been thrust into the foreground as scholars, politicians, and policymakers have attempted to combat these issues.

While both psychology and sociology appear to be moving toward a view of poverty that includes an integration of human behavior and social environment, this has not always been the case (Lichter & Crowley, 2002). According to Burney and Beilke (2008), focusing on overcoming the limitations of poverty is more productive in influencing the lives of students than any other social policy. This section on poverty outlines the impact poverty on the individual student, his or her educational opportunities, and his or her social surroundings. In addition, this section contains a discussion of the psychological and sociological theories of poverty and how they contribute to academic disparities for academically gifted, poor, African American male college students.

Defining Poverty

For the purpose of this case study, the benchmark set forth by the USDHHS (Table 1) was utilized to measure poverty for the participants in the study. "The original definition of poverty provided a range of income cutoffs or thresholds adjusted by such factors as family size, sex of the family head, number of children under 18 years old, and farm-nonfarm residence" (U.S. Census Bureau, 2010b, para. 4). This study used the 2009 poverty rate reported for Texas by the U.S. Census Bureau (Table 2) to evaluate the eligibility of participants on this criterion. While federal guidelines for defining poverty have been criticized continuously for being too low, they remain one of the sole methods used by the states to indentify poverty (Citro & Michael, 1995). Some of the reasons indicated for the criticisms include the notion that the guidelines do not cover such basic needs as housing, food, and clothing (Citro & Michael, 1995; National Center for Children in Poverty [NCCP], 2005).

Table 1

The 2009 National Poverty Guidelines, U.S. Department of Health and Human Services

Size of family unit	48 contiguous states[a],	Alaska	Hawaii
1	$16,245	$20,295	$18,690
2	$21,855	$27,315	$25,140
3	$27,465	$34,335	$31,590
4	$33,075	$41,355	$38,040
5	$38,685	$48,375	$44,490
6	$44,295	$55,395	$50,940
7	$49,905	$62,415	$57,390
8	$55,515	$69,435	$63,840

Note. For families with more than 8 persons, add $3,740 for each additional person. From *American Community Survey: Selected Poverty Measures*, by U.S. Census Bureau, 2005, retrieved from http://www.census.gov/hhes/www/poverty/about/overview/measure.tml

[a]Includes District of Columbia and outlying jurisdictions.

Theories of Poverty

Psychological theories focus more on behavior by the individual, while sociological theories of poverty emphasize the role of the social environment. A sociological view of poverty is reflected in Rank's (2005) book *One Nation, Underprivileged,* in which he argued that the cause of poverty lies not within individual failings but within the structural failings of American society. He contended that there is an implicit assumption in the American ethic of individualism and its emphasis on self-sufficiency, namely the myth that the rich are hard working and deserve their rewards while the poor are impoverished because of personal inadequacies.

Table 2

Numbers and Percentages of People in Poverty (Below Federal Guidelines) in the United States and the Most Populous States, 2008 and 2009

Area	2008		2009	
	n	%	*n*	%
California	4,813,999	13.4	5,128,708	14.2
Texas	3,791,560	16.0	4,150,240	17.2
New York	2,616,642	13.8	2,691,757	14.2
Florida	2,384,852	13.3	2,707,925	14.9
United States	39,328,443	13.3	42,868,163	14.3

Note. From *Income, Poverty, and Health Insurance Coverage in the United States: 2009*, by U.S. Census Bureau, 2010a, retrieved from http://www.census.gov/prod/2010pubs/p60-238.pdf

There are several reasons why poverty continues to be a critical issue in the United States. According to Lampman (1971), "The first hardship that often accompanies poverty plainly has adverse effects on individuals' physical and psychological well-being" (p. 31). This concept was explained in a study conducted by Lichter and Crowley (2002) that indicated that children raised in poor families were less healthy and worse off in terms of cognitive development, school achievement, and emotional well-being. For example, poor adolescents were more likely to have low self-esteem, act out antisocial behaviors, and become delinquent. Lichter and Crowley contended that some of the harmful effects of poverty are due to low income, while some result from other family conditions that often accompany poverty, such as family instability and low levels of education.

The Culture of Poverty

The culture of poverty is both an adaptation to and a reaction of the poor to their marginal position in a class-stratified, highly individuated, and capitalistic society (Lewis, 1959). As a theoretical position, the "culture of poverty" is profoundly connected to both hopelessness and alienation (Lewis, 1959). Unfortunately, in society today, there is a forgotten subculture of poverty that millions of the nation's poorest people share. Hence, the idea of poverty stems from a stratified capitalist system that, primarily through the agency of family, works to maintain poverty as a long-term condition of those who are impoverished (Lewis, 1959).

> One can speak of the culture of the poor, for it has its own modalities and distinctive social and psychological consequences for its members. It seems to me that the culture of poverty cuts across regional, rural-urban, and even national boundaries. (p. 2)

The psychological and social classifications of poverty must be examined beneath the superficial component of being poor but must also be examined by taking into account the interlocking variables that ultimately contribute to the problem of why people are impoverished (Lichter & Crowley, 2002).

Psychological Theory of Poverty

According to Turner and Lehning (2006), "Until 1980, psychological theories of poverty emphasized the role, the individual or group to explain the causes and impact of poverty" (p. 2). This summary provides insight into the causes and impact of poverty as it relates to the field of psychology. First, it examines poverty within the internal frame of "the mind and behavior of the individual or group" (p. 2). Second, it addresses poverty from an external frame that seeks to explain "the sources of poverty within the individual without examining the structural forces affecting the poor" (p. 4). Although some believe that poverty is a product of biological inheritance, many believe that intellectual capacity is not a measurable construct of whether or not one is impoverished

(Turner & Lehning). Therefore, the question becomes: how does one validate intellectual testing even though it does not gauge an accurate measure of social status? While some researchers do not believe that poverty is a matter of intellectual capacity, others try to attribute the issue of poverty to language (Renchler, 1993; Slavin, 1998; Turner & Lehning).

Moreover, social theorists have utilized psychological theories, particularly those of Freud, to explain the circumstances of impoverished people (Turner & Lehning, 2006). Because Freud believed that impoverished people were childlike and that they needed to be taken care by the government, people operating from Freud's perspective tended to blame impoverished people for their own situations. These ideas can be seen in the utilization of McClelland's (1961) need for achievement theory and Weiner's (1986) social attribution theory, the latter of which posits that people attribute success to themselves and attribute their failures to an external influence outside of self. Thus, these theories are often framed from a deficit perspective, which suggests that people place themselves in their own impoverished circumstances. To address this issue, society must look past blaming people for their situations and begin to examine the various social, cultural, and political factors that contribute to the status of poverty.

Sociological Theory of Poverty

Poverty, like all social interaction, is defined in terms of the society in which it takes place; "the essence of poverty is inequality and the basic meaning of poverty is relative deprivation" (Valentine, 1968, p. 14). Sociological studies of poverty focus on "social forces, cultural groups, social systems, and the values, beliefs, and aspirations of individuals" (Lehning, 2006, p. 3). Sociological theories explore the multiple levels of social interaction and how communities are impacted by poverty. This conceptualization of poverty explores the environmental impacts of poverty on urban communities.

Harrington (1962), in *The Other America,* examined policy and scholarly inquiry of the issues concerning poverty. Harrington noted that the "increasing racial segregation in inner-city neighborhoods is a result of the structural and cultural racism that exists in the United States" (p. 6).

Harrington (1962) viewed "social forces to be primary causes of poverty" and explained how "low-income status impacts poor neighborhoods" (p. 6), as well (more important) psychological development. Harrington contended that the frame of reference regarding poverty is perpetuated by these individuals because of their surroundings. Another issue seen with these social constructs is the issue of racial segregation within communities, which perpetuates the spatial mismatch theory (Lehning, 2006). Inner-city neighborhoods are faced with social problems (e.g., levels of crime and violence) that often trap the community within a cycle of crime. Because sociological theories of poverty are multilayered, it is difficult to grasp a clear conceptualization of the true issues surrounding poverty. According to Lehning (2006), "The sociological approaches to understanding poverty features the interaction between behaviors and surrounding systems at the individual, family, neighborhood, and policy levels" (p. 19).

Understanding the Term *Poverty* in the United States

The term *poverty* is often defined in specific terms; however, the term is sometimes vaguely defined relative to levels of poverty. The concept of SES is also commonly used as a reference to relative financial standing with regard to income, level of education, employment, health care coverage, and access to resources (Burney & Beilke, 2008). The notion of determining who is poor in America began in the late 1960s when the federal government attempted to develop an annual poverty count. As a result, the federal government sought to define measures of poverty based on the poverty thresholds of families and the predetermined poverty guidelines (Table 1).

The original version of federal poverty measures was based on poverty thresholds developed by Mollie Orshansky, an employee of the Social Security Administration. Orshansky's vision was to use thresholds as a statistical means of estimating the number of Americans in poverty each year. Specifically, the thresholds disaggregate families' poverty levels on the basis of demographics (e.g., race, SES, type of residence). Another method utilized to measure poverty is application of the poverty guidelines issued in the *Federal Register* by the USDHHS. These poverty guidelines serve an administrative function. For example, the guidelines are used to determine financial eligibility for several federal programs. Essentially, both the poverty threshold and poverty guidelines seek to identify a range within which the poverty line exists. Nevertheless, criticism and controversy regarding these measures of poverty remain. According to Fisher (1992), the criticisms of the measures of poverty include the following: (a) The guidelines have never been updated to account for changing household consumption patterns; families no longer spend one third of their income on food and two thirds on other basic needs; (b) the guidelines fail to take into account the extra costs of two-earner families, such as clothing, transportation and, perhaps most important of all, childcare; and (c) the guidelines do not recognize geographic differences, even though the cost of food, clothing, and housing varies from state to state and within states.

Despite these criticisms, these parameters continue to collectively define poverty at a national level. The USDHHS takes several factors into consideration to determine whether a family is living in poverty: (a) If a family's total income is less than the family's threshold, then that family is considered low income; (b) the official poverty thresholds do not vary geographically but are updated for inflation using the Consumer Price Index (CPI); and (c) the official definition of poverty uses income before taxes

and does not include capital gains or noncash benefits (e.g., public housing, Medicaid, and food stamps).

The aforementioned criteria determine whether a person or family is eligible for assistance through various federal programs. For example, the Free and Reduced Price Lunch program is used as an indicator of poverty. Students whose families have incomes of 130% or less of the federal poverty guidelines are eligible for free meals at school and students whose families have incomes 131% to 185% of the poverty guidelines are eligible for reduced-price meals (Burney & Beilke, 2008).

Unfortunately, level of income does not adequately address the various distinctions between families with increased resources and families without them. According to Rothstein (2004), the length of time the family has been in poverty, other family assets such as home ownership or a college savings account, and the poverty level of the family affect academic achievement and performance by students. Poverty cannot be defined based on statistical findings alone; the perceptions and experiences that individuals have about poverty provide critical insight into how educational researchers should seek to understand the multiple dimensions of poverty. According to the National Center for Education Statistics (2009), a family is considered "working poor" if all family members ages 15 and over meet the following criteria: (a) they have a combined work effort of 39 weeks or more in the prior 12 months, or (b) they have a combined work effort of 26 to 39 weeks in the prior 12 months and one currently unemployed parent is in the process of looking for work. In a national comparison, Texas workers were slightly more likely to have lower wages than the U.S. average and rank near the bottom in terms of access to job-sponsored benefits (U.S. Census Bureau, 2009). For instance, in Texas, as in many other states, the working poor often find lack of available resources to be a barrier to taking advantage of educational opportunities.

According to Swail (2000), education has a powerful impact on the individual, the family, and society at large, and it is one of the best ways to overcome poverty. However, poverty remains one of the most influential factors affecting the educational outcomes of students, particularly African American males. In a study conducted by Toldson (2008), African American students who decided to leave school were from families that made less than $20,000 per year. Entwisle, Alexander, and Olson (2005) claimed that, by the time a student enters kindergarten and first grade, achievement gaps between poor students and their more affluent counterparts in reading and mathematics are already present. It is evident that a family's financial status has a significant effect on the education attainment of the child. Yet there remains a shortage of research that focuses on the impact of poverty and its intersectionality with academic achievement and race.

Intersection of Poverty and Race

The notion of poverty has to be understood both as a painful reality experienced by millions of human beings and as a construct of competing conceptualizations, definitions, and measures (Wagner, 1995). Cotter (2002) stated that, "since 1960s poverty has been treated in scholarly research, public policy, and popular culture as a largely urban, mostly Black problem" (p. 534). With this in mind, the intent of this section is to provide a frame of reference to understand how poverty and race intersect. This section reports on critical scholarly research that focuses on the effect of SES and graduation rates, the absence of low-income students in rigorous academic programs, and college outcomes for African American students from low-income families.

According to Bowen and Bok (1998), African American students who have a lower SES tend to have lower graduation rates than their White counterparts. Research has shown that students from lower-income families may be less academically prepared

for the rigor of college due to limited access to high-quality schools and other educational resources (Bowen & Bok, 1998). Only 47% of all low-income young adults are participating in postsecondary education. As seen in recent literature (Cunningham & Santiago, 2008; Engle & Tinto, 2008; Pell Institute, 2004), low-income college students face greater academic and financial risks than their middle- and upper-income counterparts. St. John (2004) reported that African American freshmen were more likely to persist to their sophomore year if they receive increased amounts of financial aid. Financial indicators affect college persistence, particularly for African American students from lower-income families. Consequently, socioeconomic factors (e.g., family income status, available financial aid, and necessity for the student to work while attending college) contribute significantly to the disparity of collegiate outcomes for students from diverse backgrounds (St. John, 2004).

Students from low-income minority groups are often underidentified and underrepresented in rigorous academic programs (Newberg, 2006). Thus, few children from high-poverty schools get the education needed in their early years that would prepare them for the advanced curriculum that they need for college preparation (Kozol, 1991; Newberg, 2006). Braxton, Milem, and Sullivan (2000) advocated for more research-based programming in developmental services to help African Americans to thrive in collegiate settings. According to Bonner (2001b), it becomes increasingly important for the gifted African American male to focus on how the multiple statuses as poverty and giftedness intersect. Essentially, postsecondary institutions' environmental influences on the educational experiences of gifted African American college students are consistently lumped into the literature on African American males (Bonner, 2010a). However, they need to be examined as a subpopulation of the larger category of African American college students.

Poverty is a multifaceted social condition that requires a "reformulation of our traditional views of identifying and serving gifted children" (Bank & McGee-Banks, 2001, p. 370). Specifically, the exploration of the intersection of poverty and race should be examined to understand the academic outcomes of academically gifted African American males. Banks and McGee-Banks (2001) conveyed the notion that giftedness is not impacted by only a single factor; instead, they maintained that high achievement is a result of dynamic relationships among social, economic, and academic factors.

There is no question that high academic achievement in high school increases the likelihood of the attainment of a postsecondary education (Burney & Beilke, 2008), thereby increasing the lifetime earning potential of students. Burney and Beilke contended that "increased education is what will allow students to escape poverty and limitations poverty creates for themselves and future generations" (p. 190). Banks and McGee-Banks (2001) explained.

> While factors such as the intellectuality of the home may not be associated with any particular cultural or ethnic group, one's socioeconomic status is a constraint on one's ability to provide a home environment that is sufficiently stimulating to the gifted child. (p. 130)

With regard to academically gifted, poor African American males, it is increasingly important to look at their situations holistically (Bonner, 2010b). Some researchers (Bombi, 2002; Weinger, 1998) have accepted that any definition of poverty must be understood, at least in part, in relation to particular social, cultural, and historical contexts. The recent research on the intersectionality of socioeconomic factors, environmental climate, and the student's ability to achieve academically has emerged as a vital area of educational research (Bonner, 2010b). While nationally the numbers of college-going students has increased, there remains a substantial gap in the enrollment rates between low-income students and students from middle- or upper-income families (National Center for Education Statistics [NCES], 2009). For instance, among the

highest academically qualified, only 47% of low-income students went on to attend a 4-year institution of higher education, compared to 67% of high-performing, high-income students (Advisory Committee on Student Financial, 2002).

Financial Factors and Paying for College

During the 1960s, the federal government attempted to increase educational opportunities for African Americans through policy initiatives such as the Civil Rights Act of 1964 and the Higher Educational Facilities Act (Lucas, 1994). These acts increased funding for student financial aid and provided federal incentives to follow federal mandates and penalties for failing to follow them. The national government sought to extend its efforts by "dictating an increased commitment to social justice and education opportunities for all students" (Thelin, 2003, p. 16). Federally supported programs were not the only efforts extended to African Americans as they attempted to obtain access to higher education. The affordability of college is a major source of anxiety for African American male students and their families (Hossler, 2000). Since the mid-1970s, there has been a decrease in the number and amount of grants and an increase in the number and amount of loans available to students as a means to pay for their college education (Hossler, 2000). According to King (1999), 36% of African American families are unable to make financial contributions to their children's college costs. The expected family contribution for African American males is significantly lower than that for their White counterparts (Polite, 1999).

Decreases in available grant aid have required students to use federal loans to pay for their postsecondary education. This shift in federal aid programs has caused an increase in financial responsibility for the students and their families (Hossler, 2000). Thus, financial constraints play a key role in college degree attrition (St. John, 2000). Only one quarter of African American male students who enroll in postsecondary

education actually obtain a bachelor's degree (Pathways to College Network, 2003). In order to examine the linkages between financial aid and degree obtainment, the financial nexus model was used. Essentially, this model asserts that students' perceptions of college cost and the actual dollar amount of cost and aid available may affect the students' ability to complete degrees (Paulsen & St. John, 2002).

Price (2004) claimed that there is a social responsibility to provide equality of access in the higher education system, regardless of the discipline in which a student wants to study. He discussed a new form of racial and economic inequality that is currently an obstacle to the completion of a college education by African American males. Price stated that student loans place an excessive debt burden on African American males, which has continued the economic and academic stratification of this student population. Academic issues among academically gifted, poor, African American male college students intersect with social, cultural, and financial obstacles, making the examination of poverty within the African American male population difficult.

While loans provide some students with a financially secure method of paying for college, they can be an obstacle for others. The disproportionate shift from grants to student loans has created a social and class delineation among students who attempt to fund their college education According to Des Jardins, Ahlburg, and McCall (2002), loans were significant and perceived as positive during their freshmen year but as the students progressed in classification, loans were seen negatively and as a deterrent to advance to college completion. Conceptually, the main purpose of financial aid is to provide educational opportunities to all students who choose to attend college. However, financial aid policies essentially currently lend money to students in subpopulations that have low graduation rates which, if they do not graduate, accumulate debt. This is not to

suggest that financial aid policies are to blame for the lack of student success, rather it suggests that policymakers must remain cognizant of student demographics, particularly poor students and how finances influence their ability to afford college and persist to degree completion.

The Multidimensionality of Academically Gifted, Poor, African American Male Identity Development

The literature on African American males reveals several issues that continue to impede African American male students from completing degree requirements at PWIs (Bonner, 2001b, 2010a; Fries-Britt, 1998). Within the context of these studies, several influential scholars (Bonner, 2010b; Conchas, 2006; Cuyjet, 1997; Herbert, 2002) have provided foundational contexts for studying gifted poor African American male collegians. Bonner and Bailey (2006) claimed that, "establishment of a positive identity for the African American male student is significant in that it serves as the foundation upon which the student can develop some sense of agency and in turn determine where he 'fits' within the academy" (p. 28). King (2000) stated, "African Americans have made considerable gains over the past 30 years across a broad spectrum of achievement indicators; however, African American males have made less progress than females, particularly with respect to participation in postsecondary education" (p. 417).

Essentially, the problems that academically gifted, poor, African American males encounter in higher education deal with issues of both academic and social adjustment to the college environment. King noted that, "while education-related gender disparities exist for African Americans from all income levels, they are especially striking for individuals from low socioeconomic status" (p. 417). The experiences of gifted poor African American males in higher education are reflective of broader institutional and social problems in the structure of the education system. For instance, the "increasingly

high rates of death, incarceration, and unemployment, and relatively low levels of college graduation rates [of African American males]" (Henry J. Kaiser Family Foundation, 2006, p. 14) have raised academic and developmental concerns for this student population. Bonner and Hughes (2007) stated, "The gifted African American male in poverty is in many ways much like a jigsaw puzzle with interlocking pieces" (p. 5).

> While each piece on its own does not provide enough vivid detail to capture the entire picture, each constitutes a necessary part of the whole. It is impossible to develop some form of understanding related to identity and identity development among this population without considering how each one of their statuses impacts how they construct a nuanced "sense of self." (p. 4)

Thus, the academic experiences of academically gifted, poor, African American males are contingent on the academic and social components of their college experience. Each piece of the jigsaw puzzle that makes up the experiences of the African American male must be examined as an integral factor in their academic success. Gifted African American males find that their identity development, particularly their racial identity development, influences their achievement, motivation, and attitudes toward school (Ford, 2003; Grantham & Ford, 2003).

Tinto's Student Integration Model

Researchers have used important aspects of Tinto's academic and social integration theory in their development of a psychological framework with which to understand the college transitional experiences of students (Allen, 1998; Tierney, 1992). However, a number of researchers have found shortcomings in Tinto's work on persistence with regard to its application for students of color (Allen, 1998; McLeod & Young, 2005; Tierney, 1992). The complexity of student development makes it difficult to prove the validity of one psychological or sociological theoretical model over another (Evans, Forney, & Guido-DiBrito, 1998). Tinto's study emphasized the centrality of the classroom experience and the imperative for institutions to create a climate in which

multiple college communities can thrive (Tinto, 1993). According to Tinto, the lack of student connection to an institution's social and academic life is especially damaging to retention efforts.

Tinto (1993) found that the fragmentation of the curriculum, the lack of closeness with faculty and staff, and the lack of institutional programs were contributors to a low-quality academic experience for students. He affirmed that African American students face unique challenges to become more academically and socially integrated at PWIs because their norms and values may be incongruent with those of the White majority. Tinto noted that social integration influences persistence decisions for African American students as much as for White students and that incongruence with social norms often makes it difficult for African American students at PWIs to "become a member of a supportive community within the college" (p. 74).

Several researchers have challenged Tinto's model because of its limited applicability to minority students (Hurtado & Carter, 1997; Tierney, 1992). Hurtado and Carter indicated that Tinto's model fails to value culturally supportive substitutes for college integration. They contend that Tinto's integration theory overemphasizes the mainstream culture and fails to acknowledge other cultural groups. Braxton et al. (2000) revisited Tinto's model in terms of institutional and peer support. They concluded that it would be beneficial for research to study different student racial and ethnic groups. Their studies presented findings that suggest a need for colleges and universities to consider different approaches to affecting the academic lives of their African American male students.

Allen (1998) reported that it is vital for PWIs to meet the needs of all students, including providing integration programming for African American males. Allen's study emphasized the importance of academic and social integration for African American

male students on predominantly White campuses and its impact on their persistence. Concepts of academic and social integration are equally important when exploring issues concerning college departure and African American male students (Kobrak, 1992).

> Academic integration (as measured by such variables as grade, intellectual development, and contacts with faculty) had its strongest positive influence on persistence or degree attainment for students at the lowest levels of social integration (as measured be such variables as extracurricular involvement and inform interaction with peers). As a student's level of social integration increased, the importance of the student's academic integration for degree attainment diminished. (Pascarella & Terenzini, 1991, p. 411)

Research focusing on how institutional systems and the campus environment affect African American male students in postsecondary education is increasing with the continuous growth of the academy. In particular, the connection between institutional support and academic achievement has become an important topic of investigation (McLeod & Young, 2005).

Scholar Identity Model

For academically gifted African American males, developing a cohesive sense of self is an essential part of establishing a scholar identity. According to Whiting (2006b), African American males who view themselves as student of higher learning, as studious, as competent and capable, and as intelligent or talented in school settings have developed a positive scholar identity. The scholar identity model provides a frame in which African American males can develop a stronger sense of their academic abilities. To facilitate the use of the model, Whiting outlined four propositions: (a) African American males are more likely to achieve academically when they have a scholar identity, (b) African American males are more likely to be viewed by educators and families as gifted or highly capable if they achieve at higher levels, (c) the achievement gap cannot be closed nor African American males placed at promise for achievement without a focus on their academic identities, and (d) the earlier the focus on the scholar

identities of such males, the more likely there will be a generation of African American scholars who are in a position to break the negative cycle of underachievement.

Whiting (2006b) noted that it is vital that educators seek effective ways to identify giftedness and potential in African American male students. Whiting used nine distinctive characteristic and four interactive factors to illustrate how African American males can develop a strong sense of academic identity. He began his model with the notion of self-efficacy, which establishes the foundation for the other characteristics. Self-efficacy, according to Bandura (1977), is one's beliefs about one's capabilities to produce effects. Students who perceive themselves as higher achievers are compelled to perform at a higher level (Whiting, 2006b). For instance, Whiting maintained that an African American male student's performance in school is connected to his perception of his academic self-worth.

Whiting proposed that the African American male's scholar identity is developed by each of the following characteristics: (a) self-efficacy, (b) future orientation, (c) willingness to make sacrifices, (d) internal locus of control, (e) self-awareness, (f) need for achievement greater than need for affiliation, (g) academic self-confidence, (h) racial identity, and (i) masculinity. Figure 4 illustrates this proposition.

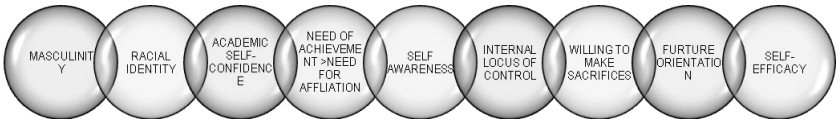

Figure 4. Whiting's Scholar Identity in African American Males. From at Risk to at Promise: Developing Scholar Identities Among Black Males, by G. Whiting, 2006b, *Journal of Secondary Gifted Education*, *17*, 222-229.

Because of the conceptual nature of Whiting's model, he provided (Whiting, 2006b) two important caveats concerning the implication process of the scholar identity model. First, he recognized that most of the characteristics may be universal among high-achieving students, regardless of gender and race. However, the racial identity and masculinity components make it more specific for African American males. Second, Whiting noted that the model is not based on the developmental processes of students and is thus not age bound. "Developing a scholar identity should begin as early as possible and our efforts must be ongoing" (p. 223).

Whiting's model (2006b) emphasizes the notion that African American males with a scholar identity do not consider the idea of being considered intelligent, studious, or talented as negative perceptions. Whiting claimed that African American males who are identified as scholars truly believe that being gifted or intelligent does not detract from their sense of masculinity or manhood. It was Whiting's intention that development of the African American male's scholar identity be a lifelong process that ultimately seeks to combat the various educational and social issues that African American males experience in higher education.

Social Influences on African American Male Students

In order for academically gifted, poor, African American males to succeed in college, it is imperative to explore the impact of social influences on their perceptions of academic success. However, academic identity development is more complex for minorities, particularly minorities who battle negative stereotypes about their intellectual capacity (Howard & Hammond, 1985). Unarguably, African American males, as a group, experience several difficult and unique challenges that impact their college experience. For some African American students, being labeled "gifted" often comes with challenges from within and outside their cultural groups. For example, gifted

African American students are often ridiculed by their African American peers as "acting White" or not being Black enough because of their gifted status (Bonner, 2000; Fordham, 1988; Fordham & Ogbu, 1986).

Cooley et al. (1991) noted that gifted African American students have the challenge of integrating their racial identification into their self-concept and determining what it means to have been identified as gifted. Powell (1990) provided a conceptual framework for understanding African American students' avoidance of engineering disciplines of study. Both concepts are framed based on the perception of the students' cultural and academic outlook. Fries-Britt (1998) stated that the stigma associated with being poor, gifted, and Black results in isolation from both the Black community and the White community. As a result of increased isolation, academically gifted, poor, African American males are in danger of withdrawing from academic settings (Fries-Britt, 1998).

Several researchers have contended that peer relationships are an essential element in promoting academic success in African American students; however, such relationships can also negatively influence achievement (Gibson, 2005; Hubbard, 2005; Newman & Newman, 1999; Palmer & Gasman, 2008). For example, African American students who have low ambition to perform academically often pass their low educational expectations to their peers (Hubbard, 2005). According to Hubbard, African American high achievers are often discouraged from completing school and homework, using Standard English, enrolling in honors/AP courses, or pursuing higher education in general because such choices increase their chances of being taunted by peers for acting White. Previous research studies have indicated that the accusation of "acting White" is associated with lower academic achievement among African American male students (Gibson, 2005; Hubbard, 2005). As a result, many African American male students who

are actually high achievers may "camouflage" their achievements because they feel that it is a necessity to do so to fit in with their peers (Horvat & Lewis, 2003). W. E. Cross (1978) emphasized the importance of "cultural border crossing."

> The academically successful African American male student exhibited high levels of academic self-concept, verbal acuity, and ranked relatively high in his graduating class. Moreover, he was able to work in a culturally diverse environment, indicating his ability to culturally assimilate. (p. 116)

In essence, high-achieving African American males often find it necessary to choose between maintaining a sense of commonality with their peers and excelling academically (Hubbard, 2005). Successful African American males who attend PWIs utilize strategies that enable them to perform "the balancing act" adeptly, which allows them to negotiate and navigate strategically between multiple social spaces (Phelan, Yu, & Davidson, 1994).

For African American males, family support is a social factor that has been thoroughly examined, and research indicates that parental support plays a significant role in achievement and persistence (Bonner, 2000, 2001a; Davis, L., Johnson, Cribbs, & Saunders, 2002; Gaylord-Harden, 2008; Hubbard, 2005; Jay & D'Augelli, 1991; Mandara, 2006; Newman, P., & Newman, 1999; Palmer & Gasman, 2008; Pollard, 1993; Powell & Arriola, 2003; Rodgers & Rose, 2001; Smokowski, Reynolds, & Bezruczko, 1999; Somers, Owens, & Piliawsky, 2008; Walker & Satterwhite, 2002). According to Smokowski et al. (1999), parental influences play a significant role in encouraging academic achievement. According to J. L. Moore (2006), "African American parents have the capability to positively influence their children . . . [and] . . . instill in their African American son, at an early age, the importance of education and their expectations of academic excellence" (p. 262). Russell and Atwater (2005) noted that African American students participating in a science pipeline program achieved at greater levels when motivation and encouragement came from parents and family.

Specifically, both of those studies defined parental involvement as consistently providing academic, emotional, and physical support to their children (Plybon, Edwards, Bulter, Belgrave, & Allison, 2003).

On the one hand, previous research has revealed that some African American parents choose not to participate in their child's educational pursuits (Hubbard, 2005). On the other hand, Smokowski et al. (1999) stated that parental guidance is one of the vital contributing factors to the success of African American students. They contended that parental guidance provides African American students with the ability to make wise decisions and keeps them on the path to academic success.

Ultimately, parents play a vital role as a continual support network for academically gifted, poor, African American males as they navigate the educational process. The combination of high parental expectations, firmness, encouragement, support, and continuous follow-up is valuable in aiding African American males to find their way through the various levels of the educational pipeline (Moore, 2006).

Academic Influences on African American Male Students

Peer Interactions. According to several academic researchers, college students spend a majority of their time with their peers; therefore, peer influences significantly impact the lives and academic performance of college students (Gibson, 2005; Horvat & Lewis, 2003; Hubbard, 2005; Newman & Newman, 1999; Somers et al., 2008). Moreover, peer cohesion among college students increases their chances of obtaining a college degree (Astin, 1993). Astin asserted that there is a strong link between positive peer interaction and college success. Specifically, the likelihood of college success increases with students who are able to navigate the campus climate despite incongruence in social values, norms, behaviors, and attitudes on campus (Astin, 1993).

Peer influence among college students can be positive or negative. Singham (2003) indicated that peers can have a negative influence on educational aspirations. Ogbu (2003) stated that academically gifted African American male students who disengage academically do so to gain group acceptance. Thus, high-achieving African American males must learn to reshape their self-concept and balance peer relationships to accommodate their own academic development (Barclay, 2001; Brookins, 2000). For instance, participating in on-campus activities can foster peer cohesion (Pascarella & Terenzini, 1991). For African American males, when compared to their White counterparts, campus involvement more often than not yielded positive effects on graduation rates (Pascarella, 1985). In addition to on-campus activities, peer support plays an integral role in the process of students motivating students. For example, African American students who engage in pre-college programs have demonstrated a positive relationship between peer interaction and academic achievement (Hubbard, 2005; Palmer & Gasman, 2008). Still other sources of support have been noted to be important for African American college students.

Faculty Support. African American male students' interactions with faculty members is an essential element in their successful transition to the college environment. Students of color who are emotionally connected with faculty and/or staff members in the institutional environment have higher retention rates (Grier-Reed, Madyun, & Buckley, 2008). African American students often look to faculty to be mentors or to serve as role models throughout their college career. Palmer and Gasman (2008) found that role models/mentors played a fundamental role in the academic development of African American male students. Particularly, several of the male participants in their study articulated that they admired their professors, with whom they shared interests. Moreover, the participants expressed the view that having faculty members from their

racial/ethnic background produced a greater sense of self-efficacy (Palmer & Gasman, 2008). African American males who have faculty members who care for, support, and encourage them are more likely to report positive self-confidence in their academic performance (Russell & Atwater, 2005).

African American males who interact with faculty members who are African American tend to develop a stronger ability to cope academically with college rigor (Frank, 2003). Frank contended that African American students aspire to achieve the status of their African American mentors; thus, faculty who are mentors act as academic, social, and career guides for this student population. Grier-Reed et al. (2008) reported a correlation between social support and overall success and preservation in African American college students. Faculty mentors can be inspirational to African American college students by motivating, encouraging, advising, and acting as role models (Allen & Smith, 2008). Unfortunately, few research studies have examined the relationship between academically gifted, poor, African American college students' achievement and the influence exerted by faculty members, if any, on their college success (Moore, Ford, & Milner, 2005). Future research studies should determine the role of faculty influence of motivation and encouragement as it pertains to academically gifted, poor, African American male college students.

Institutional Influences on African American Male Students

According to Bonner (2010a), "The higher education environment described by African American males, particularly those who attend predominantly White institutions, has been viewed as at best chilly and at worst downright hostile" (p. 30). The most vital factors in the academic and social development of African American collegians on predominantly White campuses include institutional environmental factors, such as campus climate and the institutional ecosystem (Bonner & Evans, 2004). Too often,

gifted African American males find themselves locked out of two worlds: the African American community and the White community. As a result, gifted African American males require support within and outside academic communities. The academic success of academically gifted, poor, African American college males starts within the context of the learning environment.

A study of collegiate survival by minority students by Nettles (1998) showed that White middle-class students found it easier to integrate into the academic and social structures of college campuses. Nettles noted that minority students are highly "visible" on campus and are thus often viewed as outsiders and isolated from the mainstream. Minority students often struggle not only to find a balance between their cultural development and the mainstream value systems but also to manage their own academic adjustment to the institution (Fries-Britt, 1998). While the degree of racial influences differed in each student's experience, the notion of race never left the discussion of college survival for African American males who attend PWIs (Nettles, 1998).

In order to understand and respect the multiplicity of identities with which students grapple, it is critical to recognize that "participants perceive identity dimensions as both externally defined and internally experienced, and also influenced by different contexts" (Jones & McEwen, 2000, p. 452).

> College and universities must be cognizant of who these African American students are and what they bring to the institutional context. Institutions must not assume that social integration processes are the same for African American and White students. In essence, the social integration experience for these collegians must be purposeful, exhibiting an institutional willingness to explore differences honestly. (Bonner & Evans, 2004, p. 13)

Learning environments should support the multifaceted developmental needs of African American college students to help them to address identity issues related to race, ethnicity, culture and SES.

African American College Students and HBCUs. According to the USDOE (2008), HBCUs are institutions of higher education with 40% of the student population classified as African American. The Department stated that the purpose of HBCUs is to strengthen the African American community by providing educational programs to prepare future generations for anticipated global challenges. HBCUs remain environments in which African American students could come and learn and get the engagement, support, and acceptance needed for healthy intellectual growth (Harper, 2006).

The connection between institutional support and academic achievement has become an important topic of investigation. Levels of institutional support for gifted African American students have a dramatic influence on the academic development and matriculation of this student population (Harper, 2010). Nevertheless, academically gifted, poor, African American male college students, as a whole, continue to be underrepresented in postsecondary education (Bonner, 2010b; Bonner & Bailey, 2006; Harper, 2010). In fact, poverty as a contributing factor adds yet another layer of complexity when examining the experiences of academically gifted collegiate African American males. Therefore, colleges and universities should become more proactive in their management of the holistic developmental processes of academically gifted, poor, African American male college students.

According to Kimbrough and Harper (2006), Black students who attend HBCUs perform better academically than Black students who attend PWIs, due to greater social involvement, acceptance, and increased faculty mentorship. Kimbrough and Harper detailed some of the negative experiences of African Americans while attending a PWI. For instance, African American students expressed concerns about the lack of cultural awareness at their institution. They reported that the faculty, staff, and student

populations did not view them as "full human beings with distinctive talents, virtues, interests, and problems" (Feagin, Vera, & Imani, 1996, p. 14).

> The HBCU has not only served as the exclusive avenue of access to higher education for African Americans with its promotion of a participatory ethos and an open door admissions policy, but it has also provided immeasurable benefits by way of student leadership potential and social development. (Patton, L., & Bonner, 2001a, p. 18)

Thus, HBCUs have provided and will continue to provide an avenue for increased educational opportunity for African American students seeking a postsecondary education in engineering disciplines.

African American College Students and PWIs. PWIs are institutions of higher education in which White students comprise 50% or more of the student population (USDOE, 2008). Historically, African American students chose to attend PWIs because they believed that these institutions increased their chances for social mobility (Cunnigen & Love, 1980). Cunnigen and Love contended that attending a PWI improved African American students' access to higher-paying jobs and increased economic security. Nevertheless, several studies have revealed that African American students attending PWIs have often felt alienated, isolated, and disengaged from the mainstream campus (Arbona & Novy, 1990; Loo & Rolison, 1986; Stage & Hossler, 1989).

The gap between the number of African American males entering PWIs and the number completing degrees remains consistent with the number reported in a 1970 study (Barr, 2000). One of the issues that resurfaces repeatedly concerning minorities and PWIs is that minority students often struggle not only to find a balance between their cultural development and the mainstream value system but also to manage their own academic adjustment to the institution (Graham & Gisi, 2000). Students who engage with and connect to campus life are more willing to take advantage of opportunities to secure academic membership and, consequently, enhance their likelihood of persistence

(Bonous-Hammarth, 2000). Thus, gifted African American male students' experiences on college campuses have a significant impact on their academic longevity, which could affect their potential graduation or departure from college.

Over the past decade, insight into academic and social experiences of African American male college students has been presented in two basic formats: quantitative and qualitative studies (Davis, 2004). Several researchers have provided data that identify elements that are critical to persistence in academic studies. In the early 1990s, several researchers and scholars contributed articles and edited anthologies that focused on the multitude of issues affecting African American students' interactions in the college environment (Davis, 2004). Pascarella and Terenzini (2005) conducted a 9-year study of attrition among African American and White students and found a significant positive association between academic and social integration and persistence in both groups of students. Their findings suggested that the educational outcomes of African American students are affected by their immediate environment. Thus, a culturally supportive campus is vital to the academic and social development of African American male students (Bonner, 2010b).

Moreover, learning environments should support the multifaceted developmental needs of African American college students to help them to address identity issues related to race, ethnicity, culture, and SES. This interaction is not limited to the formal academic setting but includes informal student-teacher interaction. Institutional interactions that affect the attitudes, behavior, and experiences of students seem to predict college completion (Nettles, 1998). Swail, Redd, and Perna (2003) contended that satisfied and academically integrated minority students have well-established peer relations and few interfering social or academic problems. Furthermore, these students tend to perceive the university as being nondiscriminatory and they perform well in their

courses (Swail et al., 2003). The classroom experience is essential to the academic development of African American males (McLeod, & Young, 2005; Morest & Karp, 2005; Tinto, 1993). The institutional structure has a dramatic influence on the academic development and matriculation of African American male college students on predominantly White campuses (McLeod & Young, 2005).

STEM Education

The NSF defines STEM disciplines in broad terms, including not only common categories of mathematics, natural science, engineering, and computer and information science, but also such social/behavioral sciences subjects as psychology, economics, sociology, and political science. However, recent federal and state legislative efforts have sought to focus on STEM education in mainly mathematics, natural science, engineering, and technologies (Green, 2007). In 2005, three preeminent U.S. scientific organizations (National Academy of Science, National Academy of Engineering, and Institute of Medicine) collectively called for strengthening the STEM pipeline (National Academy of Science, 2005). Essentially, the organizations maintained that the nation's demographic changes and the inability of the United States to maintain its global competitive position were key reasons to refocus on STEM education.

According to U.S. Census Bureau (2008) projections, the populations of minority groups are expected to increase rapidly in the next 40 years. The Bureau estimated that, by the year 2050, minority groups will comprise 50% of the U.S. population, while the proportion of Americans classified as White will decrease. Now more than ever, it is vital to reduce educational inequalities that continue to decrease opportunities for college degree completion, especially in the STEM disciplines. In the past decade, the United States has faced more global competition in scientific and technological innovation from such emerging countries as India, China, and Japan (National Science Board, 2010).

According to a report from the National Science Board (2010), governments in Asian nations have continued to build more knowledge-intensive economies backed by growth in science and engineering infrastructures, expansion of research and development, and expansion of higher education systems. Researchers have warned that the United States is in a state of educational emergency.

> What is needed is a sense of urgency among policy leaders, educators, and business leaders comparable to the policy emphasis that other countries are placing on higher education—as reflected in shifting international rankings. . . . The current level of performance will fall short in a world being reshaped by the knowledge-based global economy. Our country . . . needs to educate more people with college-level knowledge and skills. (Callan, 2006, p. 5)

Unfortunately, the method of improving the K-12 system remains one of the most politically and socially complex processes discussed in politics. In his 2009 speech about the future of America's leadership, President Obama proclaimed,

> The key to meeting these challenges—to improving our health and well-being, to harnessing clean energy, to protecting our security, and succeeding in the global economy—will be reaffirming and strengthening America's role as the world's engine of scientific discovery and technological innovation. And that leadership tomorrow depends on how we educate our student today, especially in those disciplines that hold the promise of producing future innovations and innovators. And that's why education in math and science is so important. (Line 31)

While the goal remains to improve the quality of education and increase the learning opportunities for all students, there remains an inequitable educational system based on social and racial divisions. Research has shown that the education system has historically been less responsive to and supportive of the needs of African Americans (Harvey, 2008; Moore & Owens, 2008).

Persistence in STEM. Recent studies have highlighted the importance of examining persistence in college students of color (Moore, 2006). Moore's study of African American male students engineering as a major focused on the impact of the students' academic experiences as a factor in persistence. In many cases, insufficient

academic preparation in science and mathematics at the early levels of education influenced African American male students' scholastic trajectory (Moore).

The economic and social issues that academically gifted African American males encounter during college may also affect their persistence (Davis, 1994). In contemporary studies on persistence and STEM, there has been an increased emphasis on the importance of fostering persistence during the critical sophomore year (Gahagan & Hunter, 2006; Graunke & Woosley, 2005; Schreiner & Pattengale, 2000). The struggles that students tend to encounter during the sophomore year have been credited to the high level of attrition experienced in this population (Sanchez-Linguelinel, 2008). On one hand, Bowen, Chingos, and McPherson (2009) claimed that "nearly 44% of all college withdrawals occur after the second year" (p. 35). On the other hand, J. L. Moore and Herndon (2003) contended that, despite the multitude of challenges that academically gifted African American males in STEM face, they are inclined not to let negative experiences, attitudes, and perceptions hinder their academic development and goals.

African American Males and STEM. The educational difficulties that African American males encounter in elementary and secondary schools are not endemic to those educational setting (Noguera, 2006; Polite & Davis, 1994). For instance, African American males are far more likely to be underrepresented in gifted education programs or assigned to advance placement courses (Jackson, & Moore, 2006). In addition, African American males are more likely than other racial and ethnic group to be marginalized, stigmatized, and labeled with academic or behavioral problems (Jackson & Moore, 2006; Noguera, 2006). Furthermore, teachers and school counselors disproportionately track African American males into lower academic courses, while many of their White counterparts are placed in advanced courses that prepare them for

college placement in competitive institution and critical STEM disciplines (Epps, 1995; Haycock, 2006).

According to Noguera (2003), similar trends can be seen in the academic experiences of African American males in postsecondary educational environments. Levin et al. (2007) noted that in 2002 African American males ages 26-30 on average had 0.72 fewer years of education than their White male counterparts. African American males account for 4.3% of the total enrollment at 4-year higher education institutions in the United States—ironically, the same rate as in 1976 (Harper, 2006; Strayhorn, 2008). Some assumptions about the status of education for African American males in the United States are apparent based on these data. In addition to these dismal graduation rates, African American males received only 16.4% of all degrees conferred in science and engineering in 2008 (Table 3).

Currently, one of the major challenges is not merely to increase the college-going rates for African American males. It is also a challenge to create a clear K-16 pipeline in the engineering discipline for this student population. The United States can no longer afford to exclude segments of its population from educational opportunities. To create and maintain a competitive engineering workforce, education must become an equitable commodity. According to T. Howard (2007), increasing the number of African American males in engineering disciplines has important implications for America's competitiveness in the global marketplace because engineering disciplines are critical drivers of economic growth and development. Howard recommended that educators and policymakers consider encouraging the following changes to the education system: (a) improve teacher quality for underrepresented minority students, (b) encourage more African American males to enroll in college preparation courses, particularly in

Table 3

Bachelor's Degrees in Science and Engineering Awarded to All American Males and to African American Males in 2008 in the United States

Discipline	All males	African American males	
		n	*%*
Science and Engineering	246,663	15,034	16.4
All sciences	189,686	12,830	14.8
Agricultural Sciences	9,013	238	37.8
Biological Sciences	33,130	1,627	20.3
Computer Sciences	32,003	2,673	11.7
Earth, Atmospheric, & Ocean Sciences	2,558	45	56.8
Mathematics and Statistics	8,884	397	22.3
Physical Sciences	10,365	450	23
Psychology	21,302	1,966	10.8
Social Sciences	72,401	5,434	13.3
Engineering	56,977	2,205	25.8

Note. From *Bachelor's Degrees, by Race/Ethnicity, Citizenship, Sex, and Field, 2008,* by National Science Foundation, Division of Science Resources Statistics (Table C-14), retrieved from http://www.nsf.gov/statistics/wmpd/2008-12/pdf/tabc-14.pdf

mathematics and science, (c) hold lawmakers and Congress accountable for ensuring that minority students have access to appropriate resources to finance their college education, and (d) encourage more effective collaboration between colleges and local secondary schools to foster minority students' academic preparedness for college to reduce barriers to collegiate access and promote academic success.

Chapter Summary

The origins of the concepts of giftedness and education for gifted students are deeply rooted in American history. Unfortunately, the evolution of these terms has not brought about a simultaneous evolution that focuses on more than just majority populations. The narrow focus on giftedness presents a severe deficiency in the scholarly literature in the field, thus requiring a broader understanding of the term. For academically gifted, poor, African American males, being gifted is only one facet of their identity; it is vital to examine the experiences of and challenges for these students holistically (Bonner, 2010b). Academic and social integration is crucial to the success of minority students in STEM disciplines (Moore, 2006). It is essential that institutions of higher education commit to supporting the developmental and academic needs of this student population. While a majority of research on giftedness, poverty, and persistence has been quantitative in nature, future research must begin to increasingly employ a qualitative method of inquiry in the hope of gaining a greater understanding of the experiences that academically gifted, poor, African American males encounter as they navigate the system of higher education (Bonner, 2001b, 2010a).

CHAPTER III

METHODOLOGY

Research is the process of developing a better understanding of complex human experiences (Brown & Dowling, 2001). With regard to educational research, McMillan and Schumacher asserted that "research provides valid information, knowledge, and principles to guide the decision-making, thinking and discussion process in education" (p. 7). As a result, researchers design studies based on their epistemology (Denzin & Lincoln, 2005). This chapter employs a qualitative frame to gain understanding of the experiences of academically gifted, poor, African American male college students engineering as a major. In addition, this chapter describes the rationale for constructivism, articulates the research question, and describes data gathering and data analysis procedures, and addresses consideration of the trustworthiness of the study.

Qualitative Methodology

Qualitative research uses a naturalistic approach to provide the researcher with an understanding of key phenomena in context-specific settings (Denzin & Lincoln, 1994; Lincoln & Guba, 1985; Patton, M. Q., 2001). In a broad sense, qualitative research is defined as "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification" (Strauss & Corbin, 1990, p. 17). Qualitative research emerged as a way to describe, interpret, and learn about people and how they construct their realities (Travers, 2001). Essentially, researchers using qualitative methodology do not seek to provide "the truth" through the data that they collect. Instead, qualitative researchers use elements of interaction such as words, gestures, and participants' actions to "form conclusions" about experiences of the participants and gather "detailed description of situations, events, people, interactions, and observed behaviors" (Patton, 2001, p. 22) to contextualize the participants' world.

Qualitative research allows for an examination of various dimensions of truth. Ultimately, qualitative researchers are characterized as "intrigued with the complexity of social interactions as expressed in daily life and with the meanings the participants themselves attribute to these interactions" (Marshall & Rossman, 1999, p. 2). Consequently, the nature of qualitative research is to explore social phenomena through the participants' perspectives.

Rationale for Constructivism

Within all complex social situations there are meaningful interactions that define a person's experiences. Thus, understanding how people conceptualize their perceptions of a given situation is important (Merriam, 1991). The constructivist epistemological paradigm views "all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context" (Crotty, 1998, p. 42). Subsequently, researchers who ascribe to a constructivist epistemological perspective view knowledge as being socially constructed through interactions between individuals and their social context (Creswell, 2003; Crotty, 1998; Lincoln & Guba, 1985). Historically, research on college students and the environmental influences that affect their academic experiences has predominantly been conducted through quantitative empirical methods (Astin, 1993; Pascarella & Terenzini, 2005), however, qualitative research is necessary to understand the nuances within this demographic. Broido and Manning (2002) posited the following characteristics to be associated with constructivist research:

a. The researcher-respondent relationship is subjective, interactive, and interdependent.

b. Reality is multiple, complex, and not easily quantifiable.

c. The values of the researcher, respondents, research site, and underlying theory cannot help but undergird all aspects of the research.

d. The research product (e.g., interpretations) is context-specific. (p. 436)

This study employed a constructivist approach to assist in understanding the experiences of academically gifted, poor African American male undergraduate students majoring in STEM disciplines. The purpose of the study was to examine the perceptions of academically gifted, poor, African American male college students engineering as a major disciplines who attended either an HBCU or a PWI. For academically gifted, poor, African American males, the construction of their perceptions is linked to their interpretation of truth. According to Lincoln and Guba (1985), "Truth is a matter of consensus among informed and sophisticated constructors, not correspondence with an objective reality" (p. 44), therefore, truth from the participants' interpretation is based on their constructions of their experiences. Thus, constructivist epistemology influenced the nature of the research design for the current study.

According to Bogdan and Biklen (1998), the aim of the constructivist frame is "to group the processes by which people construct meaning and to describe what those meanings are" (p. 38). Constructivism is beneficial for researchers who seek to understand the essence of the human experience (Lindlof, 1995). Within a constructivist framework, this study provides insight into the academic and social experiences of academically gifted, poor, African American males majoring in STEM disciplines in an HBCU or PWI context.

Statement of the Research Questions

This study was designed to address four research questions:

1. What are the academic and social factors that influence academically gifted, poor, African American males' collegiate experiences?

2. How do academically gifted, poor, African American male college students in STEM disciplines conceptualize the notion of giftedness? In addition, how do their

conceptualizations derive from concepts found in mainstream literature regarding giftedness?

3. How do academically gifted, poor, African American male college students conceptualize their experiences attending a PWI or HBCU?

4. What implications does being academically gifted and being from impoverished backgrounds have on African American males who major in STEM disciplines?

The study examined how poverty influences the academic and social integration of academically gifted, poor, African American males enrolled at an HBCU or PWI. Insight into the participants' college experiences was gained via three questions asked for the participants: (a) Were you ever formally identified as being gifted during your educational experience? (b) Who comprises your major academic and social support system? and (c) How have factors such as finances, peers, family interaction, faculty interaction, and the institutional environment influenced your college experience?

Research Design

This study followed a qualitative, single case study design. A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context (Merriam, 1998; Yin, 2008). Yin indicated that case studies are essential to the investigation of one's perception. Specifically, case studies are based on a constructivist paradigm that allows the researcher to recognize the importance of the subjective human creation of meaning (Yin, 2008). Thus, case studies provide a context in which to understand a phenomenon from the participants' viewpoint. Yin (1994) presented four applications for a case study model: (a) to explain complex causal links in real-life interventions, (b) to describe the real-life context in which the intervention has occurred,

(c) to describe the intervention itself, and (d) to explore situations in which the intervention being evaluated has no clear set of outcomes.

Yin (2008) emphasized that case studies can be used for theoretical elaboration or for analytic generalization. In particular, the purpose of a case study is to "reveal the properties of the class to which the instance being studied belong" (Guba & Lincoln, 1981, p. 371).

> The case study inquiry copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to converge in a tri-angulating fashion, and as another result benefits from the prior development of theoretical propositions to guide data collection and analysis. (Yin, 2008, p. 18)

In general, case studies allow for an exploration of a particular context. Yin categorized case studies as follows: explanatory, descriptive, and exploratory. In this study an exploratory single-method (two institutions) case study was employed. An exploratory single-method case study explores the *how* and *why* of a phenomenon, particularly in relation to how participants construct their perceptions about the phenomenon.

Sampling Techniques

This study employed purposeful sampling in the selection of participants and institutions. According to Patton (2002), the aim of purposeful sampling is to select information-rich cases that will illuminate the questions under study. A purposeful strategy for sampling suggests that participants "are chosen not for their representativeness, but for their relevance to the research question, analytical framework, and explanation or account being developed in the research" (Schwandt, 2007, p. 269). For example, Bonner's (2001b) study purposely sampled gifted African American males as a means to address his overall research question that examined the perceptions of academically gifted African American males at HBCUs and PWIs. Similar to Bonner's

study at HBCUs and PWIs, purposeful sampling was selected to examine the perceptions of academically gifted, poor, African American males in STEM in this study.

Participants and Site Selection

Participants were chosen based on criteria establish by the researcher: African American, male, low-income background, high achieving/academically gifted, junior or senior, and in an engineering major.

African Americans

Historically, African American college students have been underrepresented in enrollment in postsecondary education. Extensive literature on the academic achievement of African American college students primarily focuses on their academic failure rather than their success. Examination of the literature on this demographic shows that African American students have historically faced underrepresentation in gifted and talented programs (Bonner, 2010b; Ford, 2003; Fries-Britt, 1998; Grantham, 2004b; Harper, 2004). Bonner suggested that an increase in research focusing on the academic experiences of gifted African Americans is warranted. Therefore, this study sought to explore the perceptions of academically gifted, poor, African American male undergraduate students majoring in STEM disciplines to identify the factors that have contributed to their academic success.

Males

African American men, as a whole, are pursuing postsecondary education in greater numbers. Nevertheless, these numbers are not proportional to the number of African American males graduating from college (Cross, 2007). For instance, only one quarter of African American male students who enroll in postsecondary education actually receive bachelor's degrees. African American male college degree attainment has been noted to be significantly lower than that of their African American female

counterparts (Pathways to College Network, 2003). For instance Knapp, Kelly-Reid, and Whitmore (2006) reported that in 2004 African American males earned only 7.4% of undergraduate degrees while their female counterparts earned 10.9% . The graduation gap between African American males and females is the largest gender gap of any subpopulation (Knapp et al., 2006).

Low Income

Several factors affect the academic success of college students. SES has been noted as one of the leading inhibitors of academic success for minority college students (Borman & Rachuba, 2001). According to Strayhorn (2008), African American male college students from low-income backgrounds encounter a range of difficulties (i.e., academic and social barriers) in college. Strayhorn reported, "Only 30% of Black men who enter college go on to earn their degree, retention rates are lower for those who hail from low-income backgrounds" (p. 4). Bowen and Bok (1998) similarly indicated that African American students who come from a lower SES tend to have lower college graduation rates than their White counterparts. They posited that students from lower-income families may be less academically prepared for the rigor of college due to limited access to high-quality schools and other educational resources prior to college (Bowen & Bok, 1998).

High Achieving

The term *giftedness*, used interchangeably with *high achieving*, refers to persons who meet key academic criteria that have been defined by the researcher. For the purpose of this study, *academic giftedness* is defined in terms of college GPA, previous or current involvement in gifted/honors programs, and recommendations by key gatekeepers. Most universities calculate student GPA by summing grade points earned and dividing the total by semester hours. For example, a student earns 12 points for

every A, 9 points for every B, 6 points for every C, and 3 points for every D. The student who takes four classes and earns four grades of A has a semester GPA of 4.0. Students with a cumulative GPA of 2.9 to 4. were eligible to participate in this study. This GPA range is comparable to the GPAs found among students engineering as a major (Rask, 2010). Roughly 43% of engineering and science majors earn GPAs of 2.75 to 3.25 (O'Shaughnessy, 2010).

Another criterion for participants was to be previously involved (or have a history of being involved) in gifted/honors programming. Within this context, gifted/honors programs included, but were not limited to STEM academies, engineering charter programs, or precollege honor/Advance Placement courses. While the preceding list is relevant to their respective K-12 experiences, some of the participants also indicated involvement in engineering honor programs. Key informants who were knowledgeable of the students' academic backgrounds and experiences were contacted. The director of minority recruitment for engineering at University PWI and the department chair for the department of civil/mechanical/computer engineering at University HBCU were key informants. Each key informant nominated students who they believed met the study participation criteria. The participants were purposefully chosen based on the researcher's criteria and the nominations by the key informants.

Juniors and Seniors

Junior- and senior-level students (i.e., students who have completed 60 or more college hours) were chosen based on their academic achievement. In recent studies focusing on persistence and engineering, there has been an increased emphasis on the importance of fostering persistence during the critical sophomore year (Gahagan & Hunter, 2006; Graunke & Woosley, 2005; Schreiner & Pattengale, 2000). Bonner (2001b) utilized junior and senior participants because of their exposure to the university

and the rich detail that they could provide regarding their college experiences. The current study followed the same rationale in participant selection (i.e., juniors and seniors).

STEM Majors

Minority students' underrepresentation in degree programs in all STEM disciplines has been discussed in both scientific and educational literature (Hines, 1997; Hrabowski & Pearson, 1993; Moore, 2006; Moore, Madison-Colmore, & Smith, 2003). Nevertheless, there remains a scarcity of research that has identified important factors that influence African American males in their degree completion in STEM. The NSF (2006) reported that African American males continued to fall behind in degree attainment in STEM majors. They reported that in 2004 African American males earned 6.1% of the bachelor's degrees in science and engineering, while their White male counterparts earned 66.9% of those degrees. While the acronym STEM refers to science, technology, engineering, and mathematics, participants for this study were *only* engineering undergraduate majors, primarily because of their continued underrepresentation in the discipline. Table 4 summarizes the demographic characteristics of the participants in this study.

Site Selection

Two institutions were selected purposefully by the researcher on the criteria of location, institutional type, and STEM program participation. University PWI and University HBCU (pseudonyms) had similar competitive STEM degree programs and were both located in small towns in Southern region. Despite state's growth and diversified economy, it has one of the nation's highest percentages of population living in poverty, a growing social issue in the state. In 2002 it was estimated that millions of people in state lived in homes with incomes below the federal poverty guidelines

($33,075 annual income for a household of four persons; U.S. Census Bureau, 2005).

Table 4

Demographic Characteristics of the Participants

Pseudonym	Class	Major	GPA	University
CJ	Junior	Civil Engineering	3.2	PWI
Jack	Senior	Chemical Engineering	3.3	PWI
Marcus	Senior	Mechanical Engineering	2.9	PWI
Ryan	Senior	Aerospace Engineering	3.0	PWI
Charles	Senior	Chemical Engineering	3.2	HBCU
Chase	Senior	Computer Engineering	3.3	HBCU
Isaiah	Senior	Electrical Engineering	3.2	HBCU
Johnny	Senior	Electrical Engineering	3.1	HBCU

These two universities were selected based on regional geographic data that defined factors of poverty in similar and comparable ways. Table 5 shows that the locations of the two participant universities had significant proportions of residents with incomes below the poverty level.

University PWI

Located 70 miles outside the largest city in Southern region, University PWI is one of the top-tier research institutions of higher education in the state. In 1876, University PWI became Texas' first public land grant institution of higher learning. Prior to 1965, University PWI was an all-male and military-centered school, participation in the military corps was mandatory. During the late 1920s women were allowed to attend classes but could not be granted a degree. Over the years, University PWI's mission to

Table 5

Institutional Characteristics and Student Demography for the Two Participating Universities in Texas, Academic Year 2008-2009

School	Study participants	Institutional type	University undergraduate enrollment Total *n*	AA males[a] *n*	AA males[a] %	Engineering degrees awarded	Poverty[b] (%)
PWI	4	Tier 1: Research institution, public	38,809	537	1	1,260	39.0
HBCU	4	Master's Colleges and University I: public	8,382	2,075	24	114	33.6

[a]AA = African American. [b]Poverty = area residents with income below U.S. poverty level.

provide military training remained as the school trained a significant percentage of the soldiers who fought in both world wars. After the wars, the Texas legislature redefined University PWI as a flagship school of the state university system. Currently, University PWI is classified as a flagship institution, with more than 38,809 undergraduates and 8,000 graduate students studying in over 250 degree programs in 10 colleges.

University HBCU

Located just northwest of the largest city in Southern region, University HBCU was the first state-supported college for African Americans and the second oldest public institution in the state. Initially, the curriculum of the university was designed to serve as preparation and training for teachers. After the Morrill Act of 1890 was implemented, the curriculum at University HBCU was expanded to include subjects such as the arts, science, agriculture, nursing, and mechanics. The expansion of the curriculum created a strong tradition in agricultural research, community service, and educational excellence,

a tradition that continues at the institution. Currently, University HBCU is considered one of the top HBCUs in the state. Enrollment exceeds 8,500, including more than 2,000 graduate students. Table 6 compares enrollment figures for the two universities.

Table 6

Race Composition at the Study Site Universities

Race	University PWI (%)	University HBCU (%)
White	73	4
African American/Black	3	88
Hispanic	11	4
Asian	4	2
American Indian	1	0
Unknown	1	0
Non-United States	8	2

Gatekeepers

Gaining entry to an institution of higher education for purposes of research requires working with members of faculty and staff at various levels. According to Patton (2002), *gatekeepers* are key informants or "people who are knowledgeable about inquiry and articulate about their knowledge-people whose insight can prove particularly useful in helping an observer understand what is happening and why" (p. 321). Gatekeepers often protect research settings and participants, especially vulnerable persons (Feldman, Bell, & Berger, 2003). Wanat (2008) described how gatekeepers can highly influence the progression of a research study. She contended that it is vital to learn the context of the environment and develop a connection with those who control

access to the institution. For this study, key informants were identified through recommendations by the dissertation committee chair.

Recruitment Strategy

The recruitment strategy for this study included meeting with department heads or program directors in the engineering disciplines at the universities—the academic gatekeepers (Patton, 1990). The researcher met with the Dean of the College of Science and the Dean of Engineering at each of the study sites. After meeting with these academic gatekeepers, a letter was written to solicit participation by students who met the criteria (Appendix A). At the beginning of the interview process, participants completed a personal demographic sheet (Appendix B) that collected information about GPA, parental household income, family size, and size and location of the high school that the participant had attended.

Dealing With a Sensitive Topic

To understand the effects of poverty on the participants' college experiences, I asked questions that focused on their financial barriers. I was aware that poverty would be a sensitive topic for some participants. Lee and Renzetti (1993) defined a *sensitive research topic* as a topic that has the potential to be threatening to the researcher and/or the participant. Rubin and Rubin (1995) outlined three strategies for asking sensitive research questions:

> During the interview, the researcher should pay close attention to the spaces and gaps in the conversation, the researcher should watch to see whether or not the participant avoids answering parts of a question, finally, the interviewer should always ask about the issues that the participant had trouble answering. (p. 113)

Because of the sensitive nature of the research questions that focused on poverty, I provided participants a safe and supportive environment in which they could feel comfortable in discussing the topic.

Management of Researcher's Role

The researcher's role has been described in terms of the "social relationship" that the researcher has with study participants (McMillan & Schumacher, 1997). Because I intended to establish a personal relationship with the participants, my role as researcher was not "neutral, distant or emotionally uninvolved" (Rubin & Rubin, 1995, p. 12). Although the relationship was personal, I remained an "outsider", that is, I did not know any of the participants prior to conducting the interviews (McMillan & Schumacher, 1997). I conducted semistructured interviews to uncover the participants' perspectives. My role as researcher included operation of audio recording equipment and maintaining a professional and supportive environment for each participant.

Ethical Considerations

According to Gall, Borg, and Gall (1996), a researcher who conducts case study research should develop his or her own ethical perspective. Protecting the confidentiality of participants was a vital component of this study. Merriam (1998) contended that issues of confidentiality are often challenging in case study research. She explained that case study involves "an intensive investigation of a specific phenomenon . . . it is nearly impossible to protect the identity of either the case or people involved" (p. 217). Addressing this challenge, I attempted to provide confidentiality through use of pseudonyms for both institutions and participants. Each participant selected a pseudonym. During the entire study, data were stored in a locked file that was accessible only to the researcher and the dissertation committee chair.

Data Collection Method

Lincoln and Guba (1985) stated that, in qualitative research, the researcher is the primary research instrument. As the instrument for research inquiry, the qualitative researcher acts as a social interpreter, seeking to discover the meaning of events for the

person who experienced them (Patton, 2002). In qualitative research, data collection is used to discover, understand, and interpret findings (Merriam, 1988; Patton, 2002). Lincoln and Guba asserted that qualitative research involves collecting information about personal experiences. Patton (2002) defined *qualitative research* as an attempt to understand the distinctive interactions that happen within a particular situation. Innately, the aim of the qualitative researcher is to understand what occurred, not predict what might occur. The intent of qualitative research is to capture the essence of the participants' experiences within the context of their environment. According to Merriam (1998), the researcher has the option to use any of three conventional methods to collect interview data: (a) tape recording, (b) note taking, and/or (c) recalling after the interview. Following the research protocol, 25 semistructured interviews questions were asked of each participant. The interviews were designed to gain insight into the perceptions of academic gifted poor African American STEM majors in the HBCU or PWI context.

Interviews help researchers to understand the complexity of society through the lens of the informant (Merriam, 1998; Patton, 2002). For this study, semistructured interviews were used to gather in-depth information about the experiences of the participants. Patton contended that the interviewer's job "is first and foremost to gather data, not change people" (p. 354). Interviews are a widely used tool to access people's experiences and their attitudes and perceptions of reality (Spradley, 1979). Patton (1990) outlined three types of qualitative interviewing: (a) informal, conversational interviews, (b) semistructured interviews, and (c) standardized, open-ended interviews.

Moore (2002) noted that the interview process is particularly useful in understanding the experiences of African American males in STEM. Moore interviewed several African American males in STEM to examine their perceptions and experiences.

The current used interviews in a similar manner to gain understanding of participants' views and experiences.

Interview Procedures

The interview process did not begin until proper consent was obtained from each participant. To ensure confidentiality and safety of the participants, they were provided consent forms from their respective university's Institutional Review Board (IRB, (Appendix C) prior to the interview. The consent outlined the purpose of the study, listed any possible risks associated with participation, and provided the researcher's contact information. Each participant was interviewed with the same interview protocol (Appendix D). The interviews were conducted in study rooms at the library on each of the campuses. Each of the interviews was scheduled to last approximately 60-90 minutes, however, the time ranged from 45 to 90 minutes, depending on the level of conversation provided by the participants. Audio recordings were made of the interviews, saved electronically on a flash drive, and locked in the researcher's office. All participant data were analyzed by the researcher, results of the analysis are reported in Chapter IV.

Student Demographic Form

A student demographic form (Appendix B) was completed by each participant prior to the start of the interview. The demographic form included questions regarding the participant's grade classification, major, parental occupational status, and financial aid information. After the interview, the participant was asked to review the demographic form to ensure that the information was accurate.

Journaling

Journaling is a vital component of the qualitative research process (Lincoln & Guba, 1985). Journaling can often provide a reflective context in which the researcher

uncovers hidden beliefs, values, perspectives, and assumptions about the research process. The purpose of a reflexive journal is to reflect on research practices and processes. Ultimately, the process of journaling can often lead to the development of complementary, as well as divergent, understandings of a research situation (Lincoln & Guba). For instance, Charmaz (2000) posited that the process of journaling allows the researcher "to clarify, rather than challenge respondents' views about reality" (p. 525). For this study, two types of journals were kept: (a) a methodological journal, and (a) a reflexive research journal. The methodological journal served as the roadmap for the data collection process.

The purpose of these journals was to add to the audit trail, which is central to rigor of the study. According to Lincoln and Guba (1985), the audit trail allows the reader to trace through a researcher's logic and determine whether the study's findings may be relied on as a frame for further inquiry. In addition to the reflexive and methodological journals maintained by the researcher, a guided journal entry was also initially included in this study. One of the guided journal questions asked, "*Did you learn anything about yourself from being interviewed? If yes, share two things you learned."* However, due to a low return rate (only three of eight participants responded), that journal was omitted from the study. It can reasonably be surmised that the low response rate was due to participants' schedules that did not allot them enough time to complete the guided journal entry.

Trustworthiness

Lincoln and Guba (1985) defined *trustworthiness* as the quality of an investigation and the findings that make it noteworthy to audiences and noted that trustworthiness is based on credibility, dependability, transferability, and confirmability.

They stated that researchers have found it useful to pose four questions to assess trustworthiness:

> (1) Truth value: How can one establish confidence in the "truth" of the findings of a particular inquiry for the subjects (respondents) with which and in the context of which the inquiry was carried out?
>
> (2) Applicability: How can one determine the extent to which the findings of a particular inquiry have applicability in other contexts or with other subjects (respondents)?
>
> (3) Consistency: How can one determine whether or not the findings of an inquiry would be repeated if the inquiry was replicated with the same (or similar) subjects (respondents) in the same (or similar) context?
>
> (4) Neutrality: How can one establish the degree to which the findings of an inquiry are determined by the subjects (respondents) and conditions of the inquiry and not by the biases, motivations, interests, or perspectives of the inquirer? (p. 290)

To address the first question for the current study, "truth value" was achieved through member checks and peer debriefing. Lincoln and Guba (1985) defined *member checks* as the process "whereby data, analytic categories, interpretations, and conclusions are tested with members of those stakeholding groups from whom the data were originally collected, is the most crucial technique for establishing credibility" (p. 314). In essence, member checks occur throughout the study to ensure the truth value of the shared experiences and the interpretations by the researcher. Further, member checking enables participants to clarify vague comments. In this study, member checks were conducted throughout the interview process and after transcriptions were completed.

Peer debriefing was also utilized to strengthen the trustworthiness of the study. Peer debriefing involves the use of an outside expert who checks on the inquiry process (Lincoln & Guba, 1985). This person meets periodically with the researcher to share ideas about methods (including sampling and data analysis) and makes suggestions of ways in which the study should proceed (Schwandt, 2007). The debriefing process in this study was conducted with the dissertation committee chair. These sessions

addressed questions concerning the aim and scope of the study. Because written records of the debriefing sessions are usually kept by both researcher and expert (Lincoln & Guba, 1985), a research memo log was maintained.

The second question, concerning applicability, was addressed through transferability. Transferability is the extent to which study findings can be applied to other settings. The use of "thick description" in the presentation of findings supports transferability. According to Geertz (1973), thick description is not simply a matter of amassing relevant details. One of the aims of providing a thick description is to examine social interaction, this is done by recording the social circumstances, meanings, intentions, strategies, and motivations that characterize a particular social episode. According to Patton (2002), thick description provides the foundation for qualitative analysis and reporting. Patton contended that a good description takes the reader into the setting being described so the reader can understand the phenomenon being studied. Patton stated that thick description also allows the reader to formulate personal interpretations about meanings and significance of the findings. Thick description was achieved in this study through the information provided on the demographic forms and through the description of institutional types. Thick description added to the vivid detail of the environments being researched and to the participants' interactions and experiences.

The third question regarding consistency was addressed by using audit trails. An audit trail is a recorded documentation of the research and methodology processes during a qualitative study (Gall et al., 1996). Lincoln and Guba (1985) described an audit trail as a method of checking data from a variety of data sources, such as journal entries, observations, and interviews. The audit trail in this study allowed for management of various data forms to generate trustworthiness.

The fourth question, related to neutrality, was addressed via member checks and peer debriefing. Member checking involves seeking feedback from study participants about the data and study conclusions (Guba & Lincoln, 1985). According to Miles and Huberman (1994), this feedback can be solicited in a variety of ways and during various stages of a study. Member checking was conducted at the early stage of this study by giving the transcribed interviews to the participants and inviting them to check for accuracy in the researcher's descriptions of their experiences. Member checking can also be accomplished after data analysis has been completed. An advantage of conducting member checks at the end of the study is that more is known about the phenomenon and the researcher can present a detailed and organized document for respondents to review. At this stage, the researcher can receive feedback at a higher level of inference "than can be accomplished through the review of individual interview transcripts or field notes" (Miles & Huberman, 1994, p. 276).

Data Analysis

In qualitative research, data analysis involves the reduction, organization, and interpretation of data in a way that allows the study findings to be shared with others (Bogdan & Biklen, 1998). All of the interviews in this study were semistructured, audio recoded, and transcribed. Patton (2002) stated that the process of qualitative data analysis is a constant hunt for concepts and themes. Lincoln and Guba (1985) contended that the process of data analysis requires skillful interpretation and handling of the data and relies on systematic and rigorous method.

Content Analysis

For this research study, a unitization of data, known as content analysis, ensued after transcription of data (Lincoln & Guba, 1985). After the unitization process, data

were printed on index cards for further analysis. Lincoln and Guba described the task of categorizing data:

> To bring together into provisional categories those cards that apparently relate to the same content, to devise rules that describe category properties and that can, ultimately, be used to justify the inclusion of each card that remains to the category as well as provide a basis for later tests or replicability, and to render the category set internally consistent. (p. 347)

Patton (2002) defined *content analysis* as "any qualitative data reduction and sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meaning" (p. 453). Patton asserted that content analysis is more than simply counting words or removing pieces of content from the text to explore meaning, themes, and patterns, rather, it innately allows the researcher to understand the social constructions of reality in a subjective but scientific manner. For this study, content analysis was achieved via unitization of data from each interview transcript. Once data were unitized, the process of coding ensued.

Coding

This study employed a constant comparative method of data analysis. Creswell (1998) defined the *constant comparative method* as "the process of taking information from data collection and comparing it to emerging categories" (p. 57). The purpose of coding is not to describe but to acquire new understanding of a phenomenon of interest (Hoepfl, 1997). Maxwell (2005) stated that the coding process involves an organization of data from the interviews into categories, those categories are then outlined in a way that brings meaning to the statement. Specifically, open coding allows the researcher to highlight salient words or phrases that may be clustered to identify patterns or to create categories (Strauss, 1987). Within the context of this study, content analysis facilitated development of categories. Data were labeled and arranged into provisional categories and subcategories. This process provided fragmentation of data to aid in identification of

categories and subcategories. Essentially, the categories depicted recurring patterns in the data that captured the narratives of the participants.

Conceptual Cluster Matrix

In addition to using content analysis as a method of analyzing data, a conceptual matrix was used to assist in the data analysis process. A conceptual cluster matrix allows for unitization of data and assignment of data into various themes. The purpose of the conceptual cluster matrix is to explore relationships and to explain the links among variables or concepts in a study (Miles & Huberman, 1994). According to Miles and Huberman, the method of deciding on the rows and columns of the matrix and determining which data go into them is part of the complex analytical process. Miles and Huberman explained that a conceptual cluster matrix is represented by the broad themes, the participants and their comments, and possible connections and associations inherent in the data. For example, Alston's (1997) study focused on analyzing the perceptions of eight first-year secondary science teachers. She used the matrix to unitize data of the "novice" teachers in the study. According to Strauss and Corbin (1990), the conceptual matrix facilitates the researcher's examination of the data by exploring emerging categories and patterns. The current study used the conceptual matrix to analyze the wide range of conditions related to the data (Strauss & Corbin, 1990).

Chapter Summary

This chapter summarizes the qualitative methodology approach utilized to examine the perceptions of academically gifted, poor, African American male undergraduate students who were majoring in STEM disciplines to determine which factors had contributed to their academic success. A case study approach was employed at two institutions with eight participants. Data were collected in the form of interviews, demographic characteristics of participants, and journals by the researcher. Strategies

such as peer debriefing, triangulation, and member checking were use to increase the overall rigor and trustworthiness of the study.

CHAPTER IV

FINDINGS

While some literature (Bailey & Moore, 2004; Grantham, 2004b; Harper, 2004; Noguera, 2003) examines the various aspects of the African American experience in higher education, minimal research (Bonner, 2001b, 2010a; Ford, 2003, 2006) has focused on academically gifted, poor, African American males, particularly those majoring in undergraduate STEM disciplines. To gain a better understanding of the college student experience of this demographic, qualitative methods were used to examine the experiences of eight academically gifted, poor, African American males who attended either a PWI or HBCU. The purpose of this study was to explore the perceptions of academically gifted, poor, African American male undergraduate students who are engineering as a major disciplines to identify factors that contribute to their academic success. Four research questions guided the study:

1. What are the academic and social factors that influence academically gifted, poor, African American males' collegiate experiences?

2. How do academically gifted, poor, African American male college students in STEM disciplines conceptualize the notion of giftedness? How do their conceptualizations derive from concepts found in mainstream literature regarding giftedness?

3. How do academically gifted, poor, African American male college students conceptualize their experiences in attending a PWI or HBCU?

4. What implications does being gifted and being from impoverished backgrounds have for African American males who major in engineering disciplines?

This chapter provides the contexts of the participant and site selections, details the data of the study and, concludes with a discussion of the findings. Because

qualitative research relies on thick descriptions, background information on participants and characteristics of sites for this study is provided. According to Patton (2002), thick description provides the foundation for qualitative analysis and reporting. He noted that a good description takes the reader into the setting being described so that he/she can understand the phenomenon studied and formulate his or her own interpretations about meanings and significance of the findings. The descriptions of the participants and sites in this study are followed by the categories that emerged from data analysis, which include: *(a) self-perceptions, (b) financial obstacles, (c) engineering as a major, (d) family influence and support, (e) peer relationships, (f) relationships with faculty, and (g) the students' perceptions of the institution.*

Description of Participants

Participants were chosen based on criteria establish by the researcher: African American, male, low-income background, high achieving/academically gifted, junior or senior, and a STEM major. The information provided by the participants on the demographic form (Appendix B) indicated whether they met the poverty requirements based on the 2009 poverty rate for the state of Texas (Table 1). While federal guidelines for defining poverty have been criticized for being too low, they remain one of the sole methods used by states to measure poverty (Cirtro & Michael, 1995).

These eight academically gifted African American males evidently believed in the power of education as all of the participants noted that education was a means in which to escape their financial situations. Seven of the participants had taken and passed several advance placement courses, such as calculus, chemistry, and physics. Each expected to graduate with a degree in engineering during the 2011 or 2012 academic year. Seven were seniors, of whom six had a GPA above 3.0. The demographic form revealed other commonalities among the participants. For instance, five lived in

households with five or more family members, two lived in a single-parent household, and one had lived with his father but his grandmother was his primary caretaker.

All of the participants attributed their academic success to their families' support. However, a majority shared the notion that their family support was limited as only general support rather than academic specific support was offered. Five participants were the first members of their families to attend college, and six would the first to graduate. All came from families considered to be low SES. Despite having received scholarships to help pay for college, all of the participants had taken loans to pay college expenses. To identify factors that contributed to the participants' academic success within their engineering programs, each participant was interviewed individually. Pseudonyms are used with descriptive detail highlighting each of the participants.

CJ

CJ was the youngest of the participants. CJ was a junior Civil Engineering major at University PWI with a 3.2 GPA. CJ indicated that his academic success came from his attendance at a Science and Engineering Academy in high school. In the academy, advance placement courses such as calculus and statistics were required for all STEM-track students. CJ hopes to return to his community as a civil engineer and work for a local firm near his family. CJ's parents, who have been divorced for 10 years, are encouraging him to return home once he graduates from college. He would not be the first member of his family to obtain a college degree. His father, a retired military serviceman, has a degree, and his mother completed several years of study at a community college. CJ's mother was a volunteer coordinator at a local elementary school and his father is retired from military service. CJ noted that his graduation from college will set an excellent example for his siblings. However, financial barriers have created issues in his pursuit to obtain a college degree.

Jack

Jack was a senior Chemical Engineering major at University PWI, with a 3.3 GPA and expectation of graduating in May 2012. Jack attributed his academic success to his parents' influence. While neither of his parents has a college degree, they have always encouraged him to work toward his goals. His mother is a medical records technician and his father works at a chemical plant. There are five members in the household, with Jack being the second oldest of the children. His older sister became pregnant at a young age and did not attend college. Because his father works in a chemical plant, Jack chose to major in chemical engineering and hopes to work in management for that plant upon graduation.

Marcus

Marcus was a senior mechanical engineering major who attends University PWI and has a 2.9 GPA. Marcus's experience in engineering has been chaotic because he changed his major twice in his five years in the program. After his junior year, he decided that mechanical engineering would be the best fit for him after his internship experience with a local company. Marcus is not the first member of his family to graduate from college, as his father is an architect in his hometown. While his father works, his mother stays home. Due to recent employment cutbacks, his father now works only part-time as a freelance architect. There are six members of the family household, with Marcus being the oldest of four siblings. Marcus noted that while his father has a college degree, money was always an issue in the household; thus, loans and grants have provided the opportunity to complete a college degree, which is anticipated in December 2011.

Ryan

Ryan was a senior who attends University PWI, majoring in Aerospace Engineering with a 3.0 GPA. At the time of this study Ryan was the only African American male in his graduating class. Ryan stated that the program is one of the most challenging programs in the engineering department. He said that his high school did not provide him with the skills to be successful in STEM and, as a result, throughout high school he attended several engineering summer programs. Ryan's parents provide him with guidance and support, although they have not obtained college degrees. His mother is a bank manager and his father is a barber. Ryan indicates that grants and loans have primarily paid for his college, with loans being the primary source of financial aid since his junior year.

Charles

Charles was a senior Chemical Engineering major attending University HBCU with a 3.2 GPA. Charles expected that majoring in a STEM field would provide him with greater employment opportunities. He noted that he chose chemical engineering because of his curiosity concerning the world of science. Charles will be the first member of his immediate family to graduate, which he noted as a stepping stone to his future. Charles explained that, while neither of his parents had college degrees, they were the most vital contributors to his success. His mother is a data document analyzer for a hospital and his father is a valet driver. His family household includes five members, and he is the oldest of three siblings. While he struggles with the notion of accumulating extensive debt through loans, he said that he realizes that it is worth it.

Chase

Chase was a Computer Engineering major at University HBCU with a 3.4 GPA. Chase's goal is to create his own computer software that would revolutionize

telecommunications. Chase will be the first member of his family to earn a bachelor's degree; both his mother and father have Associate degrees from a local community college. Chase's family recently has faced hardships due to his mother's recent disability. His father, who is a computer technician, must support the family of five. For Chase, grants, loans, and an academic scholarship provide the financial means to complete his degree, with an anticipated graduation date of December 2011.

Johnny

Johnny, a senior Electrical Engineering major, attends University HBCU and has a 3.1 GPA. Johnny attributed his academic success in college to his attendance at an engineering charter school in his hometown. Johnny will be the first member of his family to graduate from college. Neither his mother or father had obtained college degrees, but that did not inhibit them from supporting him. Due to family issues, Johnny lives with his father and his grandmother, with his grandmother severed as his primary caretaker. Because his family is on a fixed income, grants, loans, and an academic scholarship were a central part of his goal to graduate in May 2011. Johnny hopes to continue his education by pursuing a Master's degree in engineering and working for one of the largest engineering firms in the state.

Isaiah

Isaiah was an Electrical Engineering major with a minor in Physics, attending University HBCU and holding a 3.2 GPA. Isaiah stated that family was the most important factor in his college success. He reported that his high school had not adequately prepared him for the academic challenges of college. However, after two semesters of college, Isaiah realized that the responsibility to prepare for college did not reside in the school but in the commitment of the individual student who wants to be successful in college. Isaiah will not be the first member of his family to obtain a college

degree, as his mother has an Associate degree in nursing and his father, who does not have a degree, is a project planner for a local computer company. Throughout Isaiah's interview he indicated that one of the most difficult hardships was his mother's being diagnose with breast cancer, which forced her to retire from her job, leading to financial issues. Isaiah is the oldest of twin siblings. He says that his one goal in life is to be an excellent example for his brothers, who have also decided to pursue degrees in engineering. Due to financial constraints, loans are the primary method used to pay for his college. Isaiah's hope is that his engineering degree will be the stepping stone to graduate school.

Description of Site Selections

University PWI

University PWI is one of the largest public institutions of higher education in Texas. University PWI strives to maintain its traditional values while transforming into one of the premiere research institution in the state. University PWI's mission statement emphasizes the institutional goal of furthering research agendas.

> [University PWI] is dedicated to the discovery, development, communication, and application of knowledge in a wide range of academic and professional disciplines. Its mission of providing the highest quality undergraduate and graduate programs is inseparable from its mission of developing new understandings through research and creativity. It prepares students to assume roles in leadership, responsibility, and service to society. [University PWI] assumes as its historic trust the maintenance of freedom of inquiry and an intellectual environment nurturing the human mind and spirit. It welcomes and seeks to serve persons of all racial, ethnic, and geographic groups, women and men alike, as it addresses the needs of an increasingly diverse population and a global economy. In the twenty-first century, [University PWI] seeks to assume a place of preeminence among public universities while respecting its history and traditions. (Institutional Statement, 2011)

One of the essential goals of University PWI is to become one of the top-tier research institutions of higher education in the country. In order to accomplish its 10-year goal, the University PWIust be willing to adjust some of its traditional non-inclusive practices (i.e., minority student recruitment and increasing diverse

faculty).Because their mission statement claims the inclusiveness of diverse populations, policies, rather than simple words, must be implemented in order to truly be reflective of their mission statement.

The College of Engineering at University PWI (CoE1) is the largest college on the University PWI campus. It is estimated that the CoE1 has about 10,500 engineering students enrolled in one of the 12 academic departments. The CoE1 engineering departments include aerospace, biological, chemical, mechanical, computer, civil, and electrical which also includes engineering technology and industrial distribution. Several of the academic departments rank among the nation's top public programs in engineering. In addition to its national ranking, the CoE1 also surpasses many other universities in recognized faculty, research funding, and the number of National Merit Scholars who attend the University.

University HBCU

University HBCU is the second-oldest public institution of higher education and the first coeducational institution in the state. The University was established during the Reconstruction Period after the Civil War. It was the first state supported College in Texas specifically for African Americans students. As one of the states' leading HBCUs, University HBCU's dedication to teaching, research, and service sets an institutional tone that aims to provide students with a quality educational experience. The University PWIission statement expresses an institutional framework that outlines the core values of the University:

> It is [University HBCU] committed to achieving relevance in each component of its mission (teaching, research, and service) by addressing issues and proposing solutions through programs and services designed to respond to the needs and aspirations of individuals, families, organizations, agencies, schools, and communities—both rural and urban. [University HBCU] is a state-assisted institution by legislative designation, serving a diverse ethnic and socioeconomic population, and a land-grant institution by federal statute. (Institutional Statement, 2011)

University HBCU's commitment to educational excellence is seen throughout the range of undergraduate degree programs, including but not limited to computer science, natural sciences, architecture, business, technology, criminal justice, education, agricultural sciences, nursing, mathematics, and engineering.

University HBCU College of Engineering (CoE2) takes pride in its ability to foster high-quality academic development of its students. One of the aims of the College is to provide its students "academic excellence with a personal touch." This aim is met through the continuous efforts of the faculty to build relationships with students. University HBCU CoE2 consists of six departments: chemical engineering, civil engineering, computer science, electrical and computer engineering, engineering technology, and mechanical engineering. Unlike other colleges of engineering, University HBCU CoE2 provides an intimate educational experience with smaller class sizes and one-on-one interaction with faculty members. University HBCU CoE2 serves a more diversified student population compared to other engineering colleges in the area. According to the CoE2 demographic profile, a majority of the students in the college are the first in their families to attend college. To serve the local community, CoE2 provides numerous Summer Bridge and pre-college programs.

Data Analysis

This study examined the ways in which academically gifted, poor, African American males in engineering develop their perceptions of their academic success. The data were generated through examination of the participants' demographic forms, individual interviews, and analysis of institutional documents (i.e., mission statements and student demographic reports). These three methods of data collection were employed to understand the experiences of the participants. The notion of student academic achievement and self-development was explored by investigating the ways in

which academically gifted, poor, African American males navigated their college experiences. While the experiences of African American male college students encompass a multitude of institutional and social factors, this study was an attempt to understand the *perceptions* of these academically gifted, poor, African American male undergraduate students who were majoring in STEM disciplines.

Categorization

The major categories from the interviews indicated that the participants made the necessary social and academic transitions to thrive in the campus environment. Research questions one, two, and three focused on the participants' perceptions of themselves as academically gifted college students and then as African Americans. Research questions four explored the dimensions of the college experience by examining the participant's notions of poverty and academic success in engineering. The data related to these four research questions were divided into seven emergent categories that focused on various aspects of the participants' experiences while attending college: *(a) self-perceptions, (b) financial obstacles, (c) engineering as a major, (d) family influence and support, (e) peer relationships, (f) relationships with faculty, and (g) the students' perceptions of the institution.*

Table 7 depicts the conceptually clustered matrix including each participant's response within the context of each of these seven categories.

According to Miles and Huberman (1994), the process of determining the rows and columns of the matrix and deciding which data go into them is an element of the multifaceted analytical process. The statements of the participants as related to each of the seven categories were identified primarily through a process of unitization of data called content analysis. The statements presented in the matrix provide an account of each participant's perceptions regarding each category.

Table 7

Conceptually Clustered Matrix of Categories Identified Through Analysis of Data: (a) Self-Perception, (b) Financial Obstacles, and (c) Engineering as a Major

Student	Self-perception	Financial obstacles	Engineering as a major
CJ	I'm confident in my abilities. . . . I don't think I know everything but I'm confident in my abilities to get a good grades and to understand the material.	My goal is that hopefully one day I will not have to struggle through life and I'll be able to support my family.	Looking back my high school gave me so many opportunities. I had friends who attended the local high school and in their math and science classes they were learning concepts I had learned in middle school. I was shocked when some of my friends who didn't attend the same school I did would complained about their math classes.
Jack	You have to work hard to get somewhere in life but you have to believe in yourself and your abilities. If you have talent and you're gifted academically then you should believe you can do it and not let anyone or anything keep you from reaching your goals.	I grew up in a low-income area but at the end of the day I was always full and I never had to sleep outside. Maybe poverty is a mind-set! I never thought about what I didn't have until I went off to the college and realized others had so much more.	It's [Engineering] challenging. Sometimes there are times when I want to give up.
Marcus	People see me differently depending on the environment I'm in or the situation (Like class, home or when I'm with my friends)	Poverty is not just having no money, it is not having the basic things that you probably should have or being without something that could help you move forward.	I've always liked sci-fi and science! Ok, I'm a nerd so I guess STEM just seems like a natural fit.
Ryan	Most people probably perceive me as potentially being gifted for my race, but I think as a whole I'm probably like the average college student	Just having to deal with paying for school is an issue. Most of my obstacles are not academic but financial.	[long pause] The engineering program at my university is hard as HELL!

Table 7 (Continued)

Student	Self-perception	Financial obstacles	Engineering as a major
Charles	Probably top tier, I know several of my professors are amazed at some of the things I can do	Poverty is if your debt exceeds what you are making, causing you to make sacrifices. I think poverty is when people have to rearrange their priorities in order to pay the bills. I mean not paying the light bill to put food on the table or not buying new school clothes to pay the rent. Things like that!	College is worth the financial hit you have to take. It's like you must give up things now to gain much more in the future. Financial issues are tough but the payoff is so much more.
Chase	From a young age teachers would always tell me, "You're some smart, don't waste your talents."	You might not have funding but there is always ways to find funding	I was always in a science or math academy . . . those subjects are intriguing.
Isaiah	Positive reinforcement about my academic abilities came from home and school. Teachers in grade school pushed me, they gave me more work went I competed the first assignment and my parent encouraged me to learn. Now I have the mind-set to either work hard or work harder. For me there is no such thing as quitting, once I decide to do something I'm invested in it until the task is complete.	Back where I'm from some people are just ok with their circumstances. Sometimes it seem like being poor was almost conscious choice for some. But I have learned that being from poverty does not define your life, take Oprah Winfrey for example. I \mean she came from nothing, she literally was in potato sack growing up, but now she is one of the wealthiest women in the world.	Why engineering? Once my CD player broke and I really wanted to know why. So I took it apart and that process of under-stand how things work fascinated me.
Johnny	They perceive me as very smart. I can grasp concepts quickly and I pretty much have a handle on what we are learning at the time.	Money is an issue but I often find that there is someone on-campus willing to help you.	Knowledge is power and an electrical engineering is a field where you gain a lot of knowledge.

Table 8

Conceptually Clustered Matrix of Categories Identified Through Analysis of Data: (d) Family Influence and Support, (e) Peer Relationships, (f) Relationship With Family, and (g) the Students' Perceptions of the Institution

Student	Family influence and support	Peer relationships	Relationship with family	The students' perceptions of the institution
CJ	My dad is the one that told me that I need to go to college and get a degree in something I like and enjoy; so I don't have to work in a career I don't enjoy.	My friends where in certain classes in high school so I wanted to stay with them.	I think it would be awesome to have a faculty mentor.	It's funny; people think engineering is all about competition . . . it's the entire university. I know people who couldn't get into some of the business programs because they only wanted so many students. This school is "dog eat dog" like the real world!
Jack	I can't really rely on my family to help with school work. They don't understand the level of math I'm working on.	My biggest supporters have always been my peers.	NSBE is a great place to network. When faculty members come to our meeting they seem much more approachable then in class. I think NSBE allows us to connect with Black faculty on another level, which is good.	A lot of times I hear this is a very conservative campus and like as far as like government and stuff like that.
Marcus	I would take everything apart. One time my teacher got mad at me because I took the remote control from our classroom apart and she couldn't figure how to put it back together. After that she gave me extra hands-on projects to work on when I finished my class work.	I have friends who are multi-ethnic and I get along with people from different races, different economic backgrounds, and cultural backgrounds. I guess get along with everyone.	Faculty relationships are weird. . . . Once my professor told me I looked timid and I needed to be more outgoing.	University HBCU is like a second home. I've been coming to this campus since I was a freshman in high school. So I decided to attend this school because it feels comfortable

Table 8 (Continued)

Student	Family influence and support	Peer relationships	Relationship with family	The students' perceptions of the institution
Ryan	Finishing college will be a big accomplishment for me and family. My family has been with me through it all [college experience], so I dedicate my degree to them	I feel like in aerospace cause it's so small you definitely get to know everyone around you.	So the faculty at my university is not really supportive, they are more concerned about how much money they can bring then student achievement.	Because the predominately Black colleges do not offer an aero-space program I didn't attend.
Charles	…in college your parents are not watching you, so you need to be self driven.	They [peers] think that we [gifted African American males] are supposed to wear pocket protectors and glasses; you know they think we look like Steve Urkel.	He [professor] seemed like a pretty nice person.	I have a greater appreciation for my campus. I love that I attended a HBCU because it shows me that with limited funds you still can get a quality education.
Chase	My mom didn't give me an option. I had to get good grades. She would say your grades are a reflection of who you are as a person. When you go out in the real world and look for a job the first thing a company wants to see is your grades from college	Engineering as a major and doing well in school doesn't make you weak or less of a man or even less of an African American.	I know the faculty members in the College of Engineering definitely fight for us. When I couldn't find an internship my mentor got on the phone and made some calls, three days later I had an interview with a local engineering firm.	This university is a family alma mater; it's been part of how my family defines education.
Isaiah	Education is important to me…what I'm saying is that education was one of those things that my family made sure was instilled in me at a young age.	Once in middle school my buddy Dave said only White boys like to read, which was weird for me to hear because I'm not a White boy but I loved to read.	In my learning environment I need to sit down and have one-on-one time with my professor. I need them to know me!	I believe if you are going to get into something [college] and you are going to do it, that you might as well do it to the best of your ability.

Because the context of the study focuses on the perceptions of academically gifted, poor, African American males in engineering, each participant provided insight pertinent to their notions of giftedness. The following sections provide a detailed discussion of each category and summarize the responses given by each participant. Throughout the section, quotations from the participants' responses provide context of the participants' reported experiences.

Category 1: Self-Perception

Participants in this study constructed their self-perception based on internal and external factors that they experienced throughout their educational careers to date. Shavelson, Hubner, and Stanton (1976) broadly defined self-perception as "a person's self-perceptions formed through experience with and interpretations of his or her environment" (p. 411). They contended that self-perception is not an entity within the person but rather a hypothetical construct that is potentially useful in explaining, predicting, and understanding human behavior.

Participants' Perceptions of Their Abilities. Because self-perception influences self-determination, how students perceive themselves is vital to their academic outlook. For these participants, self-perception about their ability to be academically successful affected their perception of being high achievers. If participants were self-assured about their academic capabilities this often led to positive academic outcomes. Jack described the importance of believing in one's abilities:

> You have to work hard to get somewhere in life but you have to believe in yourself and your abilities. So if you have the talent and you're gifted academically then you should believe you can do it and not let anyone or anything keep you from reaching your goals. (INT3UM-1)

Thus, for Jack, the belief in his academic abilities led to a positive self-perception.

Throughout the interviewing process these high-achieving African American males associated their ability to achieve academically with maintaining a positive self-

perception. For instance, Isaiah said, “I’m great in math so I have always to strive for the best grades in all my classes” (INT2UV-2). Throughout the interviews, the participants discussed how their positive self-perceptions been shaped. Each associated his strong academic identities to factors such as institutional influences and early interest in academics.

Many of the participants maintained that their academic self-perception was influenced by their institutional environments. For instance, participants who attended the University HBCU described how the support nature of the campus influenced their ability to achieve academically. Johnny said, “This college was built to support us [African Americans]; there is support in all aspects of campus life” (INT3UV-1). Charles claimed, “University HBCU is like home; people want you to succeed here” (INT4UV-5). Participants who attended University PWI also indicated comparable levels of support. CJ stated, “I know University PWI is perceived in a certain way but there are tons of support services available for students. It’s hard to say people here don’t want you succeed when they are allows offering help” (INT5UM-3). For several of the participants, the availability of academic support increased their connection to the institution. In related literature it has been noted that institutional support is one of the fundamental factors for achievement by African American males (Moore, 2006). Therefore, success for African American male college students is fostered when the academic system is well organized and provides support services that promote academic achievement for all students (Hrabowski, 2003).

K-12 Experiences. The development of the participants’ academic self-concept did not begin with their enrollment in college. Academic and social influences during childhood and adolescence led to the initial creation of a positive academic self-perception. The way in which participants constructed their self-perception was a

multidimensional process that included interactions with teachers. All of the participants indicated that a person or people whom they known during childhood affected the way in which they perceived themselves academically. Chase said, “From a young age, teachers would always tell me, ‘You’re so smart; don’t waste your talents’” (INT1UV-1). As a result, Chase became confident in his academic abilities. He claimed, “I don’t think I know everything but I’m confident in my abilities to get good grades and to understand the material even in the toughest engineering classes” (INT1UV-1). Senior engineering major Isaiah offered a similar perspective:

> Positive reinforcement about my academic abilities came from home and school. Teachers in grade school pushed me, they gave me more work when I completed the first assignment and my parent encouraged me to learn. Now I have the mind-set to either work hard or work harder. For me, there is no such thing as quitting; once I decide to do something, I’m invested in it until the task is complete. (INT2UV-2)

Other participants indicated that positive reinforcement about their academic abilities was one of the strongest contributing factors in their positive self-perception. Ryan related that people often called him smart, so he felt smart. He asserted, “Yes I think I’m smart. I grew up with teachers and most of my family telling me I was a smart kid” (INT4UM-1). He further shared that, when in second grade, his school notified his parents about his high performing abilities. The positive reinforcement that he felt from home and school offered him increased confidence in his academic abilities. CJ described how teachers in elementary school influenced his outlook on his abilities:

> I remember looking around my advanced reading group in the third grade and realizing that there were only three Black kids out of a class of 15. One teacher said it was because we were special and the other said we had superior skills. The idea of having superior skills has always stuck with me. (INT5UM-2)

Because of the many positive comments concerning their academic abilities, several of the participants began to internalize at an early age a notion of high achievement. This process of internalizing academic abilities progressed throughout

primary and secondary school and currently remained a part of their consciousness as college students.

While a majority of the participants held positive views about their K-12 experiences, not all of the primary and secondary schools that the participants attended encouraged academic achievement for *all* of its students. For instance, Marcus indicated that, while his secondary schooling was not the best, he still attributed his academic growth to the opportunity that he had to learn in high school.

> When I first realized I had to retake trigonometry and calculus in college, I was upset and doubted my abilities to be successful in engineering. Ultimately, I blamed my high school for the lack of knowledge I received. But once I got into those classes and realized how much more I knew compared to the other students, I was thankful that I had attended my high school. (INT2UM-4)

While some of the participants attended STEM magnet schools, others had attended inner-city schools that had a strong racial divide and, as a result, often did not promote an environment that included programming to foster high-achieving abilities of African American males. Isaiah claimed that one of the reasons he had not participated in the honors program or taken AP courses was that "African American males just didn't participate!" (INT2UV-3). However, he noted that the one positive program that his high school provided was College Day, which gave all students the opportunity to visit with college representatives. Isaiah pointed out that the College Day program was one of the reasons he decided to attend University HBCU. "The College Day events connected me to resources on University HBCU campus, which made the process of applying easy" (INT2UV-3).

Several participants indicated that, throughout their K-12 experiences, because of their academic support and/or support from teachers, they had no trouble performing academically. The findings in this study indicated that K-12 environments affected these students' notions of high achievement. CJ, who attended a science engineering academy in sixth grade, stated,

> My middle school was challenging but a good kind of challenging. This school made me a better student and made me feel like academically I could do anything. All around school there were banners saying how the school was a nationally recognized school for its science and engineering program, which made me feel like I was smart for just being admitted to the school. (INT5UM-2)

Johnny shared the similar influence of his K-12 education environment:

> Not going to college was never an issue. When I was in elementary I was put into the gifted program and in middle school I attend a magnet program. The school I went to made college seem like just the next step in our academic journey. In my school the idea of college wasn't something that was special; it was something we just did after high school. So I never really second guessed my college decision nor my abilities to perform in college. (INT3UV-3)

The context of the participants' K-12 school environments affected their perceptions of college. Their respective school environments were primary contributors to their academic success. According to Thorne (1986), school environments are influential in the construction of a student's perceived academic development. Thorne's assertion is supported by the experiences of the participants as their notions of academic self-perceptions were largely positively affected by their K-12 environments.

Defining Giftedness. The definition of giftedness varied among participants. For each of the participants, defining himself as gifted was not part of his self-constructed identity. While the notion of *giftedness* was seen as a positive attribute by all participants, their inclination to self-identify as gifted was absent. Jack jokingly emphasized that he does not walk around and talk about his abilities, telling people he is gifted in mathematics. Instead, he attributed giftedness to a divine power. "Giftedness is something that God has given you. It is something that you cannot go and get out on the streets. It is a gift!" (INT3UM-3). In defining giftedness, CJ explained that he understands that giftedness is perceived as making good grades, getting a high GPA, and doing well on tests. Nevertheless, he claimed that it is much more than that. "Giftedness is having the will to succeed even in the face of great challenges" (INT5UM-3). For the participants in this study, giftedness entailed not only the necessary academic skills to be successful but also the confidence in their ability to be successful. For instance, some of

the participants noted that giftedness is a combination of ability and effort. Marcus stated,

> Giftedness is not only one's natural intelligence. Someone can be naturally smart but [if] they don't apply themselves, then their abilities mean nothing. But my ability to achieve comes from not only my brain but also my determination to succeed. (INT2UM-3)

Parenthetically, Johnny declared that his conceptualization of giftedness represented *something different*. From his perspective, the label of giftedness did little for his sense of identity, primarily because he did not realize the importance of being labeled as gifted. He commented, "Being labeled as 'gifted' just meant I was put in classes where teachers would give me more work" (INT3UV-6). Johnny noted that, in retrospect, his enrollment in advance classes in high school kept him out of trouble.

For these participants, giftedness starts with the individual. Each of the participants discussed the importance of recognizing one's academic capabilities. It is important to note that the participants' framing of high achieving and their inability to connect this with the premise of giftedness compelled the researcher to use these terms interchangeably because these participants simply did not view themselves as gifted. Isaiah described his idea of giftedness:

> Ever since I can remember, learning and gaining new knowledge has always been important to me. I remember being young and watching television and seeing this commercial stating "Knowledge is Power" and I was like, "Wow, . . . I want power! So I must be willing and open to attaining knowledge." To this day, I still seek to gain all the power I can through my attainment of knowledge. (INT2UV-4)

For some of the other participants, their definition of giftedness was complex and defied a definition of a singular nature. Several of the participants claimed that giftedness is not defined solely by academic abilities only. However, only one of the participants discussed in terms of academic giftedness and giftedness expressed in other ways—namely, athletics Ryan stated,

> I have been called gifted mainly because of how I perform academically. But there are other students who have different types of gifted [sic], like dunking a basketball. It seems like, as a society, we value the gifted African American students who can dunk the basketball over the academically gifted student. (INT4UM-3)

Essentially, the participants agreed that the definition of giftedness should be viewed in practical terms versus in a conceptual manner. For participants, giftedness meant that they knew how to apply the knowledge they knew rather than simply regurgitating the knowledge they possessed. In essence, their definitions of giftedness mirror the work of Sternberg (2003) who details the importance of practical intelligence. All of the participants maintained that giftedness was an important concept for African American males. Chase stated, "A gifted person doesn't let others define who they are; being gifted means not being affected when others consider you a nerd" (INT1UV-4).

Summary. These data suggest that the cultivation of participants' self-perception was a multifaceted process that was influenced by their educational experiences and their respective K-12 environments. Moreover, the participants' construction of their academic abilities (i.e., giftedness) was encouraged within educational settings that provided both academic and socioemotional support (i.e., support from teachers and positive reinforcement with regard to students' academic abilities). Specifically, the participants sought to define their educational experiences as the mechanism by which they conceptualized giftedness within themselves.

Category 2: Conceptualization of Poverty and Financial Obstacles

The term *poverty* is often defined in specific terms; however, for the participants in this study definitions varied. Their conceptualization of poverty was not indicative of their inability to be successful but rather viewed poverty as a challenge that they needed to overcome. For instance, many of the participants indicated that poverty was just another obstacle in life that they had to overcome. Each participant noted that his experience with poverty was situational and that engineering as a major was a guarantee

that they would not return to those circumstances. Isaiah asserted, “I’m proud of where I came from but I know I want better for my family in the future. Engineering as a major offers me unlimited opportunities to provide a better life for myself and my family” (INT2UV-4).

The examination of the concept of poverty evoked an array of emotional responses from the participants. For instance, Marcus reminisced about an instance when his family could not pay the electricity bill and he had to study by candlelight. He stated, “Life is tough sometimes but you can’t let obstacle hinder your progress” (INT2UM-5). The fact that he had no electricity did not deter him from his studies; rather, he realized that getting an education would take him out of this circumstance. Thus, this section explores how participants conceptualized poverty based on their experiences and addresses the financial obstacles that affected their collegiate process.

Conceptualizing Poverty. Each participant shared their unique construction of poverty, regardless if they instantly realized they were impoverished or not. As a result, true comprehension of poverty requires an understanding of individual experiences. Individual experiences for these participants varied on the basis of family size, geographic location, and family situations. All participants shared that their families experienced financial hardships throughout their lives. However, none of the participants described themselves as having been impoverished. Jack explained,

> I grew up in a low-income area but at the end of the day I was always full and I never had to sleep outside. Maybe poverty is a mindset. I never thought about what I didn’t have until I went off to the college and realized others had so much more. (INT3UM-7)

For Jack, the concept of poverty was not relevant until he was faced with counter-frames of his reality. Such counter-frames surfaced when he was exposed to other college students, which essentially magnified the reality of what little he always had. This suggests, as Jack noted, that poverty is a mindset. If one does not believe they

are poor then the mindset of poverty is a nonissue. Realizing that he was poor was evident when he realized how much more others had. CJ similarly commented that money was an issue for his family growing up:

> Sometimes I had to make do with what I had as a kid. There were times when I had to study for a big test and the lights were cut off but that didn't change the fact that I had to study for my test. So I made do! Those types of life experiences can either make you or break you; for me, they made me an even stronger person.

For these participants poverty was seen as a matter of circumstance; they could not control the fact that their families had financial issues but those issues did not prevent them from achieving academic success. Isaiah reflected,

> Back where I'm from, some people are just OK with their circumstances. Sometimes it seems like being poor was almost a conscious choice for some. But I have learned that being from poverty does not define your life. Take Oprah Winfrey, for example. She came from nothing, she literally was in potato sacks growing up, but now she is one of the wealthiest women in the world. (INT2UV-5)

For other participants, the conceptualization of poverty was not limited but added a level of personal motivation to succeed. Ryan described poverty as having less money than is needed to live. For Ryan, his construction of poverty focused on one's inability to take care of their family. He contended,

> Just because you're not making enough money to live in the nice house or apartment doesn't mean you're in poverty. I believe poverty means that you don't have a job and you have a family to support, bills to pay, and things to take care of. When you are poor, you don't have the means to take care of your business. (INT4UM-5)

Similarly, Charles asserted that poverty is a condition in which people lack a basic necessity that requires them to make sacrifices. According to Charles, "Poverty is when people have to rearrange their priorities in order to pay the bills. I mean not paying the light bill to put food on the table or not buying new school clothes to pay the rent" (INT4UV-4). Chase stated that poverty can have many manifestations, as he claimed that the lack of financial stability sometimes hurts, but he maintained, "Man, when

you're lacking money, it can hurt at times. I mean, it hurts you physical, mental, and spiritually" (INT1UV-5).

Financial Obstacles. Financial obstacles often make degree attainment, especially in STEM disciplines, difficult for African American males. Several of the participants expressed concerns about the various financial obstacles that they encountered while engineering as a major. For instance, as a child, Ryan's ultimate goal was to be an astronaut; however, financial circumstances precluded that reality. He noted, "You would never guess how much money you need to be an astronaut. As a kid, I thought I could just go to NASA and apply, but that's not the way it works" (INT4UM-5). Similarly, for Marcus, the lack of financial stability affected his chances to earn pre-college credits because, even though he had the opportunity to take the advance placement test in high school, he could not afford to take it.

As a result of financial hardships, some of the participants had been encouraged to acquire loans to pay for their college education. In particular, Marcus disclosed that his parents informed him about the importance of being awarded scholarships and grants to reduce the amount of loans for his college education. Despite worrying about acquiring loans to pay for his education, Marcus's father reassured him, "Even if you get loans, you are making an investment in your future" (INT2UM-5). Likewise, Johnny and Charles both indicated that financial issues were their most significant obstacle in college. Charles said, "College is worth the financial hit you have to take. It's like you must give up things now to gain much more in the future. Financial issues are tough but the payoff is so much more" (INT4UV-4). Johnny acknowledged the "ridiculous" amount of money that he had to pay for books. He commented, "The fees we get charged in engineering are high, not to mention the growing cost of tuition" (INT4UV-

4). Isaiah expressed comparable sentiments concerning the cost of college. He discussed the financial impact of college:

> The biggest obstacle in college was the financial burden. Every dollar that I made working part time went toward paying for college. My dad had to deal with a lot with my mom being sick and my brothers also in college, so I made sure I did everything I could help. Looking back now that I am a senior, I know all the headache was worth it. (INT2UV-4)

Because of financial hardships, some of the participants changed their future goals, while others could not purchase the necessary resources for courses. In addition to paying college tuition, other financial obstacles included the inability to purchase course books and lab equipment.

For some of the participants, the lack of financial means required them to negotiate allocation of certain resources. For example, some of the participants discussed how they choose which books could be afforded each semester, based on cost. For instance, Chase and Ryan discussed the issue of purchasing books for engineering classes. Chase claimed,

> In some cases where I didn't have the funds, I would sacrifice getting one or two of my engineering books. During those semesters I really had to hustle to make the grades. I would have to borrow and beg my classmates to use their books. For the most part, my classmates helped me out. (INT1UV-5)

While Chase's classmates provided him with access to books that he could not afford, Ryan's classmates did not respond as positively, and he relied on the library for the books that he could not afford. Ryan explained,

> Some classmates were cutthroat. I would ask them to use their books to make copies and they would flat out say "no". So sometimes I would get lucky and the library would have a copy of the book. But if it was a newer book, I was in trouble. (INT4UM-5)

A majority of the participants reported challenges that they faced when wrestling with financial obstacles. However, several of the participants reported that they assumed their financial obstacles were experienced by every college student. Marcus indicated that he assumed that all college students worried about money all of the time. However,

after he asked one of his classmates about how she paid for college, he quickly learned that not all students had the same financial situation. Marcus described this experience: "Once when I was talking to one of my White classmates about paying for school, I was shocked when she said she doesn't think about those things. She leaves those concerns to her parents" (INT1UM-7).

While most of the participants discussed some form of financial obstacles, only one participant stated that financial concerns had not affected his college experience. Jack noted that, while money is a major issue for college students, he was blessed with a full scholarship. According to Jack, it is important to recognize people for who they are and not for what they lack.

> Because someone is not wealthy doesn't mean there are less of a person. It's important that people look past the surface and see people for who they are on the inside. Because not all poor people are what people perceive them to be. (INT3UM-5)

Other than summer semesters, he does not have to worry about loans or any other financial concerns to pay for college. He stated, "If it wasn't for my scholarship I might be in the same situation as some of my friends." He continued,

> As far as my fall and spring classes, they are paid in full. I can buy my books without any problems, I can pay my rent, my electric bill, and put gas in my car. I realize I am blessed to have a scholarship that takes the worrying out of college. Not many students can say that! (INT3UM-6)

Summary. The data in this section suggest that, while most of the participants encountered financial hardships in pursuit of their engineering degrees, they had not let financial obstacles dictate or define the ways in which they achieved their academic success. Incidentally, the conceptualization of poverty was viewed by several of the participants as a source of personal motivation. For many of participants in this study, their lack of financial resources only increased their desire to succeed academically.

Category 3: Engineering as a Major

For each of the participants, engineering as a major offered a sense of personal and academic self-fulfillment. Some participants also commented on the importance of pursuing engineering degrees. All explained that various factors influenced their decisions to major in engineering, including an early interest in engineering through their participation in STEM programs or attending STEM-focused schools. The participants explained that engineering as a major served as a financial vehicle that allowed them to gain both economic and academic advantages.

Support Programs/STEM Magnet Schools. Each of the participants articulated a strong interest in mathematics. For some, interest in mathematics developed at an early age. Ryan related that in grade school his mathematics teacher gave him extra problems after he completed his daily homework assignments in class. Likewise, Chase claimed, "Throughout high school I was known as a math whiz. I just love doing math, there was always a solution" (INT1UV-8). While each of the participants indicated a strong interest in mathematics, not all mentioned that they had an interest in science. Nevertheless, each participant claimed that he known at a young age that engineering was the field that he wanted to pursue. Isaiah shared,

> When I was a kid, I knew I wanted to be in the engineering discipline. I didn't know the exact field by name but I knew I wanted to build things. In science class we would watch the History Channel and I still remember watching this show called Engineering Disasters. After I watched that show, I thought to myself that I never wanted to be one of the engineers who created a disaster! (INT2UV-6)

For Isaiah, engineering as a major meant working for the greater good. Even as a child, Isaiah's goal had been to become the best engineer he possibly could be. Similarly, Marcus's interest in engineering was peaked through his curiosity. He described his interest in mechanical engineering as a child.

> I would take everything apart. One time my teacher got so mad at me because I took the remote control from our classroom apart and she couldn't figure how to

> put it back together. After that, she would give me extra hands-on projects to work on when I finished my class work. (INT2UM-6)

Marcus noted that one of his teachers encouraged his curiosity in engineering. He recalled a moment in the seventh grade when his science teacher given him an old computer to repair. While he did not repair the broken computer, his interest in computer technology was enhanced.

Similarly, Jack found interest in engineering as a child. He stated that he was one of those children who always had questions.

> I remember being six years old and asking my uncle to show me how to fix a car. At the time he laughed, but I wouldn't stop asking so he decided to teach me about it. I can still remember most of the parts of an engine. (INT3UM-6)

As noted by the participants, the development of early interest in engineering, mathematics, or science heightened their interest in pursuing engineering degrees. Further, the participants' early educational experiences suggested that their strong abilities in mathematics influenced their choice of engineering as a career trajectory. Some participants noted that their participation in STEM bridge programs or STEM focus magnet schools increased their desire to major in engineering. Charles related that his participation in a summer STEM bridge program had given him more insight into the field.

> My high school did not have many programs for STEM, so when I got into the summer bridge program, I was really excited. The program not only helped me explore my engineering options but I also got a chance to meet tons of people working in the engineering field. I actually met my current mentor when I was in the 10th grade during one of the informational seminars. (INT4UV-5)

Participants claimed that STEM programs offered experiences in mathematics and science that they might not have had otherwise. In addition to STEM summer programs, some of the participants reported that they attended STEM magnet schools that provided access to mathematics and science curriculum typically not offered at the students' home school. In response to questions about the effect of attending a STEM magnet school, CJ noted,

> Looking back, my high school gave me so many opportunities. I had friends who attended the local high school and in their math and science classes they were learning concepts I had learned in middle school. I was shocked when some of my friends who didn't attend the same school I did would complain about their math classes. (INT5UM-7)

Recent reports in literature have found that previous engagement in STEM-related programs not only peaks student interest but increases the likelihood that the student will major in a STEM discipline (Jackson & Moore, 2006; Moore, 2006; Morris, 2006). Such engagement, as several studies have noted, reify the existence of a STEM pipeline that posits that students who pursue STEM disciplines do so because their interest in mathematics and science was continuously cultivated throughout primary and secondary school.

Academic and Social Integration. The participants' ability to integrate academically and socially in their engineering programs was a critical factor contributing to their success. A student's ability to integrate academically and socially in college is vital for academic success. Academic and social integration refers to the student's ability to connect with the essential elements within the institutional context. The participants in this study noted that to be a successful engineering major involves feeling connected to the department. Some participants noted that engineering as a major allowed them to integrate into a community of learners with similar academic aspirations. Marcus stated, "In my program we are like a family; there are seven of us who have made it to senior year together" (INT2UM-7).

Johnny, an electrical engineering major, explained how he integrated academically and socially into his engineering department. He indicated that his transition to his engineering program was initially difficult but he realized that, if he wanted to be an engineer, he had to persist. Johnny acknowledged that his classmates, whom he views as friends, and professors were *all* in the "same boat." His quote

suggests that professors are also important people who make students feel connected to the department.

For some participants, the level of peer engagement also promoted positive learning environments. Chase noted, "The professors made it easy for the students to academically and socially integrate with our peers; it was almost automatic" (INT4UV-6). He explained that, during his first semester, the students worked in collaborative teams that were evaluated as a group. He claimed that this method of instruction forced students work together. Similar ideas were conveyed by Ryan:

> In my program we are a team. While I realize I'm the only Black dude in the program, sometimes I don't think that matters. I mean, it matters but it does not matter to my team. I don't think they care about the color of my skin; they are more interested in [whether] I can handle myself academically. My program is competitive but I'm the kind of person who lives for the competition. (INT4UM-6)

Ryan's ability to understand the expectations of the environment in which he is operating in is one of the factors contributing to his success. On one hand, he recognized the need to achieve at an academically high level. On the other hand, he also recognized that his need to be academically successful was necessary in order to fit in with his peer environment. This meant having to be competitive, even though it was not in his nature, and having to establish himself as an intellectual asset to his team members.

In terms of academic and social integration, not all participants shared the same views. Marcus, a senior mechanical engineering major, discussed his experiences in the College of Engineering:

> When I applied to the [CoE1], the major I originally wanted to go into was aerospace engineering. But two things happened to deter me from choosing aerospace as my major. During my first day of college, in one of my math classes we had to go around the room and talk about our attained majors. When I said aerospace, this kid that sat behind me asked "Are you a genius? Because only geniuses are in that major." So I started to second-guess my major choice. The second thing that happened was when my advisor during my freshmen year told me "not to shoot so high" in selecting a major. He told me to be realistic in selecting a major. (INT2UM-7)

While Marcus remained academically successful in his discipline, other individuals' perceptions of the academic profile that an aerospace engineer should encompass discouraged him from pursuing aerospace engineering. His anecdote illustrates that, even though he was initially confident and secure in his desire to be an aerospace engineer, a student and an advisor, early in his college career, changed his view about his academic ability to be successful in aerospace engineering. As a result, Marcus, despite his confidence in his academic abilities, essentially was never given the opportunity to integrate academically into the aerospace engineering program.

CJ also argued that engineering as a major is both academically and socially difficult.

> Did I always feel welcome in the program? No! I remember being in classes where students would not sit next to me. I would sit in the middle of the class-room and there would always be an empty chair between me and the next person. Then I remember when we had to start our own groups, I would always have to walk around and ask people to either join my group or if I couldn't get enough people to join my group, I had to search for a group to take me in. Sometimes it was embarrassing. (INT5UM-7)

Summary. Institutional and social barriers that hinder African American males from integrating socially and academically into academic environments must be examined. While there is a plethora of literature that notes the importance of social and academic integration, this does not ensure that some students, particularly students of color who are marginalized on campus, will be able to integrate. Hostile social and academic environments had psychologically influenced the integration process for several of the participants in this study. Ultimately, while the findings illustrated that academic and social integration of the participants was influenced by the agents of the institution, it is vital to recognize that such social interactions impacted, positively or negatively, their sense of self in relation to being an engineer.

Category 4: Family Influence and Support

Whether the participants were from a single-parent or two-parent households, all indicated that their parents pushed them to excel academically and provided guidance and support as well. Smokowski, Reynolds, and Bezruczko (1999) contended that parental influences play a significant role in encouraging their child(ren)'s academic achievement. Hackett and Jackson (1993) noted that African American families have historically maintained a family cohesiveness supportive of all members of the family unit. Specifically, they noted that consistent parental involvement provides children with academic, emotional, and physical support.

Home Culture. The participants indicated that their home culture influenced aspects of their college decisions. In examining the participants' home cultures, the findings revealed the important need for participants to balance their home culture with their school culture. Participants consistently discussed the daunting task of navigating between home and college cultures. Marcus stated, "It's weird at times because at school I have one role and when I return home, my family expects me to act a certain way" (INT2UM-8). Participants' home identities and college identities became difficult to balance. Johnny asserted, "My family has always supported me but it is a different kind of support" (INT3UV-5). Similarly, CJ claimed that, when he went home to visit family members, there were pressures to conform socially. He claimed that, "it's hard at times to be back at home because people expect you to be the same kid you were three years ago but the funny thing about college: It changes you" (INT5UM-13). CJ stated that the more time he spent away from his family, the more distant he felt. Furthermore, CJ asserted that "during the holidays it was difficult to be back at home for a long period of time. I would run out of things to talk about with certain family members" (INT5UM-

13). Charles expressed similar views with regard to the difficulties related to family members.

> I love my family, they have always been there to support me. But if I'm being honest, I have always been the different one. Every since grade school I've felt different from my cousins because I love to do academic things. Two weeks ago, I was at my aunt's house and all my cousins were outside playing basketball. Because I had a test coming up, I sat inside reading. (INT4UV-6)

Charles noted that situations like the one noted above had caused him to feel disconnected from his family. Charles's feeling of lack of connection to his family paralleled several of the other participants' experiences. However, when asked whether they discussed these concerns with their family members, all replied that they had not done so. CJ indicated that he loves his family and the feeling of disconnection is something that he has to deal with on his own. The findings suggest that, while the participants perceived that their academic abilities were valued by members of their home cultures, they still encountered difficulties as they attempted to balance home and school identities. The participants noted that their families are vital support mechanisms; however, sometimes family members had difficulty in understanding the participants' strong commitment to school.

Parental Guidance. Parental guidance involves consistent academic, emotional, and physical support. For several of the participants, parental guidance was provided throughout their educational experiences. For instance, many of the participants declared that their parents had been actively involved in their education since preschool. Their parents' continuous academic support was seen as an important factor in their ability to succeed. Ryan shared, "Finishing college will be a major accomplishment for me and family. Without my family support, college would have been difficult. I dedicate my degree to them" (INT4UM-8). Many of the participants stated that the support and motivation provided by family was a major contributor to their academic success. Marcus, who lived in an apartment complex surrounded by almost his entire family,

related that he did not remember anyone in his family telling him not to go to college; instead, it was just the opposite:

> All I heard from my family was, "This boy is smart, you better go to college!" It was my mom and dad, aunts and uncles, and grandparents all telling me the same thing. One of the things my dad would say was, "Boy, you need that degree, it's going to allow you to make some real decisions regarding your life." (INT2UM-7)

Marcus further noted that his family often reminded him that he is the future of the family. Marcus expressed that, "sometimes the idea of not letting my entire family down was overwhelming. College is tough, and engineering as a major is even tougher. It doesn't help when you have your entire family's dreams weighing on your shoulder" (INT2UM-7). Marcus's family's constant support added a level of pressure to an already stressful situation. Despite the increased stress level, Marcus reflected that his family was counting on him, which helped him through difficult times in school.

For other participants, support provided by their mothers was vital to their achievement. The importance of mothers in their child(ren)'s academic success has been widely noted in the literature (Coles, 2006; Hackett & Jackson, 1993; Newman, 2000). Ryan reflected on his mother's words:

> My mom is a wise woman. I remember what she told me when I purchased my cap and gown for graduation. She said, "You have made it to the top of the mountain. Be proud!" No one else in our family has made it to the top [graduating from college]. (INT4UM-8)

Ryan viewed his mother's comments as support but they led him to realize that his upcoming college graduation was not only an individual accomplishment but rather a collective family accomplishment. This is particularly evident with the latter part of the quote, where his mother suggests that he had climbed a "mountain"—a place where no one else in the family has reached.

Other participants stated that, even from an early age, their mothers had been consistently and enthusiastically involved in their academic development. Chase, who grew up with a strong mother figure, talked about his mother's influence. He stated:

> My mom didn't give me an option. I had to get good grades. She would say, "Your grades are a reflection of who you are as a person. When you go out in the real world and look for a job, the first thing a company wants to see is your grades from college." (INT1UV-7)

Chase attributed his mother's strictness to her upbringing. He described his mother's relationship with his grandmother:

> My mom was strict but my grandmother . . . man! When my mother was growing up, my grandmother kept a tight lock on her. My grandmother did not like when my mother got B's in school. In my grandmother's house, A's were the only acceptable grade for her. I think my grandmother pushed my mother so hard because they stayed in the projects and she [grandmother] knew if mother was going to make it out, she needed to be focused academically. (INT1UV-7)

Chase noted that being raised in a strict environment worked to his advantage because his mother, who learned from her mother, presented the highest expectations for his grades. He recognized that several of his friends who did not have the same type of discipline in their homes were either on the streets or in jail. He contended that the lessons that his mother instilled in him saved him from the mistakes made by some of his peers.

While all of the participants noted the importance of their mothers' encouragement and support, others also noted their fathers' support as being invaluable. Johnny claimed that his father's support was always present. He articulated that, "Intellectually he[father] knew I could do anything I set my mind to but he always challenged me to do more" (INT3UV-5). Similarly, CJ said,

> My dad believed an engineering degree was the key to happiness. He said, "With a degree in engineering, you can write your own ticket. With this degree you will have a career in something you love and in return you are making money doing what you love in life." (INT5UM-9)

CJ added that, although his father did not have a college degree, he provided continuous support and guidance.

> When I got into college, I knew engineering was what I wanted to study, but I couldn't decide on which field. So I asked my Dad. He reminded me of the bridge I built in my STEM academy one year and how much I loved it. He was right, so I decided on civil engineering and I'm completely happy in my program, thanks to my dad. (INT5UM-9)

CJ asserted that his father has always been his advocate. His father's support focused on the long-term opportunities that CJ's engineering degree would provide. As a result, CJ valued his father's insight, particularly his suggestion to major in civil engineering,.

From the data gathered, it is reasonable to conclude that family support and encouragement has been a major contributor to these participants' academic success. Several participants indicated that their family's support helped them through chaotic times during college. Parental support was a contributing factor to the academic success of the participants, providing reinforcement about their academic abilities.

Parental Involvement. Similar to parental guidance, parent involvement influenced the participants' academic achievement. Parental involvement, in this study, consisted of parents providing academic and emotional support to assist their child in their educational endeavors. Several of the participants recalled their parents being actively involved in their academic process. During the participants' early years in school, involvement by parents consisted chiefly of helping with their homework. However, several of the participants noted that, after they reached a certain level of mathematics and science, their parents' academic support took the form of encouragement. Johnny stated,

> Back in school my dad didn't help me with my school work too often but he did provide me with tons of emotional support. Even now that I'm in college, he calls me to see how my test went or to make sure I'm taking care of myself. (INT3UV-5)

Similarly to Johnny's experience, Marcus expressed that he knew that his parents were proud of his academic abilities; however, he does not remember his parents helping him with his homework after middle school. He recalled,

> Once when I was in 10th grade I asked my father for help with my science homework and, I remember this like it was yesterday: He turned to me and said, "You're smart, figure it out!" Looking back, I realize he probably didn't have a clue about my chemistry homework. But his word of "You're smart, figure it out" became my answer to anything in life that was difficult. (INT2UM-8)

Other participants discussed how their families valued education and provided them with encouragement; however, several noted that the support was sometimes more emotional than intellectual. Duncan indicated, "My family was there for me but they really couldn't help with class work" (INT1UM-8). Jack recalled a similar experience with his mother.

> My mother, man, she is always taking care of me. For instance, she calls me all the time, she sends me money, and she visits me on campus about twice a semester. She asks about school but she never really asks in detail about certain classes. She'll ask me, "How's school going?" and I'll say, "Fine," then she asks me if I have food for the month. That's just mom being mom! (INT3UM-7)

Regardless of their family's inability to provide academic support, most of the participants noted that their family played an integral role in their college experience. Isaiah discussed the situation with his parents:

> Mom and dad always encouraged me but when it came to homework, I had to figure it out on my own. Looking back, I'm glad my parents raised me that way because now that I'm in college, I know if I don't know the answer, no one is going to give it to me. I have to find knowledge on my own. (INT2UV-8)

Summary. The findings in this section indicated that parents played a vital role in the educational process of their children. While a majority of the participants expressed the notion that their parents' involvement in their inquiry of knowledge (i.e., school-related subjects) past middle school was limited, they still attributed their academic success to their parents' continual support. In short, for the participants in this study, parent involvement consisted of high parental expectations, firmness (disciplinary

matters), encouragement, and emotional support. It is interesting that parents, more often than not, provided support that not only reinforced a belief in their child's academic ability but also focused on the tangible aspects associated with degree attainment (e.g., money, future). Each of the participants revealed that his academic success was directly tied to the involvement and support of his parents.

Category 5: Peer Group

Peer Interactions. The participants indicated that peer support in college was just as important as family support. For African American male college students, involvement with their peers has repeatedly been linked to successful navigation of the college experience (Moore & Jackson, 2006). The participants interacted with their peers in a variety of settings, such as in-class groups, engineering clubs, and honor societies. Particularly, several of the participants noted that to be successful in an engineering program required a strong support network. For these participants, having other African American males in their engineering programs provided a sense of community. Marcus claimed that he rarely interacted with anyone outside the engineering department.

> Sometimes it's hard to find things in common with people outside your major or your area of interest. So I typically made friends who are engineering as a major, math, or science. But for me, it's no different from high school, where most of my friends were also in advanced courses. (INT2UM-9)

Isaiah attributed his academic success to continuous support from his younger brothers, also other college student peers.

> I'm thankful I have my brothers here with me. My brothers are my rock! They are the best support network I could ask for. Since we are both in the engineering program, we are able to share resources and give each other advice. My brothers really keep me going, they keep me motivated. At times when I feel like giving up, I just remember they are watching me. My success is their success! (INT2UV-8)

For Isaiah, support not only comes from peers but he also benefits from his unique situation in that his two younger brothers are also engineering majors. The bond

of siblings, for Isaiah, is compounded as his two younger brothers attend the same university and are also pursuing engineering degrees.

Similar to the experiences of the other participants, CJ had a connection with his roommate.

> My roommate played an important role in my decision to major in STEM. During my freshmen year I didn't know what I wanted to major in. At the time I was unhappy majoring in criminal justice and my roommate was majoring in industrial engineering. I remember him talking about the awesome classes he was taking and how cool the professors were. I decided to meet with one of the advisors and the rest is history. I should really thank him for putting my life on track. (INT5UM-8)

CJ attributed his entry into engineering on influential interaction with his roommate. Prior to entering the engineering field, CJ met someone who gave him insight about the nature of engineering.

Johnny also claimed that he was positively affected by African American male peers. "My friends in my program are my lifeline. When times are hard I can always count on them; they are my brothers and will always be" (INT5UV-6). Peer support, especially from the same race, provides Johnny with similar people who have comparable experiences as him. Jack gave a similar statement about his experiences with his best friend.

> One of my high school best friends and I attended the same college. We both also decided to major in engineering. While we major in different areas of engineering, we still have each other's back. Other than my family, he's the one person I can call for anything. (INT3UM-8)

Similar to Jack's experience, many of the participants found positive peer support to be an essential component to their transition in college. Essentially, peers serve as extended family to some of the participants as they navigated college. However, some of the participants also encountered negative peer influence. For instance, Johnny commented,

> Not all my peers perceive me as being smart as I thought I was. My buddies in civil engineering would make jokes, like, "If you were really smart, you would be doing civil engineering, not the mechanical fluff." (INT3UV-6)

It is interesting to note that negative peer influence, in Johnny's instance, was simply a result of engineering peers majoring in different disciplines. Several other participants shared similar experiences within the context of their institution. Marcus explained how his peers influenced their academic experiences attending University A.

> Some of the other Black students at University A didn't associate with me. I was the smart kid, the one who did well in math and science classes. Sometimes I felt like the outsider. I can say the same thing about my department because there are a limited number of Black guys in the program. I really don't have that many Black friends in the program. Well, I have my roommate and some of his friends, but I can count on one hand the number of Black guys I'm friends with. It's sad! (INT2UM-9)

It is clear that Marcus was aware of the lack of African American males engineering as a major. Also, he recognized the ramifications of their underrepresentation in engineering, such as limiting his ability to have Black friends from within his program.

Ryan claimed that students outside the aerospace engineering program had difficulty in understanding the time commitment hat his program requires.

> I wouldn't say that college really changed the type of people I associate with. It's funny because I think of college being a lot like high school, people just have their groups. Unfortunately, the sad reality of aerospace engineering is that I'm the only Black student in the program, so I'm limited. (INT4UM-8)

Participants from University HBCU (the HBCU) described their peer experiences similar to those of participants from University PWI. For instance, Charles and Johnny described how their experiences with peers influenced their academic experiences. Charles asserted,

> You have friends and then you have peers you associate with once-in-awhile. But again there are those haters, who try to look down on you because you're into making good grades and stuff. I really don't pay those individuals too much attention because I'm going to succeed regardless of what people think of me. (INT3UV-6)

Charles' ability to be successful in his program was not hindered by negative comments from peers. Unlike Ryan, Charles viewed negative comments as stemming from a

perceptions of grades—ability, rather than race. Conversely, Johnny spoke about how his peers perceived him inside and outside of the classroom:

> During class we are all cool. But some of the guys [African American male STEM students] in my program are concerned about being judged by the other students [non-STEM students] on campus, especially the girls. Some of the guys won't even carry a back pack because of the perception of being a nerd. The way I look at it, people [other students on campus] are going to like me for who I am. Honestly, if you think about it, nerds always make bank. So I'm happy to be considered a nerd. (INT3UV-6)

For the participants of this study, peer influences impacted their academic experiences both positively and negatively. Essentially, negative peer influences did not affect participants' academic success. Isaiah commented,

> People on campus have called me a nerd, library-head, and even sometimes claimed I was "acting White." I don't mind being called a nerd or library-head because those things are true. I like to study and make good grades. But when people say I'm "acting White," I get irritated because they are making the assumption that a Black guy can't be smart. The worst part, these assumptions come from other Black students. [Interviewer: Which students?] Sadly, those types of comments mainly come from the females on campus. (INT2UV-9)

Isaiah did not allow negative peer influence to affect his self-perception. Within the context of University HBCU, Isaiah acknowledged that some of the labels placed on him (e.g., nerd, library-head) did not bother him. However, he asserted that the notion that someone would perceive his academic abilities as "acting White" was irritating because it suggested that being an African American male meant that one could not be high achieving. Jack expressed similar annoyance over being harassed by his peers:

> Because I didn't do the extracurricular thing like everyone else, people [other students] would put a label on me. Honestly, around here people don't take the time to get to know you. That is really annoying! People would call me "White boy" because I didn't go out with certain groups or stuff like that. [Interviewer: Who harassed you the most?] It came from both sides, White and Black people. (INT3UM-9)

Jack's experience denotes that peers, regardless of race, viewed him as a "White boy" based on his interaction and affiliation (or non-affiliation) with diverse groups of

students. Similar to Isaiah's experience, Jack's experience illustrate that peers have a limited perception of what defines a high achieving African American male.

Summary. An increasing amount of literature documents the importance of peer influences on academic decision making (Hubbard, 2005; Newman & Newman, 1999; Somers et al., 2008). Many researchers have noted that peer influence may affect school performance and achievement (Fletcher & Tienda 2008; Sacerdote 2001; Zimmerman 2003). For these participants, peer influence provided both academic and social support and influenced their ability to achieve. The establishment of supportive peer relationships was essential for the participants' adjustment to university life. Each of the participants acknowledged that peer interaction was a significant part of his academic experience. The findings also suggest that peer interactions could be either positive or negative, but the interactions that occurred between the participants and their peers had a profound impact on their transition into college and subsequent social integration into their degree programs.

Category 6: Faculty Influences

Interaction with Faculty. While many factors contribute to academic achievement, it has been widely recognized that the relationship between students and faculty members is influential to their academic success (Anaya & Cole, 2001; Flowers, 2003; Tinto, 1993). As noted with the concept of peer support, faculty support plays a vital role in achievement by African American male college students. African American students who have educators who provide a caring, supporting, and encouraging environment are more likely to have a positive self-concept (Russell & Atwater, 2005).

Faculty-student interaction can influence a range of educational outcomes, including attitudes toward college, personal development, and degree completion. Several participants indicated that faculty mentorships assisted in their success in

college. Charles claimed, “We have a great chemical engineering department; if you need to talk to your advisor, a professor, or even the Dean of the College, their doors are always open” (INT4UV-7).

Johnny noted that faculty support occurs inside and outside of the classroom.

> The faculty at my college, no matter what department, wants you to do well in school. My junior year I took a fine arts course. I still remember how supportive the professor was. He was so interested and invested in my learning. When I first signed up for that course, I didn’t think I was going to enjoy it. But after the second week that class ended up being one of my favorite courses. (INT3UV-6)

Participants commented that they benefitted intellectually and academically when they interaction with faculty. Isaiah and Chase, seniors at University HBCU, shared similar positive experiences about their faculty mentors. Isaiah explained, “From the first day we met, my mentor and I got along very well. I guess it was due to our similar experiences growing up” (INT2UV-10). Chase also noted his positive interaction with the faculty at University HBCU:

> I know the faculty members in the College of Engineering definitely fight for us. When I couldn’t find an internship, my mentor got on the phone and made some calls. Three days later I had an interview with a local engineering firm. (INT1UV-9)

Chase shared that faculty were eager to serve as mentors and to help students in the program. His experience highlights another role that faculty play for their students: networking. In this case, Chase’s mentor used his networking skills to arrange an interview for an internship.

CJ reported that one of the professors in the honors program provided him guidance and support.

> My freshmen year, I needed some type of guidance. So I decided to talk to one of the faculty members in the honors program. He wasn’t even a professor in engineering but he offered me so much good advice about my major selection. Still to this day, I seek his advice on academic and personal issues. (INT5UM-10)

CJ's mentor offered guidance and support even though he was not a member of the engineering faculty. This suggests that faculty-to-student interaction and mentorship does not have to come from faculty within one's respective discipline.

Several participants shared that they felt connected to their faculty because of the openness of their academic departments. They identified open faculty office doors as an indicator of the openness and welcoming nature of the department. Marcus reported that the faculty members in his program try to offer students support inside and outside of the classroom, even though it is difficult for them.

> I really like my professors. They are tough and challenging but I like that about them. I know their jobs are hard with the teaching and research. So I understand they don't have the time or energy to mentor students. (INT2UM-9)

While Marcus acknowledged the importance of faculty mentorship of students, he recognized the pressure and time constraints placed on faculty by the responsibilities for research. Marcus provided an insightful explanation about being less connected to his professors:

> I work hard in class and it is not like I want a gold star for my efforts, but it would be nice if my professor remembered my name. Sometimes I feel like just any other face in a crowd of students. I wish my identity wasn't a mystery to my professors. (INT2UM-10)

Although Jack praised his mentor, he remarked that this had not always been the case. He related an issue with a faculty advisor:

> I still remember this, it was my freshmen year and my assigned faculty advisor sat me down and told me, "There are not many students that look like you that make it out of this program and there is a reason for that." So after that moment, all I wanted to do was prove him wrong and make it out of this program. (INT3UM-10)

Jack allowed a negative experience to motivate him to prove his faculty advisor wrong. In this case, even though the faculty engagement was negative, Jack did not allow it to adversely affect his ability to be academically successful.

Ryan also experienced difficulty in connecting with faculty members.

> I tried to connect with one of the faculty members in my program but I was told he wasn't taking on any new students. I learned quickly that the faculty members in my program are not too involved with student support. It doesn't matter if you are White, Black, or Asian, the faculty members in aerospace are more focused on research than teaching and mentoring. That is just the nature of the department. (INT4UM-9)

Even though Ryan is aware of the importance of faculty mentors, he accepts that the "nature of the department" does not promote such mentorship as faculty are occupied with research and not necessary cultivating student protégés. His quote suggests that faculty and student interaction is departmentalized, as other participants have reported availability of faculty mentors. While some participants struggled with faculty interaction, not all of the participants' experiences reflected this situation. Throughout the interviews, most of the participants acknowledged the importance of membership in the National Society for Black Engineers (NSBE), specifically regarding networking, creating opportunities for faculty interaction, and accessing academic support (i.e., tutoring).

NSBE. While a majority of the participants who attended University PWI stated that faculty support and mentoring was difficult within their departments, they indicated other avenues for mentoring and support on campus. They contended that faculty mentors who participated in NSBE played a significant role in their academic success within their engineering programs. They also indicated that student organizations such as NSBE are critical social and academic support networks. According to the organization's web site the mission of NSBE is to increase the number of culturally responsible Black engineers who excel academically, succeed professionally and positively impact the community (NSBE, 2011).

For many of the participants, especially those at University PWI, NSBE serves as a conduit for academic support and mentoring. CJ, who has been a member of NSBE since his freshmen year, he stated,

> NSBE is a great place to network. When faculty members come to our meeting, they seem much more approachable than in class. I think NSBE allows us to connect with Black faculty on another level, which is good. (INT5UM-10)

Isaiah, who has been a member of NSBE for years, noted, "It's not always about what you know . . . sometimes it's about who you know, and being a member of NSBE provided me with networking opportunities" (INT2UV-11).

Marcus reported that being a member of NSBE gave him access to faculty members. Ryan indicated that, "As a member of NSBE I went to study session, career informational, and interacted with different engineering majors. . . . The best part of the organization was that it introduced me to Black faculty members in engineering" (INT2UM-10).

Similarly, Johnny, who is also an active member of University HBCU's NSBE chapter, stated,

> In regards to faculty interaction with students, my department is really good, but NSBE offers more interaction with students and faculty from different areas of engineering. It is always interesting to get a different point of view about various engineering topics. (INT3UV-6)

The findings suggest that faculty support varied by institutional type and by academic department. For instance, a majority of the participants at University HBCU, an HBCU, reported greater satisfaction with their relationships with faculty members, while most of the participants at University PWI perceived their faculty support to be limited. HBCUs have been historically known to provide students with greater student faculty interaction as indicated in their mission statement. Several of the participants from University PWI articulated that, while their faculty members were highly qualified engineers, most tended not to extend support efforts outside the classroom or laboratory.

Summary. The findings suggest that the support that participants received from faculty mentors and, for some, participation in NSBE made them feel connected to the engineering program. According to Harper (2005), college students who are active participants in student organizations (such as NSBE) gain learning opportunities that can

influence the way in which African American males connect with the institution. For participants, their participation in NSBE led to development of faculty relationships that the participants considered to increase their networking opportunities. The participants acknowledged that faculty support and mentoring were key factors in their academic development.

Category 7: The Students' Perception of the Institution

For these participants, the institutional context (PWI or HBCU) was an integral aspect of their ability to integrate academically and socially. Tinto (1975) posited that interaction between students and the institution are multidimensional, as campus climate is a vital aspect of student success. Swail, Redd, and Perna (2003) noted that "campus climate mediates undergraduates' academic and social experiences in college" (p. 57). Hence, students' perceptions of their respective university (Of their university what???) and its influence, if any, framed the manner in which they viewed their interactions with their departments and institution.

Campus Climate. Although the participants realized that the College of Engineering is only a microcosm of the larger institutional structure, they claimed that elements of their experiences were representative of the entire campus climate. For instance, several participants at University PWI described the institutional environment as one that promoted competition. CJ noted,

> It's funny, people think engineering is all about competition . . . . No, it's the entire university. I know people who couldn't get into some of the business programs because they only wanted so many students. This school is "dog eat dog," like the real world. (INT5UM-14)

Ryan, a senior aerospace engineering major, also indicated that his department strived on the competitive nature of the environment:

> Competition is just part of the campus culture. You have to fight to get admitted, then you have to fight when you get into your department. It's like, your friends are your friends, but they are also your biggest competition. (INT4UM-9)

For Ryan, competition was an innate aspect of the campus climate, found not only at the departmental level but also within the classroom. He included friends as competitors. The premise of competition was reinforced throughout various levels of the institution.

Similar to Ryan's statement, Marcus noted that an overly competitive environment was more harmful than helpful.

> Some competition is good, but to have an entire program designed around that idea is not good. When it's all about the competition, people [peers and faculty] are not always willing to help. So sometimes I didn't make good grades because I didn't have help when I really needed it. (INT2UM-10)

In Marcus' experience, competition was an inherent characteristic of his program. Because of this, students and faculty were not always willing to help. From Marcus's viewpoint, competition inhibited his ability to be academically successful. Still, several participants at University PWI expressed concerns about the lack of cultural connection within institutions and especially in the classroom setting.

College Choice. Each of the participants noted that selecting the right institution was one of the most important decisions they made in their young lives. The findings indicated that a majority of the participants had been exposed to the university before deciding to attend. For instance, Ryan acknowledged that his university had a good vibe. "I came here [University PWI] a lot when I was in a STEM summer program. So my choice to attend University PWI was easy because it seemed familiar" (INT4UM-9). Chase noted that his high school arranged several field trips to University HBCU. "University HBCU is like a second home. I've been coming to this campus since I was a freshman in high school. So I decided to attend this school because it feels comfortable" (INT1UV-10).

However, other participants, such as Marcus, did not share similar experiences. Marcus claimed that he had several choices of where to attend school but came to University PWI because one of the recruiters had a significant impact on him. Marcus

proclaimed that, "He [recruiter] presented himself and the university in the best light. . . . Everything on campus was great! At the time, I felt he [recruiter] was really open and honest" (INT2UM-10). Marcus also articulated that at first he felt that the recruiter had his best interest at heart, but when he arrived on campus, it was not the story that the recruiter told. He further claimed that, "It seems they just wanted another Black face in engineering" (INT1UM-10).

In addition to familiarity with the institution, several participants indicated that their decision to attend their university was based on location. Six of the participants' childhood homes were within a few hours driving distance from the universities that they attended. This convenience of location made travel home feasible when necessary or desired. Isaiah explained,

> The location was a strong factor in selecting University HBCU. The campus seemed appealing to me just because it was kind of close to home. So if I forgot something or needed to go up to home for something, I could easily travel back and forth. But being here still gave me some freedom from my parents. (INT2UV-11)

While all of the participants moved away from home to live on or near campus during their freshmen year, they were all still closely connected to their families. Johnny said, "Living close to home was great. I was able go home on the weekends and hang with my family" (INT3UV-7). The participants' proximity to their families was one of the strongest indicators for college selection.

Positive recommendations about the college were also a strong influence in college selection. Several participants noted that they received positive feedback about the university from high school teachers, family members, and former students from their neighborhood. The participants valued recommendations from friends, mentors, and teachers who actually attended the university. For instance, Marcus noted that a friend's recommendation helped him with his college decision. Within his family, he had

limited access to people who attended University PWI. A recommendation from a high school teacher increased Chase's interest in attending University HBCU.

> My high school math teacher graduated from this University and he said that it had a really good math and science program. Because I knew someone who had a positive experiences attending [University HBCU], I was more comfortable with my decision to attend. (INT1UV-9)

Summary. The participants reported that others' validation of the university had provided insight into the quality of the institution and perhaps the projection that they, too, could be successful there. Familiarity with the institution, location, and recommendations were all influential in the participants' decisions to enroll at either University PWI or University HBCU.

Chapter Summary

The following categories emerged from data analysis: (a) self-perceptions, (b) financial obstacles, (c) engineering as a major, (d) family influence and support, (e) peer relationships, (f) relationships with faculty, and (g) the students' perceptions of the institution. While this study examined participants from two institutional contexts, it is important to note that similar categories emerged with regard to family influences, financial obstacles, peer interaction, and relationships with faculty members. It is vital to acknowledge nuances among and between participants, specifically in relation to their institutional perceptions.

CHAPTER V

CONCLUSION AND RECOMMENDATIONS

This case study explored the perceptions of academically gifted, poor, African American males pursuing degrees in STEM disciplines. This chapter discusses the findings reported in Chapter IV. In addition, this chapter presents implications for practice and suggestions for further research.

Discussion of Findings

Although recent researchers (Hrabowski, 2003a, 2003b; Moore, 2006) have discussed aspects of minority participation in STEM, little research has examined the influence of poverty. This study was designed to investigate how academically gifted, poor, African American male engineering majors perceived their college experience within the HBCU or PWI context. Based on the participants' responses, seven categories emerged to identify aspects of the participants' experiences while attending college: *(a) self-perceptions, (b) financial obstacles, (c) engineering as a major, (d) family influence and support, (e) peer relationships, (f) relationships with faculty, and (g) the students' perceptions of the institution.*

Based on the findings, it was concluded that institutions of higher education must understand the various factors (e.g., peer and faculty support, institutional congruence) that influence the academic and social integration of academically gifted, poor, African American male students. Specifically, these institutions must recognize the importance of family involvement, mentoring, and increased financial support for academically gifted, poor, African American male students. Because African American males are far more likely to be underrepresented in STEM programs, it is vital that institutions of higher education provide proactive interventions. Improving the educational

opportunities of academically gifted, poor, African American males is a matter of social and educational equity.

Relation to Conceptual Framework

When examining the perceptions of academically gifted, poor, African American male engineering majors, it is essential to understand how their experiences are influenced by the intersection of multiple theories. Three distinctive theories comprised the conceptual framework employed in this study: (a) Sternberg's (2003) triarchic theory of intelligence, (b) Tinto's (1993) student integration model, and (c) Whiting's (2006a) scholar identity model. Each of these theories served as a frame to understanding the participants' conceptualization of their experiences. Figure 5 indicates the intersection of the three theories that comprised the conceptual framework.

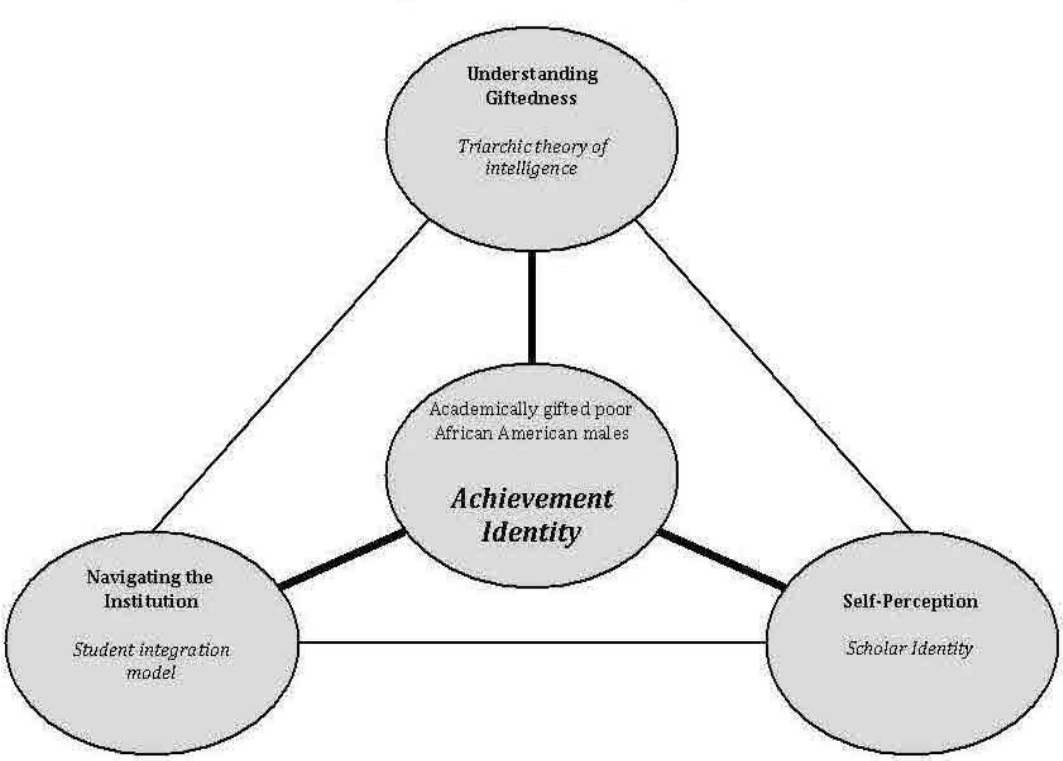

Figure 5. Achievement identity.

The components of the conceptual framework led to a holistic understanding of achievement identity. Specifically, the models enabled an understanding of giftedness, college academic and social integration, and the participants' self-perceptions of being gifted. Based on the participants' conceptualization of their experiences, the conceptual framework illustrates the interconnectedness between participants' experiences and these three theories. Participants' perceived notions of their ability, willingness to socially and academically integrate, and framing of their giftedness all occurred simultaneously to create an "achievement identity."

Triarchic Theory of Intelligence

Sternberg (2003) characterized intelligence as the cognitive ability to learn from experience, to rationalize, to remember important information, and to manage successfully the demands of daily living. Sternberg posited that the notion of giftedness is constructed from an individualized and holistic ideology that emphasizes the interactions among multiple factors in the development of academic abilities. In other words, giftedness is multidimensional as social, academic, and environmental factors influence and broaden the traditional definition of giftedness. Sternberg posited that various forms of intelligence, such as *analytical*, *creative*, and *practical*, can be attributed to innate characteristics associated with student learning.

Sternberg (2003 noted that *analytical intelligence* is based on the joint operations of metacomponents and performance components, as well as knowledge acquisition. Study participants in this study claimed that, while they were always cognizant of their academic abilities, their opportunity to acquire knowledge was sometimes limited. Consequently, they had to be proactive in their pursuit of knowledge acquisition. For instance, one of the ways in which the participants acquired knowledge in engineering was to enroll in STEM bridge programs or attend STEM charter academies.

Sternberg (2003) also acknowledged the importance of *creative intelligence,* which he stated involves insights. He held that people who embodied creative intelligence could synthesize information and solve life problems. He asserted that this creative intelligence allows people to adjust creatively in new situations and generate new ideas. Study participants indicated that, since a young age, had felt creative. One participant related that in primary school he disassembled and reassembled, in an entirely new way, a computer. All of the participants mentioned that engineering as a major requires a high level of creativity. For example, three participants made the comment that "engineering requires you to think outside the box." When asked for clarification, each claimed that engineers must consider what will be necessary for the future, rather than simply what will be necessary today.

Sternberg (2003) discussed *practical intelligence,* which he claimed involves the ability to manage everyday tasks. Practical intelligence is the ability to live and balance the demands of the external world successfully. Study participants described how the monetary demands of college often prompted them to negotiate elements of their academic process. For instance, the cost of textbooks was a recurring theme. Students noted that, to be successful without the textbook, they had to "hustle." This meant that participants had to negotiate their available resources by determining which textbooks to purchase, borrow from classmates, or borrow from the library. Participants also had to find ancillary support in lieu of resources that they could not afford to purchase. Regardless of their socioeconomic situation, participants persisted beyond the sophomore benchmark that most engineering students do not meet.

Sternberg's (2003) theory suggests that the integration of analytical, creative, and practical intelligences was evident in the participants of this study. While several of the participants acknowledged *giftedness* as a positive characteristic, their tendency to self-

identify as gifted was rarely done. Rather than perceiving themselves as *gifted*, the participants recognized themselves as *high achieving,* a term that Sternberg used to refer to the ability to apply knowledge. Participants notions of their intelligence were based on their ability to achieve academically and to utilize knowledge to persist in educational pursuits. Their perceptions about their academic abilities (i.e., giftedness) were influenced by both academic and social factors.

Social and Academic Integration

According to Tinto (1993), African American students face unique challenges in their academic and social integration at institutions of higher education. Tinto's model suggests that students' personal background characteristics, as well as educational and occupational goals, are strong predictors of academic success. Tinto asserted that individual characteristics and institutional context both impact the student's ability to persist. In this study, the participants' ability to integrate academically and socially into their college environments was a significant component of their academic success. Findings indicated that social and academic integration, campus climate, and financial aid were major contributors to the academic and social development of the participants.

The way in which students integrate socially into the university has been noted as a compounding process (Tinto, 1993). Social integration is a cumulative process that continues throughout the student's college experience. For most students, particularly African American males, peer relations and faculty mentors are important factors in student integration, both academically and socially (Cabrera, Colbeck, & Terenzini, 2001; Love, 1995; Pascarella & Terenzini, 1991). Peer relationships and faculty mentors were important factors within the experiences of the participants.

Study participants discussed how peers had influenced their college experience. Their interactions with peers were sometimes positive and sometimes negative. For

instance, some participants noted that their peers had inspired them to pursue engineering as a major. One participant explained his roommate's influence on his decision to explore civil engineering as a possible major. With regard to negative peer interaction, several participants reported that peers sometimes disapproved of their giftedness. Some reported being called names such as "nerd," "school boy," and "library head" because of their commitment to education. Others reported that peers referred to them as "White boy," judging their drive to be academically successful as wanting to be White. Participants indicated that they did not care about being teased but noted frustration about being called "White". In several studies, Ford (1992, 1996, 2005) asserted that gifted African American males were more likely than gifted female counterparts to report negative pressures from peers when they performed well academically. One participant declared, "Because you are an African American male who is achieving academically does not mean you want to be White; it just means you want to achieve something in your life."

Faculty mentoring, both inside and outside of the classroom, was a significant contributor to the academic and social integration of the participants. For instance, participants who attended University PWI the PWI, had to seek faculty mentorship through their involvement in an engineering organization. They declared that, because faculty interaction outside the classroom was minimal, they sought mentors through other avenues (e.g., honors programs, organizations). Study participants at University HBCU, the HBCU, reported that finding a faculty mentor was not problematic, as the nature of the engineering department was built on the concept of student support.

Study participants at University HBCU noted that a lack of student success was a result of the individual and not the environment. On the contrary, participants at University PWI claimed that individual competition was embedded within every aspect

of the institutional context. Student success is based on the students' ability to remain competitive in unbalanced circumstances, many of which are out of students' control. Participants' realization of the lack of resources compelled them to meet various academic and financial challenges.

Campus Climate

The campus climate influences the academic and social experiences of college students (Brown, Morning, & Watkins, 2005). The concept of *institutional fit* is essential to understanding the effect of campus environments on successful integration by students. Study participants who attended University HBCU indicated that they had an instant connection with their institution. They commented on the nature of the institutional climate, calling University HBCU their "second home." When asked to explain this, they asserted that University HBCU was supportive of their needs. Study participants who attended University PWI presented a different narrative, claiming that they had experienced culture shock (incongruence between home and school cultures; Swail et al., 2003).

Several participants at University PWI noted limited numbers of African American males in their engineering program. One participants said that he was the only African American within his entire department. Swail et al. (2003) noted that lack of diversity with regard to income and race/ethnicity in the student population, faculty, staff, and curriculum often restricts the nature and quality of minority students' college experiences. While the study participants who attended University PWI were aware of this lack of incongruence (i.e., race/ethnicity and income status), they did not allow those factors to hinder their academic performance and social experiences.

Financial Aid

As state appropriations for public institutions have continued to decrease, college tuition has rapidly increased. According to the USDOE (2003), average increases in tuition in the past decade have outpaced the rate of inflation by three to four times. A reduction in need-based grant aid imposes an additional financial burden on low-income college students whose navigation of higher education is driven by availability of financial aid. Unfortunately, the average cost of a public 4-year college is equivalent to 71% of the average low-income student's annual family income (Padroin, 2004). This condition limits families' ability to contribute financially to their child(ren)'s college expenses.

Study participants indicated that financial aid awards were a significant contributor to their success. They noted that lack of financial aid and other monetary resources made engineering as a major challenging. For instance, the participants asserted that overpriced textbooks and increased laboratory fees intensified the already high financial burden of college. Regrettably, national data on educational attainment illustrate that race and family income continue to impact college enrollment and graduation rates (USDOE, 2003). As a result, when African American males from low-income backgrounds enroll in higher education, they are often burdened by serious financial obstacles.

Scholar Identity Model

Establishing a coherent sense of one's self is an essential part of the collegiate experience for academically gifted, poor, African American males. Whiting's (2006a) scholar identity model posited that African American males' identities are constructed by interaction between the school environment and several internal characteristics, such as self-efficacy and willingness to make sacrifices.

Self-efficacy refers to one's belief about one's ability to perform a specific task. According to Bandura (1997), "Efficacy is a generative capability in which cognitive, social, emotional, and behavioral subskills must be organized and effectively orchestrated to serve innumerable purposes" (pp. 36-37). In other words, by organizing and executing a necessary course of action, people self-regulate their learning, in addition to setting proximal goals as a means to increase their beliefs not only about their ability to perform a task but also their persistence in the task. Leading scholars on gifted African American students (Bonner, 2001b, 2010a; Ford, 1996, 1999; Grantham, 2004a; Hilliard, 2003) have maintained that "strong sense of self" is an essential characteristic of academically gifted African American males. Whiting (2006a) asserted that, when self-efficacy is positive for African American males, they tend to share similar characteristics: (a) high resilience; (b) high self-confidence; (c) high self-control; (d) a strong sense of self-responsibility; and (e) a clear understanding of the tasks that they face and the belief that they can accomplish all of the subtasks associated with their goal.

All of the study participants stressed that they believed in their ability to achieve. As a result, they were able to perform successfully in their respective majors. However, each participant asserted that academic success was dependent on the willingness to make sacrifices. For instance, Isaiah said that his need to achieve was greater than the need to participate in unimportant social experiences such as parties. He claimed that other students considered him an outsider but that their perceptions were irrelevant. His academic goals took precedence over nonacademic events. Whiting (2006a) indicated that African American males who have a scholar identity understand the necessity for *self-sacrifice* to reach academic goals. The participants stressed that the time commitment to homework, study, and in-class assignments seemed to be more daunting

in their major than in other college majors but they declared that they were willing to sacrifice now to realize gains in the future.

Relation to Research Questions

This study employed a qualitative research process to address the four research questions. The four questions were generated from the literature regarding factors that contribute to the academic and social development of academically gifted, poor, African American college males majoring in STEM disciplines.

Research Question 1

Research question 1 asked, What are the academic and social factors that influence academically gifted, poor, African American males' collegiate experiences?

Study participants indicated that one of the most significant academic and social factors that influenced their collegiate transition was support. They declared that supportive family relationships were important for their self-confidence, which in turn increased their drive for achievement. Peer and faculty support was associated by participants with higher levels of academic achievement. Marcus explained that his mother's weekly telephone calls made him feel that he was not alone in his academic journey. Jack asserted that family support was essential for his mental well-being.

Peer support also contributed to the academic and social transitional process for the participants. CJ (University PWI) reported that his academic support came from his relationship with peers, which led to increased confidence in his academic abilities. Several participants asserted that surrounding themselves with other engineering students was important to their academic and social transition to college.

The findings revealed that NSBE had played an integral role in the facilitation of academic and social integration through increased peer interaction. The participants cited that their participation in NSBE had allowed them to get to know faculty members

outside the classroom context. However, Ryan (University PWI), the only African American aerospace engineering student in his program, noted that NSBE did not focus on aerospace majors, which he found frustrating. Nevertheless, he claimed that NBSE provided opportunities to network and interact with faculty from a range of disciplines of engineering.

The participants indicated that faculty involvement was vital to their success, specifically during their early years in engineering, which had enabled them to acclimate socially and academically to their institution. Participants stated that faculty mentors were an integral aspect of their ability to create support networks. Marcus (University PWI) claimed that not all faculty in his department knew him, but he appreciated the ones who put forth the effort. The level of faculty involvement and engagement made a difference in the participants' academic and social transition.

Research Question 2

Research question 2 asked, How do academically gifted, poor, African American male college students in STEM disciplines conceptualize the notion of giftedness? In addition, how do their conceptualizations derive from concepts found in mainstream literature regarding giftedness?

Academic giftedness has been defined in mainstream literature in terms of IQ or other cognitive ability assessments (Renzulli, 1986). However, findings in this study suggest that the participants' conceptualization of giftedness was not framed in the same manner as described in the literature. Each participant conceptualized giftedness based on the ability to achieve academic success. Several participants did not self-identify as gifted. For example, some indicated that they had viewed themselves as high achieving since an early age. Jack (University PWI) shared the importance of constant positive teacher reinforcement with regard to his academic abilities. For each of the participants,

their perceptions of their academic abilities were due to the consistent reassurance they received from peers, teachers, and members of their families.

Participants viewed the notion of giftedness as multifaceted and multidimensional; that is, they viewed giftedness as applicable in a range of contexts, such as practical and creative abilities. They stated that giftedness was not limited to one specific definition. For the participants giftedness was not a fit trait, it was seen as the use of one's abilities. They agreed that gifted persons need a strong sense of their ability. For the participants their conceptualization of giftedness is compounded by factors such as self-perception, need for achievement, future orientation, and willingness to make sacrifices. The findings suggest that, for the participants, having a high sense of confidence was one of the most critical factors to being successful in engineering. Participants were not intimidated by academic challenges in their programs; their increased sense of confidence supported their identity as high achieving.

Research Question 3

Research question 3 asked, How do academically gifted, poor, African American male college students conceptualize their experiences attending a HBCU or PWI?

The findings showed that participants' perceptions of their institutional environment varied. For instance, all of the participants at University HBCU indicated that the overall campus climate supported the academic endeavors of all students. In contrast, participants at University PWI (a research institution) described the campus climate as based on competition and as hostile and uninviting at times. Ryan (University PWI) related that his department was "cut-throat" and that this condition was reflective of the entire university. CJ (University PWI) stated that sometimes the excessively competitive nature of the campus made it difficult to seek academic assistance. Solomon and Solomon (1993) noted that research-focused universities place undergraduate

students' academic needs secondary. Thus, if the campus climate is perceived as competitive by students, then students must decide whether they are equipped to pursue a particular discipline of study. Often, the competitive nature of STEM disciplines influences students' decision not to pursue these disciplines of study.

Regardless of institutional type, the participants noted that factors such as positive peer influence and faculty support were essential to their integration into the institution. However, participants at University HBCU indicated a stronger sense of peer and faculty support inside and outside the classroom. As a HBCU, University HBCU seeks to develop and educate the "whole" student. Kannerstein (1978) noted that HBCUs have two missions:

> The Black college, thus, has a dual mission. It is about human excellence, the superior education and training of tender minds, nourishment of the creative imagination, and reverence for learning; it is also the development of moral character and the production of better men and women for a more humane, decent, and open world. (p. 55)

For the participants who at University HBCU, being gifted and poor did not hinder their academic transition. Charles (University HBCU) claimed that the campus climate was based on student support, especially within his engineering department. He noted that the engineering faculty and staff just wanted students to succeed; thus, they provided all necessary resources for success (e.g., mentoring, tutoring, and career advising).

For African American males engineering as a major, positive peer interaction and faculty support are vital for their success. The campus climate plays an integral role in successful integration of academically gifted, poor, African American males.

> The establishment of a positive identity for the African American male student is significant in that it serves as the foundation upon which the student can develop some sense of agency and in turn determine where he 'fits' within the academy. (Bonner & Bailey, 2006, p. 28)

Clearly, the campus environment has the potential to encourage or discourage academic and social transition of students. Bonner (2010a) and J. F. L. Jackson and Moore (2006) asserted that institutional context influences students' ability to achieve. As seen through the experiences of these participants, academic success began within the context of their learning environments. These findings suggested that the nature of the campus climate influenced the participants' perception of their ability to be academically successful.

Research Question 4

Research question 4 asked, What implications does being academically gifted and being from impoverished backgrounds have on African American males who major in STEM disciplines?

One of the implications for African American males who come from lower-income backgrounds is that they have an increased risk to encounter financial barriers to success. Financial barriers acknowledged in this study included lack of college affordability, inadequate access to tutoring, insufficient access to funds for textbooks or other instructional supplies, and financial demands living expenses. Chase (University HBCU) noted that engineering as a major was academically difficult but that the lack of financial support and resources added another layer of complexity to the process.

While several researchers (Jackson & Moore, 2006; Moore, 2006) have focused on African American males in engineering, little attention has been given to the influence of poverty on their ability to achieve. Three participants reported that lack of financial aid had forced them to withdraw from college for a semester, which had delayed graduation for a year. These participants' need for achievement was exemplified by their commitment to return to complete the degree. While the participants noted a slight disappointment, they all claimed that it was just another one of life's hurdles that they had to overcome. All but one participant reported working part time in order to

meet college expenses. Isaiah asserted that all the money that he earned went toward school and helping his family.

Despite financial setbacks, all participants remained optimistic about their academic circumstances. The findings suggest that financial hardships that participants encountered did not inhibit their ability to be successful. All indicated that financial issues were the most significant challenge in their academic experience. Nevertheless, analysis of data indicated that participants who maintained a high self-efficacy and willingness to make sacrifices did not let financial issues derail their academic goals. This finding indicates that feeling efficacious increased participants' confidence to be successful academically.

A positive sense of self was one of the primary contributors to achievement identity in these study participants. Much remains to be learned about the experiences of academically gifted, poor, African American males in higher education, particularly with regard to engineering. Therefore, it is important to study how their multiple statuses as an academically gifted, African American, poor, male in engineering major intersect.

Recommendations for Practice

The findings of this study indicate that the support received by the participants (peers, faculty, family, and financial sources) significantly contributed to their academic achievement. Based on the findings, four recommendations for practice are presented.

1. *Implement family involvement in the college transitional process via community-based practices.* Study participants noted that family influence and support was a critical component in their collegiate experiences. Guiffrida (2003) asserted that minority students' families play an important role in the development of their educational and social identities as college students. Study participants described family support as essential; however, opportunities for family involvement on campus were

minimal. Many of the participants shared that the more time they spent in college, the more they felt disconnected from their family. In most cases, their experiences were rooted in the fact that their families had limited knowledge about the participants' daily experiences as college students. Although every participant claimed that he always felt academically supported by his family, that support was not necessarily indicative of the family's understanding of the college process.

Thus, it is vital to establish "family friendly" transitional programs for academically gifted, poor, African American male students, specifically in engineering disciplines. Department-based programs should be designed to support family inclusion, especially for economically disadvantaged families. Institutions of higher education must realize that initiatives focusing on family involvement should be systemic. With regard to HBCUs, Kimbrough and Harper (2006) recommended,

> Given that most HBCUs are nestled in the heart of Black neighborhoods or in close geographic proximity to large concentrations of African Americans, they are in a unique position to reinforce college-going messages to young boys and teenage males. After-school, summer, and special outreach programs should be created to nurture pools of prospective African American male college-goers. (p. 205)

Consequently, all programs should move beyond just recruiting students at the high school level and should focus on community-based initiatives. It is essential that community-based family involvement programs engage not only the nuclear family but also various community stakeholders (e.g., community social organizations, local businesses, and churches). Community-based programs should be initiated to create connections between the student, the community, and the institution.

2. Create a mandatory mentoring program that focuses on first-year African American male engineering majors. Mentoring can have a significant impact on the experiences of African American engineering majors. Otto (1994) defined mentoring as a relationship based on mutual respect and made by choice. Mentors are identified as

persons with recognized success who help others to interpret and learn to navigate unfamiliar environments (Daloz, 1986). According to Sutton (2006), mentoring has the potential to decrease students' feelings of marginality, increase their sense of personal significance (that they "matter"), and provide important validation of belonging to the campus environment. The availability of mentors is extremely valuable for African American males engineering as a major disciplines.

A mandatory mentoring program could enhance development of self-concept, self-esteem, and self-confidence within first-year African American engineering students. Administrators, faculty, senior engineering students, and graduate engineering students, regardless of race, could serve as mentors for incoming majors. Their goal would be to work with their mentees to help them to acclimate to the institution and the department. Mentors would aid in mentees' achievement of academic excellence and social integration on campus, as well as increase retention in engineering. Mentors would furnish information on resources such as which courses to take, test preparation skills, and financial aid information. The mentoring program could also provide access to networking opportunities. Overall, the mentoring program would support the mission and goals of the institution by increasing opportunities for underrepresented students. Research on student mentoring shows a number of benefits associated with this practice, such as increased academic success, goal commitment, and satisfaction with institution (Allen, T. D., & O'Brien, 2006). Study participants who engaged with a mentor for a sustained period of time reported more satisfaction with their college experiences.

3. *Establish P-20 initiatives to provide academic, social, and financial support to academically gifted, poor, African American males as an institution-based initiative supported by all stakeholders.* The aim of the P-20 initiatives would be to target, as early as preschool, African American male students from low-income backgrounds. The intent

of the program would be to expose African American students to engineering majors and related career opportunities. The recommended P-20 initiatives would focus on financial aid, recruitment and admissions, academic services, student services, and curriculum and instruction. The initiative would be designed as a collaborative effort by all stakeholders (students, parents, school, community, and the university).

Traditional P-20 programs have distinct programming characteristics that differ by school and state (Yonezawa, Jones, & Mehan, 2002). Both state and federal stakeholders should genuinely encourage and enable academic support programs for low-income African American males. Effective P-20 programs are marked by the following characteristics: (a) high standards for program students and faculty, (b) personalized attention for students, (c) interaction with role models, (d) peer support, (e) college-/community-based program schools, (e) financial aid and scholarship assistance, and (f) focus on problem-based curricula. These administrative and instructional practices could serve as preparatory tools for African American male students in their navigation of the educational pipeline, specifically in engineering disciplines.

HBCUs and PWIs should incorporate P-20 programs to capitalize on long-term development and success of students, particularly low-income African American males. For institutions of higher education, the goal of providing students increased academic opportunities must be one that is inclusive of all students, regardless of socioeconomic status or race. The purpose of P-20 programs is to promote collaboration among secondary schools, their communities, and institutions of higher education. Ultimately, P-20 programs can create dual opportunity for collaborative conversations between universities and area primary and secondary schools. While myriad issues affect the

experiences of academically gifted, poor, African American males in college, a P-20 initiative could provide critical academic support and college preparatory skills.

4. *Create and make mandatory financial literacy courses for students and their families to increase awareness of available financial aid*. The implementation of financial literacy courses that target students and their families in both secondary and postsecondary institutions could increase awareness of financial aid acquisition to increase college affordability. In a time of rising college costs, financial aid is essential to increase students' college access and success; however, as tuition has increased, availability of needs-based financial aid has decreased (St. John, 2003). This condition creates additional challenges for low-income students, particularly African American males pursuing engineering degrees. Essentially, academically gifted, poor, African American male engineering students are being priced out of their programs due to decreases in financial aid and increases in tuition and fees.

Several participants disclosed that financial setbacks were significant obstacles in their college journey. Participants' experiences suggested that, even though they knew that college was a valuable experience, they were not necessarily cognizant of the costs, particularly additional fees (e.g., laboratory fees, textbooks, living expenses). According to Cabrera and La Nasa (2000), students from low-income backgrounds generally do not receive accurate information regarding college cost and affordability. Vargas (2004) proclaimed that a lack of awareness is detrimental to college success.

> Low-income, minority, and first-generation students are especially likely to lack specific types of "college knowledge." They often do not understand the steps necessary to prepare for higher education which include knowing about how to finance a college education, to complete basic admissions procedures, and to make connections between career goals and educational requirements. (p. 7)

The American Council on Education (2004) estimated that 29% of low-income students reported that they had not filed a Free Application for Federal Student Aid (FAFSA) because they believed that they could afford to pay for college on their own.

Likewise, the USDOE NCES (2008) reported that approximately 72% of undergraduate students in Texas did not receive grant aid in 2007-2008. These statistics are reflective of national averages. This suggests that families are either misinformed or underinformed about financial options that make college affordable. Financial literacy courses, through a partnership among university financial aid counselors, high school counselors, and high schools students, could increase awareness on the part of students and their families. Such financial literacy courses have been recommended by the U.S. Advisory Council on Financial Literacy (Steverman, 2009). Steverman recommended that the federal government mandate financial education for K-12 students and require college students to take a financial literacy course as part of the standard core curriculum. Such courses would seek to increase students' awareness of resources that are available to assist with college costs and minimize stress associated with college affordability.

In addition to a required financial literacy course, it is recommended that engineering departments provide more financial support services. Several participants asserted that their lack of financial resources had not allowed them to purchase textbooks. To provide low-income African American male students academic and financial support, engineering departments should make deliberate efforts to ensure affordable access to textbooks. Moreover, several colleges have proposed initiatives that allow students to rent textbooks. This requires a partnership between departments and libraries to ensure that multiple copies of current textbooks are always available for student use. Universities should collaborate with high schools and communities to provide information about various methods by which low-income families can finance their child(ren)'s education. Even though institutions of higher education are currently experiencing dramatic financial cutbacks, it is important that universities initiate

practical and inexpensive options to increase financial literacy of students (and their families) from impoverished backgrounds.

Implications for Future Research

The findings of this study provide insight into experiences of academically gifted, poor, African American male students engineering as a major disciplines. While this case study provided insight into the academic and social perceptions of the participants, research that extends on various other aspects of their experiences is necessary. First, researchers should reframe traditional notions of giftedness to reflect inclusiveness of multiple perspectives (e.g., analytical, creative, and practical intelligences). Second, research should focus on multiple statuses (e.g., race, masculinity, socioeconomic status, workforce transition) that academically gifted, poor, African American males encounter as they navigate engineering undergraduate degrees. A holistic understanding of this demographic is warranted if researchers and universities intend to meet the needs of academically gifted, poor, African American males in engineering disciplines. Third, future studies should explore issues of academics and masculinity, the influences of mentoring, and effects of long-term goal setting by African American male students in engineering disciplines. Fourth, researchers need to examine the factors that motivate African American males to study engineering disciplines. Lastly, there needs to be more research publications that contribute to the dialogue about African Americans male engineers and their transition into the engineering workplace. Because there is minimal research that examines the experiences of this demographic group, further research could examine the nuances of this student population. The implications for future research are summarized in Figure 6.

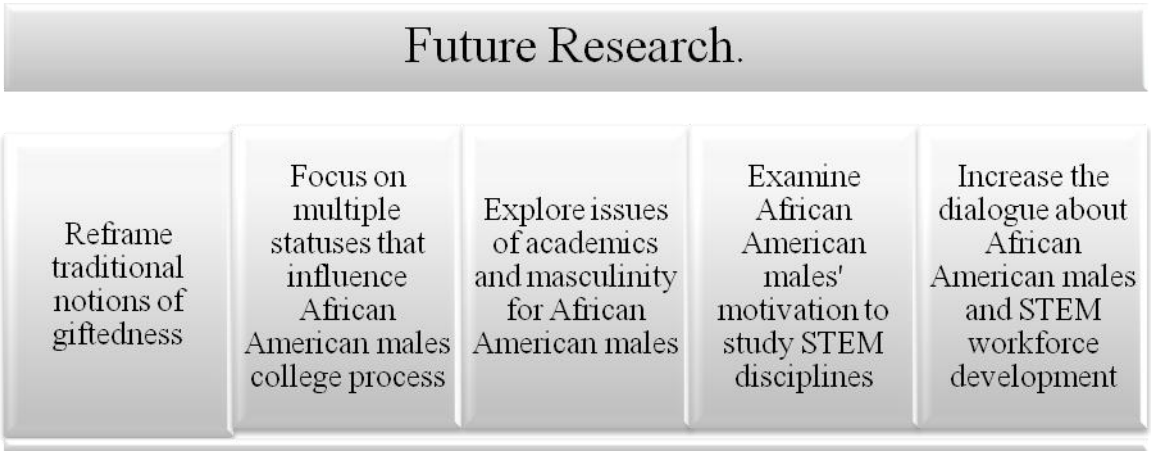

Figure 6. Implications for Future Research.

Summary and Conclusion

This study explored the perceptions of eight academically gifted, poor, African American engineering majors. In utilizing a qualitative methodology, interviews were conducted, audio taped, and analyzed by the researcher. Seven themes emerged from content analysis of the data: : *(a) self-perceptions, (b) financial obstacles, (c) engineering as a major, (d) family influence and support, (e) peer relationships, (f) relationships with faculty, and (g) the students' perceptions of the institution.* The conceptual framework was based on Sternberg's (2003) triarchic theory of intelligence, Tinto's (1993) student integration model, and Whiting's (2006a) scholar identity model. Discussion was presented summarizing the relationship of the findings of this study to the conceptual framework and to the related literature.

This study provides a glimpse into the experiences of academically gifted, poor, African American male students in engineering disciplines. Their stories presented a chronicle of their ability to achieve their academic goals despite financial adversity. The findings in this study serve as a basis for future inquiry into areas of student and academic development of academically gifted African American males pursuing

undergraduate engineering degrees. More important, this study created a frame for understanding issues of poverty and student academic achievement.

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APPENDIX A

LETTER OF INVITATION TO PARTICIPATE

Dear student _____,

My name is Alonzo M. Flowers, and I am a doctoral student in the Department of Educational Administration and Human Resource Development at Texas A&M University. The reason of this email is to solicit your participants in my research study. The purpose of my study is to explore the perceptions of academically gifted, poor, African American male undergraduate students who are engineering as a major disciplines.

For this study, participants will be chosen to meet the following criterion:

1. African American
2. Male
3. Income status
4. Academic ability : high achieving/gifted,
5. Undergraduate engineering field (junior and senior classifications).

Once the participants are selected, they will complete a personal demographic sheet that will gather information to include: grade point average, parental household income, family size, and high school size and location. This study is confidential and the records of this study will be kept private. Participants will be asked to commit to a 60 or 90 minutes interviews, scheduled around the student's availability. Your identity in this study will remain concealed and no identifiers linking you to this study will be included in any sort of report that might be published.

Moreover, research records will be stored, secured, and only accessible by me and my dissertation chair Dr. Fred Bonner. Interviews will be audio recorded and the recorded will be use throughout this study. The risks associated with this study are minimal, and are not greater than risks ordinarily encountered in daily life. The information gained from this study would allow for a greater understanding of the perceptions of academically gifted, poor African American males on college campuses.

I am looking forward to your participation!

If you are interested in participating or have any questions or concerns regarding my research study, please feel free to contact me.

Alonzo M. Flowers M.A.
Doctoral Candidate
Department of Educational Administration and Human Resource Development
(210) 863-5058
Aflowers78@gmail.com

APPENDIX B

DEMOGRAPHIC FORM

Demographic Information

Please fill out the following information pertaining to demographics.

1. What is your classification? _____
2. Current Grade Point Average? _____
3. Where is your hometown? _____
    a. Hometown Zip Code: _____
    b. Name of High School: _____
4. Did you take any advanced courses (AP pr dual credit) in high school? If so, name the courses please.

    _____
    _____
    _____

5. What is your current major? _____
6. Are you the first in your family to attend college? _____
7. Do either of your parents have a college degree?

    (Mother) _____ (Father) _____

8. What occupation(s) to your parent(s) hold:

    (Mother) _____ (Father) _____

9. Number of Family Members in your Household (During High School Years):

    _____

10. Have you received any type of financial aid since you have been enrolled in college?

    Yes _____ (Years:_____) No_____

    - Grants _____ - Loans _____ - Scholarship _____
    - Other Support _____ *(Describe):* _____

11. What is your expected date of graduation? _____

12. What pseudonym for your name would you like me to use for this study?

    _____

APPENDIX C

CONSENT FORM

CONSENT FORM

Academically Gifted, Poor African American Males Undergraduates in Engineering disciplines: Perceptions of Factors Contributing to Success in a Predominantly White Institution (PWI) and Historically Black College and University (HBCU) Context

Introduction

The purpose of this form is to provide you (as a prospective research study participant) information that may affect your decision as to whether or not to participate in this study.

You have been asked to participate in a research study about academically gifted, poor, African American male perceptions who attend either a predominantly White university (PWI) and a historical Black college and university (HBCU). The purpose of the proposed study is to explore the perceptions of academically gifted, poor, African American male undergraduate students who are engineering as a major disciplines to determine which factors contribute to their academic development. The participants for this case study were chosen on the premise of purposive sampling. A purposive strategy for sampling suggests that participants "are chosen not for their representativeness, but for their relevance to the research question, analytical framework, and explanation or account being developed in the research" (Schwandt, 2007, p. 269). For this study, participants chosen must meet the following criterion: African American, male, low-income background, high achieving/gifted, and must be enrolled in an undergraduate engineering field. Essentially, this criterion for potential participants is necessary as a purposive sample will allow insight into the phenomena of my study.

You were selected to be a possible participant because you met the criterion required for the study. In order to keep your identity safe guarded, you have an option to give the researcher a false name, in order to conceal your true identity, if you wish.

What will I be asked to do?

If you agree to participate in this study, you will be asked to participate in a one on one interview-with myself as the interviewer. This study will take 60-90 minutes of your time during one contact period. I will ask you a series of questions, which I will give to you during the interview.

Your participation will be audio recorded.

What are the risks involved in this study?

The risks associated with this study are minimal, and are not greater than risks ordinarily encountered in daily life.

What are the possible benefits of this study?

The information gained from this study would allow a greater understanding of the perceptions of academically gifted, poor African American males on college campuses.

Do I have to participate?

No. Your participation is voluntary.

Who will know about my participation in this research study?

This study is confidential and the records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored, secured, and only accessible by me. Audio recordings will be use throughout this study.

Whom do I contact with questions about the research?

If you have questions regarding this study, you may contact Alonzo M. Flowers, aflowers78@gmail.com ,548 Harrington Tower.

Whom do I contact about my rights as a research participant?

This research study has been reviewed by the Human Subjects' Protection Program and/or the Institutional Review Board at Texas A&M University. For research-related problems or questions regarding your rights as a research participant, you can contact these offices at (979)458-4067 or irb@tamu.edu.

Participation

Please be sure you have read the above information, asked questions and received answers to your satisfaction. If you would like to be in the study, please read and sign the consent form. I will be happy to answer any questions and set up a time for the interview.

Signature

Please be sure you have read the above information, asked questions and received answers to your satisfaction. You will be given a copy of the consent form for your records. By signing this document, you consent to participate in this study.

Signature of Participant: _____ **Date:** _____

Printed Name: _____

Signature of Person Obtaining Consent: _____ **Date:** _____

Printed Name: _____

APPENDIX D

INTERVIEW PROTOCOL

1. In regards to your academic abilities how do you think most people perceive you?

2. In regards to your academic abilities how do you perceive yourself?

3. Explain to me the reason (s) why you decided to attend college?

4. What does completing your college education mean to you?

5. Growing up did any one talk to you about the importance of education?

6. a. What are the reason(s) you choose to pursue your higher education at a Historically Black College or University (HBCU)?

   b. What are the reason(s) you choose to pursue your higher education at a Predominately White Institution (PWI)?

7. During any time during your educational experience were you identified as an academically gifted student?

8. In your own words, what does the word *giftedness* mean to you?

9. How would you describe your *academic transition* to your college environment?

10. How would you describe your *social transition* to your college environment?

11. After *X amount* of years in college, do you believe you have integrated into the campus community? If so, how? If not, why?

12. Were there obstacles you had to overcome in the pursuit of your education? If so, what were they? Explain.

13. Does your family play a role in your educational pursuits? If so, how? If not, why?

14. What are the reason(s) you choose to pursue your degree in an engineering disciplines?

15. Please explain the how you feel being an African American male who is majoring in a engineering disciplines?

16. What are some of the *positives* in majoring in engineering disciplines?

17. What are some of the *negatives* in majoring in engineering disciplines?

18. Who comprises your *academic* support network while pursuing your degree in a engineering disciplines?

19. Who comprises your *social* support network while pursuing your degree in a engineering disciplines?

20. What are you goals once you have completed your degree?

21. Have your long-term goals changed over the course of your college experience? If so, how? If not, why?

22. From your lived experiences, describe the word *poverty*.

23. Have finances played a role in your college experience from your perception.

24. Were finances a factor in your engineering disciplines of study? If so, how? If not, why?

25. Do any support services exist on your campus that you have benefited from? How have does support services impacted your college experience?

26. From your perception what is the view, *held by the students* of gifted, poor, African American males on your college campus?

27. From your perception what is the view, *held by the faculty* of gifted, poor, African American males on your college campus?

28. From your perception, is there a double standard for gifted, poor, African American male college students in engineering disciplines of study?

29. From your perception how would describe *academic support* racial and ethnic groups of students in engineering disciplines of study?

30. What advice would you give another gifted, poor, African American males student considering a similar academic path you have taken?

VITA

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Education: B.A., Texas State University, San Marcos (Political Science; minor U.S. Ethnic Studies/Multicultural Relations), 2001

M.A., University of Texas at San Antonio (Counseling and Teaching and Development), 2005

PROFESSIONAL EXPERIENCE

Department of Humanities, Blinn Community College
Coordinator/Instructor, First-Year Seminar
Instructor, Student Success Course

Texas &M University, Department of Higher Education Administration
Co-Instructor, Advance Student Development Theory

The University of Texas at San Antonio
Early High School College, Study Skills Instructor

Rick Hawkins High School (School of Excellence in Education)
Academic Dean

Dr. Paul Saenz Junior High School (School of Excellence in Education)
Curriculum and Instructional Coordinator

School of Excellence in Education
Classroom Teacher, Secondary Social Studies (Grades 6-12)

HONORS

The University of Wisconsin-Milwaukee Diversity Fellowship
Phi Kappa Phi Educational Honor Society
Diversity Fellowship Award, Texas A&M University