

**EXPONENTIAL GENIUS: HOW AFRICAN AMERICAN MALE
ACTUARIES DEVELOP MATHEMATICAL EXPERTISE**

A Dissertation

by

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ABSTRACT

This study explored the development of mathematical expertise among male African American actuaries, within the present hegemonic educational, social and cultural system of the US. Using qualitative methodologies, the emergent framework, Exponential Genius describes the common personality constructs, identity formation processes and formative experiences of accomplished African American male actuaries. The Exponential Genius schema is identified to be the byproduct of the coalescence of personal transactions and societal antecedents of the successful African American male actuary. The following: Endurance and Excellence, Equity, and Ecologies of Hope are recognized to be the agencies that provide the momentum and the catalytic impetus that contribute to the mathematical exceptionality of the African American male actuary and by extension necessary components for the mathematical success for African American males.

DEDICATION

Greek Philosopher, Aristotle, is credited with the following thought: “The roots of education are bitter, but the fruit, sweet.” My personal and professional pursuit of greater insight into the circumstances that promote mathematical success among African American males has been plagued by tragedy and profound loss: as I recall the experiences of these last four years, the word bitter is hardly a malapropism. Yet, like Aristotle I can say that the fruit though bitter, has been mixed with a healthy dose of sweet.

I dedicate this venture to the God of the Universe; whose wisdom is unparalleled and whose love is boundless, I thank you for the pain and the joys. They have been able workmen in your Hands. To my family and dearest friends who helped me through every challenge, I also dedicate this work to you.

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CHAPTER I

INTRODUCTION

Background

Statistical analyses conducted by the National Center for Education Statistics (NCES) for the 2013 academic year, have revealed significant disparities in educational achievement and life outcomes particularly among boys and young men of color (Kena, et al., 2015). One troubling and resistant trend is the underperformance of African American males in mathematics. While comparative analyses by NCES reveals that mathematics achievement in 2013, improved for African American males at every grade level from the previous years, African American males in that year, received the lowest average mathematics scores of 12th grade students (The Condition of Education, NCES, 2015, p. 13). The research community has also identified that African American males are falling behind in mathematics achievement and other important indices of life success (Fryer & Levitt, 2004; Fortin, Oreopoulos, & Phipps, 2015; Martin, 2000; Mincy, 2006; US Department of Education, 2015; Fantuzzo, LeBoeuf, Rouse, & Chen, 2012).

In 2013, NCES also reported that 17% of African American males aged 25-29 completed a Bachelor's degree or higher, which is 33% lower than the completion rate for 25-29-year-old Asian males who had the highest completion rate. White males were ranked second with 31% of them completing a Bachelor's degree or higher. Twenty-nine percent of males identified as belonging to 2 or more races completed a bachelor's degree or higher, while 15% of Hispanic males 25-29 completed a Bachelor's degree or

higher. African American males were therefore ranked 4th among the 5 racial groups in the category of 25-29-year-old males completing a Bachelor's degree or higher (The Condition of Education, NCES, 2015, p. 20). These statistics further support the view that African American males are lagging behind in important indices associated with social mobility.

In response to these significant gaps in general academic achievement among African American males, President Obama launched a national program called *My Brother's Keeper* (MBK) in February 2014. Its specific intention was to improve social and educational outcomes among underserved males generally, but it encouraged widespread interventions specifically designed for African American males through the country. It must be noted however, that MBK does not pay specific homage to the growing gap in mathematics achievement between African American males and their racial peers, which is the primary interest of this research venture.

Many of the initiatives of MBK were born out of research focused on improving life outcomes for people of color through educational opportunity. Thus, MBK actively pursues and uses the products of educational research to implement in states around the country “a coherent cradle to college and career strategy” (Jackson & Beaudry, 2015, p. 1).

As a result, potentially powerful alliances now exist between the research community and a growing list of consumers of educational research whose primary interest is understanding the experiences of African American males.

This study represents the researcher's effort to contribute a relevant perspective to the ongoing discussion related to the mathematical achievement of African American males. The title, Exponential Genius, is an intentional reference to the mathematical concept of geometric increase which is distinctively different from the constant increase associated with arithmetical increase. The term exponential is used in mathematics to represent trends that transcend linear rates and in language the term is used to represent trends that supersede the norm. Thus, the term Exponential Genius as used in this study is a reference to the phenomenal accomplishments of African American males who have achieved extraordinary success in one of the most rigorous and competitive fields of applied mathematics. The term, Exponential Genius, is also well suited to this investigation because it provides a perspective that is contrary to the dismissive and dismal view of African American males in mathematics and mathematics based professions.

According to Katherine Weaver, Executive Director of The International Association of Black Actuaries, there are 228 male African American actuaries in the United States (K. Weaver, personal communication, March 13, 2017). The men who have managed to satisfy the rigorous credentialing process to become actuaries represent exemplars and are therefore best positioned to comment, advise, and inform this research venture.

This study joins a growing number of research projects specifically tailored and contextualized for the African American male. Some of the research groups and products dedicated to investigations into the African American male in academic settings are:

- Yes, We Can: The Schott Foundation's 50 State Report on Public Education and Black Males (Holzman, 2015)
- A Call for Change by the Council of the Great City Schools (Lewis, Simon, Uzzell, Horwitz, & Casserly, 2010).
- The New Jim Crow: Mass Incarceration in the Age of Colorblindness. (Alexander, 2012).
- America's Cradle to Prison Pipeline. (Children's Defense Fund, 2007).
- Losing Our Children in America's Cradle to Prison Pipeline. (Edelman, 2007).
- Half of African American Male Dropouts and 1 In 10 White Male Dropouts Have Prison Records. (Wald & Losen, 2003).
- Multilevel Analysis of Suspensions in Maryland. (Krezmien, 2006).
- *Black Males Left Behind*. (Mincy, 2006).
- The State of Black America 2007: Portrait of the Black Male. (National Urban League, 2007).
- Revealing New Truths About Our Nation's School. (Office of Civil Rights, 2012).

The aforementioned research projects, represent significant ideological shifts from the traditional approach to the study of African American communities because they provide perspectives different from the traditional deficit lens through which African American communities are commonly analyzed.

Notions of deficits assumed to exist in the African American community, inform many extant educational reformations. Deficit theory has therefore been the governing

epistemology through which underachievement of African Americans has been analyzed (Valencia & Solorzano, 1997; Skrla & Scheurich, 2001; Lewis, James, Hancock, & Hill-Jackson, 2008; Gorski, 2008; Feagin, 2013). According to Gorski, instead of “accepting myths that harm low income students, we need to eradicate the system wide inequities that stand in their way” (p. 32). The implicit suggestion of Gorski’s comment is that there are alternative ways of interpreting gaps in educational achievement, which focus on inadequacies in educational enterprise and these approaches are likely to yield more reliable and permanent solutions.

Feagin (2013) also writes extensively about the philosophies and the perspectives of educational research, which has constructed African Americans as inherently “pathological” not only in their mathematical abilities but in terms of their social and cultural selves. This assumption of “pathology” engendered by the research community is so well entrenched that it is normative, and there can be little doubt that these ideas inform education policy and practice as well (Lewis, James, Hancock, & Hill-Jackson, 2008; Baldrige, 2014; Martinez & Rury, 2012).

Research efforts that concentrate on the improvement of mathematics achievement of African American males has not kept pace with the plethora of investigations dedicated to description of his general academic achievement and sociocultural heritage. The present research therefore intends to contribute insight and a deeper understanding of the processes involved in the acquisition of mathematical expertise for African American males.

Theoretical Framework

From a researcher's point of view, the lens through which a phenomenon is analyzed is inextricably linked to the conclusions. Thus, conclusions are without doubt as strong as or as weak as the framework through which they are analyzed. The Deficit Framework, through which the African American learner has historically been analyzed, has proved an insufficient and largely inadequate vehicle for understanding and providing solutions to gaps in academic achievement among African American males particularly in mathematics achievement (Lewis, James, Hancock, & Hill-Jackson, 2008). In support of this position, James and Lewis (2014) assert that, "educational responsiveness must be divorced wholly from traditional hegemonic praxis, and instead embrace approaches informed by the complexities of *blackmaleness*" (p. 267). This developmental theory mandates that educational interventions for Black males be informed by the lives of successful Black males. The researchers also noted that successful Black males trace their positive development back to pivotal relationships, academic experiences, and personal resilience inherited via community social ties throughout the African American community.

Yet, a specific focus on how African American males acquire expertise in mathematics is needed to fashion educational interventions and support structures to improve African American male's academic outcomes in math. Within this context the researcher proffers that at the intersection of Ethnomathematics (Valero, 2008; D'Ambrosio, 1985), Critical Race Theory (Ladson-Billings, 1998; Solorozano & Yosso, 2001; Taylor, 1998; Ladson-Billings & Tate, 2006; Delgado & Stefancic, 2012), and

Culturally Relevant Pedagogy (Ladson-Billings, 2006; Irvine, 2010), lies an important analytical space which may ultimately provide a nuanced interpretive framework for understanding, and supporting the development of African American male mathematical expertise.

Such an approach requires a paradigmatic shift in how research is conducted on African American male mathematics students. The perennial underperformance in mathematics among African American males has been examined through samples of African American males who are underperformers in mathematics. Like James and Lewis (2014) this study intentionally shifts the focus from the unsuccessful African American male student of mathematics to the successful African American male mathematician. Accomplished African American male mathematicians are therefore the exemplars best suited to inform a revolution in performance in mathematics for Black males. Black male engineers, physicists, accountants and mathematics educators are robust sources for understanding the nature of mathematical success and expertise. The mathematicians, who will provide the data entry points for this study, are actuaries who represent, to many, the quintessential applied mathematician. This inquiry therefore seeks to inform its solution-based approach via models of success, which is inherently of greater value than the persistent focus on the assumed deficits of the educationally “disadvantaged” and disenfranchised African American male.

The long term effect of this unrestrained and unfettered gap in general academic achievement and particularly mathematics achievement among African Americans has without doubt translated into limited access to the economic and social opportunity

structures of American society (Darling-Hammond, 2010; Edelman, 2007; National Urban League, 2007). The failure of the educational research enterprise to give serious attention to the economic and social consequences of sustained differentials in mathematics achievement constitutes a failure of the profession. This inattention adds to the relegation of generations of African Americans to a marginalized existence in American society. Rhonda Tsoi-A-Fatt (2010) has recognized the seriousness of the plight of African American males and wrote the report, *We Dream a World: The 2025 Vision for Black Men and Boys* funded by the Open Society Foundation. In that report Tsoi stated:

By 2025, we dream of a world where Black boys are highly educated, Black men are anchored in the economic mainstream, Black boys see in their fathers promising futures, and entire communities of Black families are physically and emotionally healthy. (p. 3)

The term, *cradle to prison*, is commonly used in the academic literature to describe the inverse relationship, which exists between academic outcomes among Black male learners and overrepresentation in the criminal justice system (Edelman, 2007; Children's Defense Fund, 2007). Mincy (2006) wrote:

Twenty one percent of Black males who did not attend college were in jails or prisons in 2004. Among Blacks who dropped out of school, 60 percent have spent time in prison by their mid-thirties. (p. 90)

The term proffers that America's failure to educate its urban youth and most vulnerable populations, particularly African American males is the primary cause and

source of supply for the country's densely populated prisons. Darling-Hammond (2010) wrote, "States that would not spend \$10,000 a year to ensure adequate education for children of color spend over \$30,000 a year to keep them in jail" (p. 24). While this is admittedly a general statement, it evidences the importance of a competitive education, which many African American males are denied.

Purpose of the Study

The purpose of this study is to identify the common personality constructs, identity formation and formative processes of African American male actuaries. It is expected that this investigation will reveal how mathematical expertise is developed among African American males. An informed framework could prove useful in the cultivation and nurturing of future generations of African American male mathematicians.

Research Questions

There are three primary research questions guiding this research:

1. How do African American male actuaries describe their personal attributes, identity formation processes and formative educational and social experiences?
2. How did they acquire mathematical expertise in the context of schooling in the United States?
3. How impactful were social relationships to their academic and professional preparation?

To answer these questions, I take an approach that can be described as phenomenological interpretative where six fully credentialed African American male

actuaries participated in one-on-one semi structured interviews. Sampling was purposive in that all participants were members of the International Association of Black Actuaries (IABA), a network formed to engender growth and success in the actuarial profession.

Significance of the Study

The community of educational researchers has documented the gaps in mathematics achievement for African American males, ad nauseam. Sociocultural anthropologists have also exhausted their efforts to contextualize the milieu in a bid to provide explanations for the trend. There is therefore no need to continue an extensive discourse about the causes of the gap in mathematics achievement for African American males. Rather a change in focus and a change in perspective are required. The situation demands an alternative way of looking at an old problem: a possible shift in the conventional logic with the hope of reversing a persistent trend.

James and Lewis (2014) encouraged more research on African American male exemplars to inform solutions, close achievement disparities and change the discourse from African American male pathology to their potential. This study therefore seeks to exemplify this positive version of research with a specific focus on Black male mathematicians. Actuaries can be considered the quintessential Mathematician. By profession actuaries represent the highest level of professional and academic accomplishment for applied mathematicians. Careercast (2015), which provides an annual ranking of the best professions, has listed the actuary as the premier profession. Actuaries are well compensated and as of March 24, 2016, the median annual Actuarial Fellow salary is \$148,970, making it an extremely lucrative profession. Actuaries are

required to have specialized mathematics knowledge in Calculus, Statistics and Probability. While it is true, that they must also have demonstrable competency in computer programming, economics and business, the foundational skills and daily work of the actuary involves complex mathematical analyses. Black male actuaries therefore represent a group, which is imminently qualified to provide insight into both the processes by which success in mathematics can be achieved and insight into the mechanisms of financial and social mobility.

The International Association of Black Actuaries (IABA) is home to a small and select group of African American mathematicians. Within that prestigious organization are males who have managed to circumvent a system, which is churning out disparate outcomes in mathematics to achieve professional success. The African American males who are members of this organization will therefore be the source of data from which, it is hoped that a new approach will emerge. The IABA has 228 male registered members who identify themselves as of African descent or ancestry (K. Weaver, personal communication, March 13, 2017).

The story is told of one of the world's most famous coin counterfeiters. It is said that when he was asked, how he was able to produce such remarkable counterfeits he responded by saying that he had an intimate understanding of the genuine coin. We cannot hope to replicate genius if we only understand what failure looks like, we must first look to the genuine article. Hence the reason for the focus on genuine article, that being accomplished Black male mathematicians.

The approach suggested in this study also finds legitimacy in the age-old adage, which states that it is infinitely more useful to teach a man how to fish than to daily provide him with the fish he needs. It is therefore inherently more useful and in the long term more practical to teach African American males how to navigate an oppressive educational system than it is to supplant the existing system, which has historically put restrictions on educational access for generations of African Americans. This study is a deliberate attempt to present a comprehensive model of the successful African American male mathematician, which is diametrically opposed to the pathological model of the Black male's mathematical abilities.

Key Terms

There are a few terms that are important to understanding the context of the study and are here referenced.

Actuary—A professional who analyzes the financial consequences of risk. Actuaries use mathematics, statistics, and financial theory mathematics, statistics and financial theory to study uncertain future events, especially those of concern to insurance and pension programs (Careercast, 2015). For the purpose of this study, the actuaries selected for participation will be fully credentialed and not degreed actuaries. This means that they would have passed the necessary professional examinations to perform all the functions of an actuary. Actuarial Fellows, Associate actuaries and Enrolled actuaries, are the levels of actuaries who will be selected for participation in this study.

Enrolled Actuary—An Enrolled Actuary (EA) is any individual who has satisfied the standards and qualifications as set forth in the regulations of the Joint Board for the

Enrollment of Actuaries and who has been approved by the Joint Board to perform actuarial services required under the Employee Retirement Income Security Act of 1974 (ERISA). The requirements as set forth by the Joint Board is comprised of a set of professional examinations coupled with clearly outlined professional experience in the actuarial field, which must be certified by the organization where the experience was gained. The examination requirements are not as extensive as the other two tiers of the actuarial profession. Enrolled Actuaries are required to successfully complete three examinations. (Society of Actuaries (SOA), 2017a).

Examination one covers the mathematics of compound interest, mathematics of life contingencies and demographic analysis.

Examination two covers, actuarial assumptions, actuarial cost methods, calculation of minimum required contributions and calculations of maximum deductible contributions.

The final examination covers laws related to the Employment Retirement Security Act (ERISA). (Society of Actuaries (SOA), 2017a)

Associate Actuary—An Associate Actuary of the Society of Actuaries must demonstrate his knowledge of fundamental concepts and techniques for modeling and managing risk. This is accomplished by the successful completion of two examinations, an e-Learning course, a validation of educational experiences (VEE) and a professional seminar. The Associate actuary must also apply for and receive approval for Admissions to the Society of Actuaries from the Board of Directors. (Society of Actuaries (SOA), 2017b). The examinations are geared to ensure that the individual is able to apply the

basic rules of risk theory for uncertain future events, especially those with financial implications.

The professional aspect of the preparation covers the professional code of conduct and the importance of adherence to standards of practice. Associate actuaries who have been members of the SOA for five or more years are able to vote in the Society of Actuaries elections (Society of Actuaries, 2017c).

Fellow Actuary—The requirements to become a Fellow Actuary (FSA) are by far the most stringent and demanding. To obtain the FSA designation, individuals must complete a series of examinations, e-Learning courses and modules, validation of educational experiences outside apart from SOA (VEE), a Professional Seminar and the Fellowship Admissions course. (Society of Actuaries, 2017c).

There are two tracks for the Fellowship designation. In order to become a Fellow, the individual must complete all of the requirements of one of the tracks. There is considerable flexibility on how each of the requirements is fulfilled but the SOA does provide individuals with a suggested order for each Fellowship track. (Society of Actuaries, 2017d).

African American—Any male who self identifies as African American is a possible candidate for participation. For this study, any male of African ancestry can be considered for participation. Thus, Black males from the Caribbean or Latin American background are legitimate participants even if they do not self-identify as African American.

Assumptions

Albert Einstein is credited with the following statement: “You cannot solve a problem from the same consciousness that *created it*. You must learn to see the world anew.” That *consciousness* as it is here explored, is not assumed to be the poverty, or the structural makeup of the household, or the cultural practices of African Americans, but rather the educational practices and microaggressions, which has conflagrated the African American male experience.

An underlying assumption of this study is therefore, that institutional and systemic practices represent the consciousness responsible for academic gaps, including the gap in mathematics achievement. Solutions to the gaps in achievement cannot therefore be housed in the very hegemonic practices known to be catalysts unless those practices are of themselves analyzed for their deficits. We cannot continue to assume that the organizational framework of educational enterprise is infallible: we must have the courage to view the world of education anew. We must dare to critique the very institutions, assumed to be the bastions of educational enterprise. Thus, this study must necessarily also examine the hegemonic social-cultural contexts, which animate the education and development of African American males.

Summary and Overview

It is best to disclose at an early junction, the researcher’s connection with the topic not only for the reader’s benefit but additionally, to serve as a personal reminder to adopt a constantly reflective and introspective attitude for the purpose of conforming to

sound research principles. This research while having significance for the research community is also profoundly important to the researcher

The researcher's interest in the achievement of African American males in mathematics was born from her experiences as a mathematics teacher in the 9th largest school District in Texas (Largest School Districts in Texas, 2012-13). Recognizing the differentials in mathematics achievement for African American males she began to experiment with a variety of pedagogical strategies. Some of the approaches used were based on published and documented strategies and others were instinctive and based on her personal successes with African American male students of mathematics. Her interest in and commitment to an investigation of the processes that promote favorable outcomes in mathematics for African American males therefore provided the impetus for the study.

This first chapter outlined a more hopeful approach to redressing disparities in mathematical outcomes among African American males. Instead, of examining African American males' struggles in math courses or challenges to teaching Black males, this study seeks counter narratives from exemplars in the field of applied mathematics. This study seeks to inform developmental models by exploring how mathematics expertise evolves among Black male applied mathematicians.

The chapter, which follows provides a description of the theoretical frameworks and relevant research from the literature used to advise and interpret the findings of this study.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter synthesizes the seminal and most current research about African American males' experiences with mathematics within the context of schooling in the United States. The gap in mathematics achievement for African American males in mathematics is not the only gap known to exist. The gap in mathematics achievement is likely a composite gap, reflective of societal differentials that exist for African Americans throughout the United States. These gaps must have a source.

Unfortunately, since education is not a value free enterprise, most if not all the gaps are sustained, maintained and nurtured through the school system. These gaps are often ingrained in school policies, professionals, procedures and practices, which sustain the widening chasm between African Americans and other citizens of the United States.

Consider the following educational gaps as identified by Tsoi-A-Fatt (2010):

- Black boys are three times more likely to be suspended or expelled from school than White peers, therefore missing valuable learning time in the classroom.
- Black boys are 2.5 times less likely to be enrolled in gifted and talented programs, even if their prior achievement reflects the ability to succeed.
- Black boys are 2.5 times more likely to be classified as in need of special education services by their schools.
- Black boys are more likely to have underprepared and ineffective teachers.

- Most Black boys do not participate in a quality afterschool program that can augment their learning.
- Less than half of Black male students graduate from high school on time.
- Black males lack resources and support to complete college. Those who attend are not likely to graduate.
- Black boys are more likely to attend schools that are under-resourced and performing poorly.

It is naive to assume that these gaps do not influence the achievement of African American males in mathematics and by extension his social and financial mobility (Bureau of Labor Statistics, 2013; Children’s Defense Fund, 2007; Edelman, 2007; Mincy, 2006). Thus, the gap in mathematics achievement for African American males is best understood to be the product of related gaps affecting the group and therefore warrants sustained and systematic attention.

This chapter therefore synthesizes research that explains the achievement gap within the historical context of racial and social marginalization. Second, prominent and more progressive frameworks such as *resilience and grit*, African American learning styles, and the importance of positive racial identity will be explored. The chapter concludes by considering counter narrative research on Black males and mathematics informed by critical race theory, which serves as one of the theoretical frameworks underpinning this study.

Explaining the Academic Gap

A review of the literature situates the African American male learner as a permanent fixture at the base of what is commonly called *The Achievement Gap*. The Achievement Gap, “refers to the differences in scores on state and national achievement tests between various demographic groups” (Anderson, Medrich & Fowler, 2007, p. 547). The lens through which African Americans is described is rarely favorable and often cast with references to the challenges faced by these learners. Lewis, James, Hancock, and Hill-Jackson (2008) synthesized the last fifty years of educational research that attempted to explain the achievement gap among African Americans. They note that everything from careless parenting, poverty, educational achievement of parents and even intellectual inferiority of ethnic groups have all at one time or another were used to explain the gaps in educational achievement among African Americans.

Historical Analysis of the Educational Gaps

In the 1990s educational researchers began to posit other catalysts and alternative interpretations to the Achievement Gap. These theories have served to present alternative explanations to the academic challenges facing ethnic minorities, with special attention being paid to the African American learner. There now seems to be a growing consensus that the Achievement Gap transcends issues of the school though the school is by no means an innocent bystander.

Anderson (2004) posited that “the current test score gap is neither the first nor last achievement gap” (p. 3) which African Americans must overcome. He argues that before the “Achievement gap there was the Literacy gap, the Elementary School

Attendance Gap, and the High School Completion Gap and recently the College Graduation Gap” (Anderson, 2004, p. 5). All of these gaps, Anderson traces to the turbulent and often violent history of racial tensions in the United States wherein educational opportunity was the manipulated currency. In this seminal work, Anderson argues that the gaps which now exist in the academic performance of African Americans is merely a function of older gaps perpetuated by racism. Thus, the gap in mathematics achievement, according to Anderson’s logic is largely a product of historical gaps, and like in the past African Americans will find strategies to close this latest gap as well.

Milner (2012) followed Anderson’s argument and proffered an alternative to the Achievement Gap, which he calls, “*the opportunity gap explanatory framework*”. In this account, Milner provides a rich source of investigative opportunities through which the achievement gap can be re-examined. Irvine (2010) provided an extensive list of gaps, more likely to be the sources of differentials in achievement. She wrote:

The teacher quality gap; the teacher training gap; the challenging curriculum gap; the school funding gap; the digital divide gap; the wealth and income gap; the employment opportunity gap; the school integration gap; the affordable housing gap; the school integration gap; and the quality child healthcare gap. (p. 12)

These more progressive studies were offered as counter narratives to prior periods of educational research that blamed Black children, the community and culture for educational disparities (Lewis et al., 2008). Deficit Ideology proclaims that certain communities are doomed to failure. Yet, this body of research was critique because it failed to explain how so many African Americans manage to defy expectations to

become successful, functioning members of society. Researchers seeking to understand success (versus failure) among African Americans turned to resilience, grit, learning styles and racial identity development. The chapter concludes by considering counter narrative research on Black males and mathematics informed by critical race theory, which serves as one theoretical framework for this study.

Social and Cultural Tools for African American Achievement

Resilience and Grit

Students or individuals who are able to surmount risk factors to find success are called *resilient* in the academic literature. The term resilience is not however, limited to the field of education and as such several definitions are available. However, all of the definitions identify the presence of risk factors and cite efficacious responses to named risk factors. Academic resilience can therefore be defined as, “academic achievement when such achievement is rare for those facing similar circumstances or within a similar sociocultural context” (Gayles, 2005, p. 253). The concept of resilience is especially important to disenfranchised and marginalized groups. It is one of the traits which if cultivated can propel those expected to fail, to heights to which they are not expected to rise. Minority populations are especially prone to the vicissitudes of life. Any program or intervention, which can assist in the reconstruction of the identity, can be very appealing. It is also assumed that if the reconstruction of the identity is possible there is the hope that such a change can lead to improvements in academia particularly mathematics. The theme of resilience is a welcomed framework to explain the successes of African Americans as opposed to the deficit model, which is oriented towards failure.

African American males, who are successful in mathematics, are all found to have this quality of resilience resident in their makeup. It is the trait, which somehow allows them to circumvent the negative stereotypes and the expectations of failure to re-engage with academic ambitions and then to have those ambitions realized. For some researchers, resilience is a form of resistance to the dominant culture, which expects failure of them (Cammarota, 2004). Likewise, grit a concept related to resilience, is the ability to demonstrate, “Perseverance and passion for long-term goals” (Duckwork, Peterson, Matthews, & Kelly, 2007, p. 1087) even in the face of considerable challenges.

Learning Styles

Kunjufu (1988) also argues that African American children are further hurt by a curriculum which refuses to acknowledge “a higher verve” and that “African American students are relational in their thought processes and are more oral in cognition than are Whites.” Around the same period that Kunjufu began to investigate the learning styles of African American students, Boykin and Allen (1988) and Willis (1989) also provided evidence to support the view that African American students were in possession of behavioral learning styles, which were unique.

The program that can identify and implement plans for these characteristics of the African American learner is likely to meet with success because it is based on research findings of the characteristics and needs and learning styles of the African American learner.

Hale (1986), in her book *Black Children: Their Roots, Culture and Learning Styles*, quoted from Herskovits (1939) “the phenomena being studied might in some way

have been influenced by the carry-over of certain African traditions” (p. 12). Here the author is referring to learning styles of African American students and argues that African cultural heritages may have been transmitted into observable behaviors, which American education is not designed to recognize nor value. He thus offers another rationale for observed behaviors rather than the deficits, which are usually cited as being responsible for lower academic achievement.

Racial Identity

In a quest to gain a healthy and informed grasp of the African American dilemma, racial identity must not be overlooked. The racial identity of African Americans is best understood in the context of the hegemonic practices, which govern living in the United States. Many see the development of the racial self in the African American as a prerequisite for the development of a holistic, well adapted, proud African American personality (Rowley, Sellers, Chavous, & Smith, 1998). More recently in the educational realm, Dee and Penner (2016) found significant gains in GPA and attendance rates for at-risk students of color who were enrolled in ethnic studies courses. Their findings support the view that a positive racial identity is important for the academic and social success of individuals of color. Yet, within the plethora of literature on the racial identity of African Americans, very little can be found that espouses the educational benefits of the cultivation of a strong racial identity among African Americans.

Hale (1986) wrote that African American students have been historically sold a myth that everything about Africa was “disgraceful” and that “Blacks that had attained the highest level of culture by having been brought to America and having been civilized

by the White man” (p.11). Confronted with this sort of libelous doctrine it is little wonder that African American “students were not interested in Africa and preferred not to be reminded of their African heritage” (p. 11). However, scholars now suggest that it is exactly this attitude, which has caused harm to the psyche of the African American learner and that efforts to inculcate pride in one’s heritage is the inoculant to such self-destructive beliefs.

Kunjufu (1984) a prominent researcher in the field of racial identity also argues that integral to academic success in all subject areas is the existence of a strong racial identity. Like Stinson (2006), he believes in the deliberate reconstruction of the public and private image of the African American learner. Kunjufu (1984) clearly identifies factors, which contribute to the negative private and public image of the African American male, and then provides useful interventions for each. He begins by first identifying the societal factors which contribute to the negative self and private identity of the African American male learner and then proposes solutions using alternative societal constructs. The following are the conditions, which he believes contribute to the negative self and public image of the African American:

Chronic underemployment and unemployment; The changing concept of childhood; Elitism; Low expectations; Lack of commitment to educating all children; Misuse of achievement tests to label and place students. (Kunjufu, 1984, abstract)

The present research is positioned within this progressive line of thought, and thus Critical Race Theory (CRT) is the most apparent theoretical framework. The

upcoming section will focus on counter narrative research and review relevant research on mathematic achievement among African American males.

Racial Socialization

Many CRT protagonists call for the development of a strong racial identity among African Americans and all ethnic minorities. The term “racial socialization” is used to describe this process and “is defined as the process in which African American parents raise children to have positive self-concepts in an environment that is racist and sometimes hostile” (Thomas & Speight, 1999, p. 153). The absence of instructional materials, learning opportunities and affirming classroom environments, which represent the interests of minorities often identified as a root cause for the academic and social challenges of minority students in urban schools. Hence, the growing emphasis on racial socialization.

Racial identity inspires pride in one’s ethnic background. It encourages the individual to accept and promote one’s heritage and encourages educational pursuits. In a study which sought to examine the effects of racial socialization and race related stress of African American parents, (Thomas, Speight & Witherspoon, 2010) wrote, “These parents most likely have some degree of resilience based on their positive racial identity that buffers the potentially negative effects of racism” (p. 410). Positive findings such as these are very useful because they provide partial endorsement for racial socialization.

Though there are undeniable personal benefits to be derived from racial socialization there is some evidence, which suggests that there are social implications to

this course which are not as productive. Thomas, Speight, and Witherspoon (2010) also wrote:

Racial socialization processes have been linked to a variety of important outcomes in children and adolescents. Specifically, research suggests that parental racial socialization practices and messages are related to racial identity attitudes, self-esteem, depression, anxiety, and anger management, along with school efficacy and achievement. Thus, racial socialization is an important parental practice providing key protective factors for children. (p. 150)

Thomas, Speight, and Witherspoon concluded their study by saying that “Parents need to find a balance between teaching children about race-related issues in a way that promotes positive self-concept without overwhelming them or creating hypersensitivity to race” (p.410).

Theoretical Framework

Critical Race Theory

Historically the emphasis on racial identity is largely a by-product of the Civil Rights Era, the cultural pedagogy movement and more recently theories like Critical Race Theory (CRT). Critical race theory argues that strong racist themes are embedded in all schools in America (Delgado & Stefancic, 2001). The theory, further states that racism exists in “all hierarchical structures that govern all political, economic and social domains.” (DeCuir & Dixson, 2004; Delgado & Stefancic, 2001). American schooling is therefore inseparable from this ecology, and is thus organized to create, sustain and justify social and racial hierarchies through policies, practices and pedagogies.

Advocates of critical race theory discuss the idea of ‘whiteness’ in schools. Whiteness is “neither new nor separate from racism; Whiteness comprises ideologies, attributes and actions of racism in practice” (Chubbuck, 2014, p. 305). Yoon (2012) also has an operational definition of whiteness and writes that, “whiteness is collectively constructed by multiple players, in real time and despite educators’ best intentions. This construction has implications for students’ learning experiences, a school’s professional culture and outcomes that reify institutional inequities” (p.1). The existence of this “whiteness” has prompted the thrust for racial identity development particularly among African Americans to counter the harmful effects of whiteness in education settings.

Critical Race Theory, while acknowledging that racial meritocracy exists in the United States, is also focused on the effects of that meritocracy on the performance of racial minorities (Cook, 1990; Crenshaw, 1991; Dalton, 1995). Critical race theorists are therefore by virtue of their interest in the effects of the meritorious social structures in place in the United States primarily concerned with issues of social justice and interpret issues of unfairness in society through the lens of race.

Proponents of CRT, are steadfast critics of movements which have encouraged the idea of color blindness. Color blindness they assert, only serves to maintain racial hierarchies. In legal cases, CRT scholars who are primarily people of color first ask the question of how race applies to the situation and then they consult with the law (DeCuir & Dixon, 2004). In educational settings, Critical Race theorists, also first look at the issues along racial lines. Thus, for Critical Race theorists, race is foundational to understanding and interpreting social issues at the legal, educational and policy levels.

In order to analyze the role of race in social events and institutions Critical Race theorists have developed tools of analysis. One essential tenet and tool of analysis is counter-storytelling (Matsuda, 1995). Counter-storytelling is a method that “aims to cast doubt on the validity of accepted premises or myths, especially ones held by the majority” (DeCuir & Dixson, 2004, p. 27). The counter-story according to DeCuir & Dixson (2004)

is a means of exposing and critiquing normalized dialogues that perpetuate racial stereotypes. The use of counter-stories allows for the challenging of privileged discourses, the discourses of the majority, therefore, serving as a means for giving voice to marginalized groups. (p. 27)

Counter-story telling is particularly useful to this project because the phenomenal success of the participants evidences that the narrative about the African American’s mathematical abilities are inaccurate.

Another basic tenet of CRT previously alluded to is the notion of the permanence of racism. Within the context of CRT framework, racism continues to play a dominant role in American society and this role is conscious and unconscious (Lawrence, 1987). For example, within the context of the school, the CR theorist may observe discipline referrals and suspensions, the composition of gifted classes, special education referrals etc. considering the racial make-up of the data.

Critical Race Theory adopts the notion that, whiteness has characteristics of property. According to Harris (1995) property operates on three levels: the right of possession, the right to use and the right to disposition. Harris argues that the White race

has had access to each of the three aspects of property and thus by the transitive property whiteness, having characteristics of property can be considered to be property.

Interest convergence is a term used to describe another analytical tool of CR theorists. When applied to a particular context, gains within communities of color, for example the enactment of the civil rights act, are viewed not as gains but rights enjoyed by Whites for centuries now conferred upon those who should have been entitled to the same rights. Additionally, the term is used because the rights or privileges granted are interpreted according to CR theorists to be allowed only because they “converged with the self-interests of Whites” (DeCuir & Dixson, 2013, p. 28). Critical race theorists note that the so-called rights begrudgingly allowed upon non-Whites caused no significant disruption to the lives of Whites, which begs the question, of why does the historical record evidence the deliberate withholding of rights when no harm was caused to the dominant class or race? Critical theorists also argue that since the disparities between Whites and communities of color is so wide that concessions made are unlikely to bring about any significant improvements or benefits to communities of color. One popular example of this perspective is the precarious gains of the *Brown* decision. With the desegregation of schools facilitated by the *Brown* decision,

losses in terms of human capital by way of the dismissal of scores of African American teachers and administrators, school closings in Black neighborhoods, and the limited access to high quality curricula in the form of tracking, inflated admissions criteria, and other factors, have made the so-called “gains” from *Brown* questionable. (DCuir & Dixson, 2013, p. 28)

The final tenet of CRT is called, the critique of liberalism. Critical Race theorists are critical of certain ideas, embraced by liberal legal ideology. The assumption that there is value in the notion of colorblindness, the neutrality of the law and the notion of incremental change are all viewed as antithetical to the underlying goals and objectives of critical race theorists and their agenda and are therefore rejected. CR theorists propose that at face value these inducements seem to have merit but argue that because of the history of racism in the United States that it is not reasonable to expect that the law, which gave voice and power to the prejudices, is capable of being colorblind.

An extension of the perspective of the notion of colorblindness in CRT is that the concept of colorblindness has made it according to Williams (1997) impossible to view Whiteness as neutral but rather the normal to which others either conform or differ. The standard or interpretation of colorblindness is thus a term, which has an inherent measuring rod where the unit of measure is the standard of Whiteness.

The most virulent and pernicious manifestation of the idea of colorblindness is that the concept has permitted the ignoring of institutionalized race based policies. In other words, the argument that society should be striving towards colorblindness allows power structures to remain in place by ignoring inequities known to exist. It is also very naïve and almost disingenuous to assert that the mere adoption of the term will eliminate racism and racist actions. Critical Race theorists therefore hold great objection to the use of the term colorblindness.

CR theorists agree that though much progress has been made in the development and refining of the theory, much work needs to be done towards developing analytical tools which can be applied to educational research (DeCuir & Dixson, 2013).

Culturally Relevant Pedagogy

Educators who have embraced the CRT framework have expanded it to pedagogy and teaching. Accepting that schools operate and are informed by the hierarchical structures that give them life, schools therefore cannot help but reflect the ingrained racism, which governs the society they exist in. Understanding that the racism is residual and chronic, Ladson-Billings (1994) began to explore interventions through pedagogy “that empowers students intellectually, socially, emotionally, and politically using cultural referents to impart knowledge, skills and attitudes” (pp.16-17). It was Ladson-Billings who coined the term Culturally Relevant Pedagogy and the approach was informed by central tenets of Critical Race Theory.

One major tenet of Critical Race Theory and the researchers who have embraced its assumptions is that the only way to combat the racism entrenched in society is to actively and purposefully infiltrate and undermine the extant hierarchies to foster greater social justice through education that is culturally relevant and informative of the discourses which are entrenched in society. Ladson-Billings who is herself a Critical Race theorist, therefore focused on teaching methods which did not only help the individual to deal with structural racism but her methods were committed to collective empowerment which is a phrase synonymous with social justice.

According to Ladson-Billings (1995a, 1995b), culturally relevant pedagogy has three main components:

- *Focus on long-term academic achievement and not merely achievement on end of year assessments.*
- *Cultural competence which “refers to helping students to recognize and honor their own cultural beliefs and practices while acquiring access to the wider culture, where they are likely to have a chance of improving their socioeconomic status and making informed decisions about the lives they wish to lead” (Ladson-Billings, 2006, p.36)*
- *Sociopolitical consciousness is the responsibility of the teacher and refers to the teacher’s duty to lead “students to recognize, understand, and critique current and social inequalities” (Ladson-Billings, 1995b, p. 476)*

In the most recent work of Ladson-Billings (2014) she refers to the need for educators to continue adapting their methods and curricula. She writes, “any scholar who believes that she has arrived and the work is finished does not understand the nature and meaning of scholarship” (Ladson-Billings, 2014, p. 82)

Culturally Responsive Teaching

Gay, is another prominent critical race theorist. Gay (2010) used the term *culturally responsive teaching* and defined it “as using the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning encounters more relevant to and effective for them” (p. 31).

The following is a summary of the six main components of culturally responsive teaching:

- Culturally responsive teachers are *socially and academically empowering* in their methodology and they do so by setting high expectations for students. They are also committed to the success of every student.
- Culturally responsive teachers are *multidimensional* and this is achieved by engaging students in cultural knowledge, experiences, and perspectives.
- Culturally responsive teachers *validate every students' culture*
- Culturally responsive teachers are *socially, emotionally and politically comprehensive* in their approach to educating the whole child.
- Culturally responsive teachers contribute to the *transformation of schools and societies* by using the strengths of students to drive instruction, assessment, and curriculum design.
- Culturally responsive teachers are *emancipatory and liberating from oppressive educational practices and ideologies*

Model of Black Male Success

James and Lewis (2014) provide a generalized framework for understanding the ways African American males navigate the presiding societal challenges to become successful. Their offerings are aligned with recent research trends, which steer away from deficit ideology to focus on the strengths and coping mechanisms of successful Black males. In other words, their research provides a counternarrative to the traditional approach of studying African American males. Called “Kindling the Spark of Black

Male Genius through Education”, the title is supported by the careful and detailed analysis of the “inopportunities” that African American males circumvent to become leaders in almost every stratum of society. The ability to navigate what is called, “the void” by a series of social processes is the cornerstone of the theory. They wrote, “Traversing the void is a required and recursive experience over the course life and career development among Black males” (James & Lewis, 2014, p. 13).

James and Lewis (2014) proffer that Black males possess a quality they term *blackmaleness*. Blackmaleness is an inherent ability, which allows Black males to travel through multiple realities, using a combination of “choice and chance” to achieve both academic and social achievement. James and Lewis offer that Black males are able to do this through a learned ability to adapt to the “shifting identities” that exist within the void of inopportunity. The researchers make a concluding note that success among Black males is best understood through careful examination of the lives and experiences of college educated, mature and self-actualized Black males.

Discourse of Achievement in Mathematics

The generally circulated narrative assumes the African American male learner to be deficient in mathematics. Feagin (2013) writes extensively about the philosophies, which have constructed African Americans as inherently “pathological”. This assumption of “pathology” is well entrenched in society and has come to be accepted as normative of the group. McGee and Martin (2011) begin their study of African American males in mathematics with the following statements:

- “Mathematicians are old White men. You would never fit in” (p.1348).
(*Comment directed at an African American male participant “Yes, there is engineering...but you should pick a major that you are more likely able to graduate in” (p.1348). (Comments directed to an African American male participant by his mathematics teacher)*)
- “Make sure you get a Chinese or Asian roommate! (p.1348). (*Joke from an AP high school mathematics teacher directed to an African American male participant after announcing his intent to major in engineering)*)

Stinson (2006) refers to this common narrative as “the discourse of deficiency” which focuses on “the perceived cultural, schooling and life experiences in general of Black children” (p.482). He argues for the development of an alternative narrative, which he calls, “the discourse of achievement” (p. 478) and assumes this counter narrative to be a useful tool in the eradication of the mathematics achievement gap among African American males.

The “failures” of African American males in mathematics is well documented and usually contextualized by comparing their performance to their White peers (e.g., Lubienski, 2002; McGraw, Lubienski & Strutchens, 2006; US Department of Education, 2015). From the inception, of investigations into the performance of African American males in mathematics, performance was always positioned as a comparative index where comparisons were made along racial lines. This perspective is well aligned with the Deficit Ideology and should not surprise the reader.

Mathematics Achievement Reconceptualized

Exploring K-12 Mathematical Success

Beginning with Ladson-Billings (1997) a renewed perspective began among a small group of researchers who tried to refocus the discussion to consider the life and schooling experiences of African American students who experienced success in mathematics rather than failure. Berry, Thunder, and McClain (2011) followed the logic of Ladson-Billings and deliberately pursued the characteristics possessed by African American males who were successful in mathematics. Though the study made no attempt to design a program to cultivate and nurture the traits found to exist in successful African American male students of mathematics, it provided useful insight into the characteristics of successful mathematics students. The study was called a “mathematics autobiography” and it attempted “to document important (mathematical) milestones, and to gain a sense of the perceptions of 32 successful African American males in grades 5 through 7” (p. 10). The boys’ student records (courses, grades, standardized test scores, teacher comments and exceptionality status) were considered for placement in a summer program.

Briefly, the Berry et al. study found the six common characteristics of African American males who were successful in mathematics, which included:

1. **Computational Fluency:** They all demonstrated and verbally testified of their “computational fluency”. This is a reference to the most basic of math competencies. The ability to perform the four basic operations with special reference to multiplication. The boys in the study all stated that their knowledge

of the basics of math helped them to master and move quickly through the more challenging topics.

2. **Extrinsic Recognition:** The boys identified with and were proud of their good grades in mathematics. Grades in school, giftedness identification, performance on Standardized tests served as enforcement for their abilities and prodded them to continue striving towards success in the subject.
3. **Awareness of Their Status in the Tracking System:** As a follow-up to the previous common trait, it was observed that the students who were successful identified their experience and placement in “gifted classes” exposed them to more rigorous math and expectations.
4. **Relational Connections:** The boys identified that their positive relationships with teachers, parents and out of school activities contributed to their mathematical identities or view of themselves as competent students of mathematics. In their autobiographies, many of the boys stated that their parents contributed significantly to their view of themselves as successful mathematicians. Interestingly, this was stated by even students who were the children of single - family households.
5. **Out of School Activities:** The out-of-school activity of working on the bills, and taxes provided many of the successful boys’ opportunities to work with building their computational fluency. Other boys testified that teachers who gave them experience with real world mathematics were partly responsible for their success in mathematics.

6. Engagement with the Unique Qualities of Mathematics: The boys were clearly able to distinguish mathematics from other subjects and would describe their sense of pride that they could follow the logic of a problem and persevere to complete the problem and arrive at the correct solution. One young man, states,

What I like about math is “it’s kind of complicated, and I like, I want my work to be complicated so I can actually do better when I get to higher grades. And it feels like I finished something. It’s like when it’s hard, like when we were doing an engineering project, I feel like I finished something really good, like I did a really good job. (Berry, Thunder, & McClain, 2011, p. 17)

The boys isolated for this study made important contributions to the understanding of the racial identities of African American males in schools. The boys felt that teachers “treated groups of students differently, based on race, gender or ability”. Also, since African American boys were poorly represented in the “gifted” mathematics classes many of the boys felt isolated and an emerging construct was a sense of “otherness” which these boys all seemed to identify with. This sense of “otherness” seemed to be a product of what Stinson (2006) later considered to be a response to the “White male math myth” discourse.

Martin (2009) also explored the common narrative about the African American mathematician through the sharing of his experiences at The University of California at Berkeley. Writing about those experiences some twenty years later, he concluded, “I find myself confronting similar race-based sentiments in research and policy discussions

focused on African American learners and mathematics in the K-12 context.” (Martin, 2009, p. 296) His overriding question then becomes, with this common narrative about the African American student of mathematics, how do these prejudices and stereotypes affect the way, “policy makers conceptualize the aims and goals of mathematics education for African American...students based on inadequate conceptualizations of race, mathematics ability, and achievement” (Martin, 2009, p. 298).

Martin, himself a scholar in mathematics education recognizes that while mathematics may be considered a neutral subject area that mathematics education is far from being value free (Ernest, 2002). Foundational and historical biases, do not recognize the African American male as being a competent and able student of mathematics and these attitudes are often reflected in the classroom.

Ethnomathematics

Brown (2008) is an advocate for *ethnomathematics*, which is a theory, spawned from Solorozano and Yosso’s (2001) concept of counter stories all generally belonging to Critical Race Theory. “Ethnomathematics is the study of the relationship between mathematics and culture” (p. 32). In addition, to ethnomathematics there is also another framework from which it is suggested that African American males receive instruction in mathematics to promote success. It is called, critical mathematics literacy (Powell & Frankenstein, 1997). Critical mathematics literacy is an attempt to introduce mathematics as a viable tool for the interpretation of the inequities in society.

Terry (2011) gives a very good illustration of how this approach can be applied. In his ethnography, he highlights a location in Los Angeles where the crime rate was

unusually high. In the narrative about this place, he refers to an alleged drop in the crime rate, assumed to be the result of an increase in hired patrol officers. The Police Chief uses the alleged drop in crime to insinuate that the crime rate dropped because of an increased police presence. In his study, Terry performs a mathematical exercise with some students. The result is that the students could recognize that the ratio of police officers to citizens did not change, but that the police chief merely insisted that it did. The young men who did the calculations then recognized that the advertised decrease in crime was in fact a fallacy and that it was intended to continue the popular narrative of African American males as being dysfunctional and in need of policing. In this illustration, Terry suggests that African American males should be allowed to mathematically analyze the popular statistics circulated about them and then to use their knowledge of mathematics to show that the messages delivered are often not mathematically correct. He believes that this process will not only help to build greater mathematical competencies but will serve to boost the negative stereotypes many African Americans have of themselves and their communities.

To further support his approach, Terry cites the very graphic language contained in a song by Mos Def entitled, *Mathematics*. The song is a cry from rapper, Mos Def for African American males to “effectively decode, process and understand the meanings embedded in urban life....to counteract the negative forces therein-they must develop mathematical literacy.” This “new math” requires African Americans to “critically mathematicize everything from the going-ons of the neighborhood block to understanding global capital markets-and everything in between” (Terry, 2011) In this

approach to mathematics, Terry, suggests the use of mathematics to keep the African American informed and so that he can have access to opportunities not available to him.

Stereotype Threat and Management

Stereotype threat is defined “as a type of confirmation bias in which the threat of being viewed through the lens of a negative stereotype suppresses academic performance among Black students at all academic levels” (McGee & Martin, 2011, p.1352).

Especially in the context of standardized math tests, “Black students who are aware of racial stereotypes related to mathematical ability may experience anxiety related to the confirmation of those stereotypes, and as a result, their performance on math tests will suffer” (Steele & Aronson, 1998, p.419). African American males understand well the popular narrative about their perceived mathematical competencies. “The constant depictions of African Americans as deficient mathematics learners have crafted images that failure is normative with respect to African American mathematics learners”. (Moses-Snipes & Snipes, 2005)

Stinson (2006) refers to this common narrative as “the discourse of deficiency” which focuses on “the perceived cultural, schooling and life experiences in general of Black children” (p. 482). He argues for the development of an alternative narrative, which he calls, “the discourse of achievement” and assumes this counter narrative to be a useful tool in the eradication of the mathematics achievement gap among African American males.

“Stereotype Management” is the term used to explain high achievement and resilience among African American males who have experienced success in mathematics.

Stereotype management is described as a “tactical response to ubiquitous forms of racism, and racialized experiences across school and non-school contexts” (McGee & Martin, 2011, p. 1387).

McGee and Martin (2011) provide an alternative perspective of the African American male by the identification of individuals who have used the stereotype threat to propel themselves towards success in mathematics. Thus, there is evidence in the literature of an emerging personality, which can cope and find success in mathematics but not enough is known about these personalities. Whiting (2006a) suggests that educators must work systematically to build scholar identities among African American males. Though his work is not limited to mathematics he provides a useful framework, which he calls the “scholar identity model” which is grounded in a few achievement based theories. In his model, Whiting like Kunjufu believes that a few external factors can be utilized to build the necessary components of the scholar identity. The external forces he cites are: The community, the school, family and a faithful mentor. James and Lewis (2014) also advocate for these forces. These societal influences can be tailored and used to build the following: masculinity, racial identity, academic self-confidence, need for achievement-need for affiliation, self-awareness, internal locus of control, willing to make sacrifices, future orientation and self-efficacy (Whiting, 2006b).

Relation to Present Study

The prejudicial views of the African American student of mathematics, known to exist have undoubtedly influenced and contributed to the gaps in achievement for the group. Terry (2011) understanding that these biases exist has envisioned the provision of

counter stories as a pedagogical strategy to improve urban mathematics curriculum.

Terry insists that pedagogical interventions “designed to re-engage and re-orient students to mathematics as a critical cultural activity are necessary. Solórzano and Yosso (2001) have also contributed to this view that mathematics instruction should involve the development and sharing of *counter stories*, which are aligned with the cultural ethos of those being served. Counterstories are stories that incorporate elements of Critical Race Theory (CRT). They are a unique group of stories that actively involves the tenets of CRT in the story telling process. Solorozano and Yosso (2001) also argue that counterstories satisfy at least “four theoretical, methodological, and pedagogical functions:” They are:

1. Counterstories build community among the marginalized by personalizing educational theory and practice.
2. Counterstories provide a context within which to challenge and transform the hegemonic wisdoms of those at society’s center.
3. Counterstories open new realities to marginalized peoples by helping them to envision possible lives.
4. Counterstories teach marginalized people to actualize those possibilities through synthesizing elements of stories with current realities, thereby producing richer actual lives.

The present research examines counternarratives among African American men with unquestioned success in the highly competitive mathematical profession, actuaries. Their lives serve as counternarratives to the history of pathology and inability forced

upon African American males. Informed by Solórzano and Yosso (2001) use of counter narratives this study seeks to personalize educational theory, challenge hegemonic theory, and open new ways to envision mathematical expertise among African American males. The research seeks to center the discourse of redressing mathematic underperformance on Black male success models, rather than revisiting deficit research models.

Summary

African American males who have managed to surmount historical and current academic obstacles to become successful Mathematicians are exceptional. Investigations, which attempt to isolate the antecedents to their success is vitally important and worthy of attention. This study focuses its attention on African American males who has achieved noteworthy success in the field of mathematics. The upcoming chapter details the methods, research design, data collection and analysis of interview data.

CHAPTER III

METHODOLOGY

James and Lewis (2014) admonish educators, parents and policymakers to focus on the developmental supports and experiences of successful African American males. They argue that a detailed analysis of the experiential mechanisms of *exemplary* African Americans offers the promise of strategies which can be crafted to nurture, life and educational achievement for African American youth. Long-term benefits are also more likely to be accrued if African American male students are outfitted with internal dialogues that are readily accessible and applicable to their life circumstances. These skills, if learned and socialized into the building blocks of the family, can help African American communities to thrive in an educational system that is not always fair. (Milner, 2012)

The possibility that ideas gleaned from this study could be used to influence and improve the performance of African American males in mathematics not only fueled the researcher but also guided and determined the methodology of this study. The researcher used a phenomenological interpretative approach, (Merriam, 2009; Van Manen, 1990, 2014) because the method was most compatible with the goals of this research project. The phenomenological framework allowed the researcher to study a phenomenon, i.e. the phenomenon of the successful African American male mathematician, and to understand this experience through the eyes and experiences of the men who lived it.

One of the theoretical vehicles which informed this project is, Critical Race Theory. Foundational to this theory is the idea that strong racist themes are embedded in all schools in America (Delgado & Stefancic, 2001). Critical race theorists also subscribe to Critical Race Methodology (CRM) which is a method of analyzing contexts to illuminate how race and racism play a role in maintaining educational gaps (Cole, 2017). The counter-story is one technique used by CR theorists to deconstruct negative statements, assumptions and rationales often used to explain academic trends among people of color. As each interview was conducted the researcher consistently asked questions which prompted the participants to consider the role of race in the experience they shared.

Research Design

Using qualitative methodologies, the researcher investigated through structured and semi-structured interviews, the attributes and common life experiences of male African American actuaries. There was no assumption of cause and effect and the researcher in seeking to avoid the assumption of casualty kept a reflective journal where feedback, initial thoughts and impressions were recorded and frequently monitored during the interview phase. The reflective journal was also instituted as a self-check to avoid researcher bias and premature assumptions (Lincoln & Guba, 1985; Merriam, 2009).

Additionally, the phenomenological design allowed the researcher “a radical and disciplined way of seeing with fresh, curious eyes” the life experiences of the male African American actuary (Finlay, 2014, p. 122) which is ultimately a primary goal of

this work. Due to the researcher's experience as mathematics teacher of African American males, it was important that the researcher be constantly on guard against allowing the personal perspective to color the interpretation of participant commentary- the phenomenological design allowed for and guarded against this inclination by its focus on the participant's perspective.

Discovery can only be facilitated through an effective and rigorous vehicle of investigation. To that end, the researcher designed a series of questions designed to elicit "the lived meaning of a human phenomenon" (Van Manen, 2014, p. 297). The questions developed utilizing this phenomenological design were asked to African American actuaries to seek insight into the following research queries:

1. How do African American male actuaries describe their personal attributes, identity formation processes and formative educational and social experiences?
2. How did they acquire mathematical expertise in the context of schooling in the United States?
3. How impactful were social relationships to their academic and professional preparation?

Participants

Identifying participants who met the criteria for participation was the first step in the investigation. The host organization, International Association of Black Actuaries (IABA), posted to its website a description of the study and a link which took interested individuals to a screening survey administered through Qualtrics (see Appendix B). Hartford, Connecticut, is home to IABA's, headquarters. However, none of the

participants were in fact residents of Hartford or other cities in Connecticut. Since the organization is International it was expected that actuaries from different states even countries would register their interest by completing the online screening survey. Membership however, was no guarantee of selection. Respondents who met the credentialing requirements were also required to have attended a US school either at the High School level or the University level. One actuary, who consistently expressed his interest in the study, did not fit the protocol for participation, as he was not educated in a US college.

As a result of the responses to the survey, participants who met the criterion for participation were contacted via the email contact they provided in the recruitment survey. In this initial correspondence, potential participants received, Institutional Review Board (IRB) approved information about the study as well as the consent form (Appendix D), which they were asked to complete prior to the scheduling of the interview.

It is clear from the sample of six participants, that African American males are not a monolithic group. The diaspora and the quest for educational opportunity and social mobility have transported many immigrants of African lineage to these shores. In any K-12 classroom or tertiary educational institution, African American males can be found of both diverse and common origins. The purpose of here identifying this difference is to draw attention to the diversity of the Black males in the sample. This difference is compatible with the diversity that exists in Black America and therefore the sample is to some degree representative of Black males in the United States.

The survey was posted to the organization’s website August 2016. The initial response to the survey as it was posted on the organization’s website was relatively quick. The first response was posted on August 24, 2016 and the last, November 1, 2016. Table 1 is a summary of respondents to the initial screening Qualtrics (an online survey tool) questions about gender and level of actuary.

Table 1
Summary of Respondents

		Please indicate your gender.			Which level of actuary are you?		
		Male	Female	Total	Associate	Fellow	Total
Please indicate your gender.	Male	19	0	19	7	6	13
	Female	0	3	3	1	0	1
	Total	19	3	22	8	6	14
Which level of actuary are you?	Associate	7	1	8	8	0	8
	Fellow	6	0	6	0	6	6
	Total	13	1	14	8	6	14

NOTE: There was no response from 8 participants

At the end of that period 22 individuals completed the survey. After a brief verification process 13 of the 22 respondents qualified for participation; however, when contacted, two of the seven who indicated that they were Associate actuaries, were found not to be Associates. Eventually, 55% of the respondents who met the criteria for participation, submitted completed consent forms and participated in the interviews.

The ethnic background and age of the actuary was also included in the screening survey since these distinctions were variables that might influence the findings. Table 2, summarizes the ethnic background and age of the participants.

Table 2
Final Participant Demographic Information

Participant Pseudonyms	Actuarial Designation	Country of Origin	Age
Denzel	Enrolled Actuary	US	35
Jack	Fellow	Caribbean	35
Frank	Associate	First Generation US Citizen	24
Cage	Fellow	US	32
Kevin	Fellow	Caribbean	33
Scooter	Fellow	US	44

The six male, African American actuaries were a diverse group. While the term African American is used to describe the men, three of the six had what might be considered a recent immigrant background. Two participants were immigrants from the Caribbean. They both obtained their tertiary and professional credentials in the United States and arrived in the United States in their early twenties. One participant is a first generation African American, and three participants US born citizens.

The two participants born in the Caribbean lived in the United States in excess of 15 years. They were both from the same Caribbean country and attended the same University. They experienced their University education in the US and thus qualified for participation by virtue of their having lived the experience of a Black male in US schools.

The solitary first generation US citizen was born to Nigerian parents, and he too, though of a different ethnic background, is demographically an African American. This participant who was called Frank, made several references to his status as a child of immigrant parents and referred to what he called an “immigrant mentality” when asked how he was similar to or different from his African American peers.

The three US citizens were also not homogenous but they did have in common that they did not consider themselves to be recent immigrants. While these participants were not directly asked if they could trace their lineage to another country, when asked if their parents or grandparents were from another country they all replied no. Their response would suggest that these men were at least third generation African Americans.

African American males who graduated with a degree in Actuarial Science were not included unless they successfully completed the professional preliminary examinations. Thus, degreed but not fully credentialed actuaries were not selected to be participants. Since the focus of the study is on the highest level of attainment, or the *crème de la crop* in a highly mathematical field, only Enrolled, Associate, and Fellow actuaries were selected for participation. The enrolled actuary is the lowest level of actuary, yet fully credentialed; the Associate Actuary is the second highest level of actuary and the Fellow, which is the highest achievement for those in the profession.

The approved IRB protocol identified Associate and Fellow actuaries to be suitable participants. However, during the recruitment efforts the sole Enrolled Actuary, who participated, demonstrated an unparalleled interest in the study and thus prompted the researcher to enquire about the qualifications of the Enrolled Actuary. Upon this

investigation, it became clear that the Enrolled actuary is considered an actuary and therefore could be included.

Data Collection

The International Association of Black Actuaries (IABA) agreed to post on their website an advertisement for the study and a recruitment survey to determine eligibility. The expectation was that since IABA is an international organization and one exclusively for the African American/Black mathematician that there would be no shortage of interested participants. Additionally, the support given by the organization in posting details of the study also hinted that interest would be high. In anticipation of high interest and more importantly high diversity among the participants, it was determined that demographic information could potentially provide critical contextual information and thus scrupulous attention to the background of each participant was collected.

To address the confidentiality of the participants, personal identifiers and demographic details were stored on a password protected flash memory drive. Audio files were not labeled with the participant name but rather the pseudonym and the date of the interview. Both the audio and the transcribed text file were stored on the same password protected flash memory drive. All audio files will be deleted six months after the findings of this research venture are presented and defended.

Demographic information about each actuary was critical as individuals are invariably a product of their background. Demographic information was collected from the screening survey and further details about schools attended and years in the US were

gathered during the interview. Any demographic details, not addressed in the initial interview were included in the written follow up interview.

Each of the six African American male actuaries participated in an initial hour and a half interview. The interview was conducted over the phone. Each participant was given the option to have the initial interview as a face-to-face conversation using Skype or Face Time, but all participants opted for the more conventional phone conversation.

While there was a script and formal outline for each interview, the interviews were semi structured and questions were open ended. Assurance that deviation from the scripted questions was acceptable was found in Van Manen's (1990) comment that "a certain openness is required in human science research that allows for choosing directions and exploring techniques, procedures and sources that are not always foreseeable at the outset of a research project" (p. 162). The very nature of qualitative research preempts strict adherence to a narrowly prescribed and administered script. Any comment, which was similar to another participant or which seemed to demand further probing was investigated or asked in the written follow up interview. Sometimes the probing stretched beyond the hour that was agreed upon. Whenever an interview exceeded the hour, the researcher always asked as a courtesy, if the participant was willing to continue. In each case, participants were willing to continue. Their willingness to participate was a good sign that they were not only committed to the process but that they were also deriving some satisfaction from the activity.

After the initial interviews were conducted, the audio recordings were professionally transcribed. The researcher then coded the transcriptions using Dedoose

software (Weisner & Lieber, 2013). The actuaries were subsequently contacted with a request to respond to some follow up questions. The researcher sought more information regarding some emerging themes, which appeared to be present but not fully developed in the initial conversation. All the actuaries willingly consented and responded in writing, even though they were given the option to respond in another oral interview.

Foundational questions were consistent across all interviews; however, the questions served only as a guide as previously indicated. As participants shared with the researcher personal stories, impressions and anecdotal experiences, the researcher made note of issues, which seemed worthy of further probing. The initial questions, submitted to participants before the scheduled interview, were as follows and are included in Appendix A:

1. What are your earliest recollections of your experiences with mathematics as an African American male?
2. What were the messages you received from school, home or community about your ability as a student of mathematics?
3. What specific steps did you take to rise above the narrative about your abilities as a competent student of mathematics?
4. Are there any factors/experiences that you can identify which helped you to sustain your interest in mathematics?
5. What specific steps do YOU remember taking to ensure your personal success in mathematics? Did you take these steps with the encouragement of anyone or were they inspired by your own inner drive for success?

6. If you had to teach mathematics to a young African American male now, how would it compare to how you were taught?

The first interview was conducted on September 11, 2016, and the last November 29, 2016. All the initial interviews lasted beyond the stated one-hour limit except one. In preparation for the process, the researcher conducted one pilot interview in which potential audio recording issues were addressed and questioning techniques practiced and rehearsed. After this interview, she developed a more streamlined pre-interview protocol. The researcher also became more adept at asking probing follow up questions because in addition to the one pilot interview she conducted a few mock sessions with peers before the next interview.

After each interview, the researcher listened to the audio at least once, making notes in her journal; the audio was then sent to a professional transcriptionist. The journal served to strengthen and enforce any methodological adaptations, which the transcript may have prompted. Eraldson, Harris, Skipper and Allen (1993) confirm this view by writing that “the journal provides information about the researcher’s schedule and logistics, insights and reasons for methodological decisions” (p. 143). Since the insight gained from each entry is vitally important for methodological reasons, there was never a time when two interviews were being transcribed simultaneously. Each transcript was reviewed independently for any methodological adjustments, and then later all journal entries were examined for similar themes or questions which then became the focus of follow-up questions.

Prior to conducting the initial interviews, I scheduled an interview with a peer who had prior experience with Dedoose, software for qualitative research. Dedoose, is a web-based, collaborative analysis tool for qualitative data. It also has capabilities for mixed method analysis (Weigner & Lieber, 2013). Transcribed interviews were uploaded to Dedoose immediately upon receipt. Dedoose provided a platform on which to organize the data from the interviews, but the researcher conducted the coding.

Data Analysis

After each interview, the researcher listened to the recording to assess the accuracy of the transcript. As she listened, she took note of comments that were unclear or which needed further probing. These notes were taken in Dedoose (online data analysis system) and at other times, thoughts were placed in the reflective journal. During the interviews, she made a deliberate effort to review the responses of the other participants with whom the current participant shared a common ethnic or cultural background and to also compare participant reflections with the reflections of the entire group. This recursive practice helped to strengthen the dependability of the study (Eraldson, Harris, Skipper & Allen, 1993, p. 143). Also, the “reading, writing, re-reading, and re-writing” (Giles, 2010, p. 1213) helped to “transform analysis into *engaging* language capable of describing and evoking the phenomenon in all its subtlety and rich layers” (emphasis in original, Finlay, 2014, p. 122).

The researcher followed a strict sequence for analysis. After each transcript was reviewed and follow-up notes added to the reflective journal, the researcher uploaded the transcript to Dedoose. Every effort was made not to schedule any interviews until the

previous interview was coded. As a novice researcher, this procedure also allowed the researcher time to reflect on the previous interview in light of the current interview and to internalize important emergent themes. There was only one period when two consecutive interviews were uploaded to Dedoose and not immediately coded.

The scheduling and timing of each interview was an important consideration. Since there was a large degree of uncertainty as to when each participant would be available for the interview it was important that the period between interviews be spent proactively. The researcher therefore made it a practice to both listen to and re read previous transcripts before each scheduled interview. Strong phenomenological studies require a careful and thorough consideration of data so that “the views, opinions, beliefs, perceptions, interpretations of experiences” are fully captured (Van Manen, 2014, p. 299).

After all the initial interviews were coded, the researcher reviewed the notes made in Dedoose and her journal and compiled a list of follow-up questions. The follow-up questions were presented to the actuaries in written form. Participants were given the option to respond to the follow up questions in written form or if they preferred, following an interview format. All the participants responded in written form. There was only one participant who did not provide responses to the follow up questions.

The following are the questions asked in the follow up period and included in Appendix E. The questions were used as a guide. Since some participants addressed some of these issues in the initial interview, all participants did not receive each of the questions listed:

1. What was the role of sports in your life?
2. Do you feel that code switching was/is a necessary skill you had to develop in order to be successful?
3. What specific steps do you remember taking to deal with failure? Or what personal characteristics helped you with the challenges of passing the professional exams.
4. Are you an atheist, agnostic or believer in God?
5. Do you consider this statement to be true or false? Algebra is the gateway to success in mathematics.
6. Which of the following characteristics do you think were most influential in your success? Please rank your responses. If there is another characteristic not mentioned, please identify and rank it as well.

Curiosity Persistence Early Mathematical Awareness Hard
work Family Fear of the future OR something else. What is that something
else?

After the initial and post interviews were coded, the researcher analyzed the data looking for common themes, experiences, or personal traits of the participants. I approached this task by first condensing codes that were similar into one heading called a parent code and then related codes were placed under the parent code. The first phase of this process, involved a careful examination of each sentence or cluster of sentences. With each identified code or theme, the question was asked, “What does this sentence or sentence cluster reveal about the phenomenon or experience being described?” (Van

Manen, 1990, p. 93). This reflective question helped the researcher to stay focused on the enquiry and not subordinate issues, which might be more relevant to follow up investigations.

Trustworthiness

It was important to the reliability of the study that the participants be representative of male African Americans in the school system and in the profession. Lincoln and Guba (1995) first coined this term to refer to the quality or goodness of a qualitative venture. If the participants were too far removed from the population of African American males in the school system and in the actuarial profession, then it would be difficult to assert that their experiences and responses could be used as a model for how mathematical expertise is acquired by African American males. The diversity represented by the sample gave strong support to the reliability of the investigation.

Member Checking and Triangulation

Efforts to improve the internal validity of a qualitative study can be facilitated by conducting what is commonly called, member checks or respondent validation. In this study, there were times when member checks were conducted to verify that emergent findings were in fact accurate. For example, a member check was conducted when one of the participants used the term *immigrant mentality* in the initial interview. Later as other participants who shared a similar background alluded to what seemed to be a similar theme, the researcher contacted the first participant to request that he explain what he meant in greater detail. According to Maxwell (2008), “This is the single most important way of ruling out the possibility of misinterpreting the meaning of what

participants say and do and the perspective they have on what is going on” (p. 223).

Member checking as this example demonstrates, was also useful because it served as a safeguard to any biased interpretations which the researcher may have ascribed to the comment due to her own personal background as an immigrant.

Triangulation was not as easy to conduct. Triangulation is achieved by “using multiple sources of data and cross-checking of data collected through observation at different times or in different places, or interview data collected from people with different perspectives” (Merriam, 2009, p. 216). While it was possible to cross check data from the different perspectives of each participant, it was more difficult to cross check statements using other sources of data. The one occurrence of triangulation, which seemed most frequent, occurred when the researcher asked the participants to recount examples of their early success in mathematics to verify what the participants universally stated, that they demonstrated an aptitude in mathematics at an early age.

Positionality

My background and experiences as a mathematics teacher cannot be separated from this investigation. My peculiar and unique experiences with the African American male student of mathematics collectively represent some of my best memories as an educator. Those memories formed the basis for this investigation and will likely be the inspiration for all future research interests. A brief exposition of the experiences that brought me to this investigation would be insufficient and so a detailed account of my personal experiences and how they are relate to this investigation are included in Appendix F.

During the interview phase of this investigation, there were times when my personal experiences as a person of color from the Caribbean helped me to understand experiential differences between the US born actuaries and the Caribbean born actuaries. While my background did provide me with the ability to interrogate the differences between the US born actuaries and the Caribbean born actuaries, it was also important that I not allow my background to speak or color the actual perspectives of the actuaries. I was therefore always mindful to reconnect with the actuaries to clarify any statements for which I may have been inclined to provide my own interpretation.

Two examples come to mind and they will be briefly shared here since they represent an aspect of my positionality statement different from the one shared in Appendix 1.

The US born actuaries, all referenced networking as they described their professional experiences and College activities. The Caribbean born actuaries however never used the term, even though the actuary is expected and required to be involved in networking. This difference and the rationale for the difference was easily identified because I too rarely use the term. The difference is primarily due to a somewhat negative view of networking. Networking is sometimes considered in the Caribbean context to be an activity which allows a person to access a privilege for which he/she is not deserving. And in some situations, it is also perceived to be aligned with corruption.

Another easily identified difference was in the use of and understanding of the word code switching. The US actuaries were very familiar with the term and used it freely. When the term was introduced to the Caribbean born actuaries they did not

understand the term and needed a definition. The Caribbean born actuaries also each contextualized the term in ways not expressed by the US born actuaries. As judged by their comments, they both had a somewhat negative view of the term-believing that it was an unnecessary departure from their “authentic selves”.

My cultural frame of reference can therefore be considered a form of methodological capital which allowed me to both interpret and understand differences which may have been ignored by other investigators. It was also important to the methodological soundness of the study that I be aware of my cultural frame so that I could intentionally guard against the imposition of one cultural frames onto another.

CHAPTER IV

THE THREE E'S OF EXPONENTIAL GENIUS

This study was undertaken to explore three related inquires:

1. How do African American male actuaries describe their personal attributes, identity formation processes and formative educational and social experiences?
2. How did they acquire mathematical expertise in the context of schooling in the United States?
3. How impactful were social relationships to their academic and professional preparation?

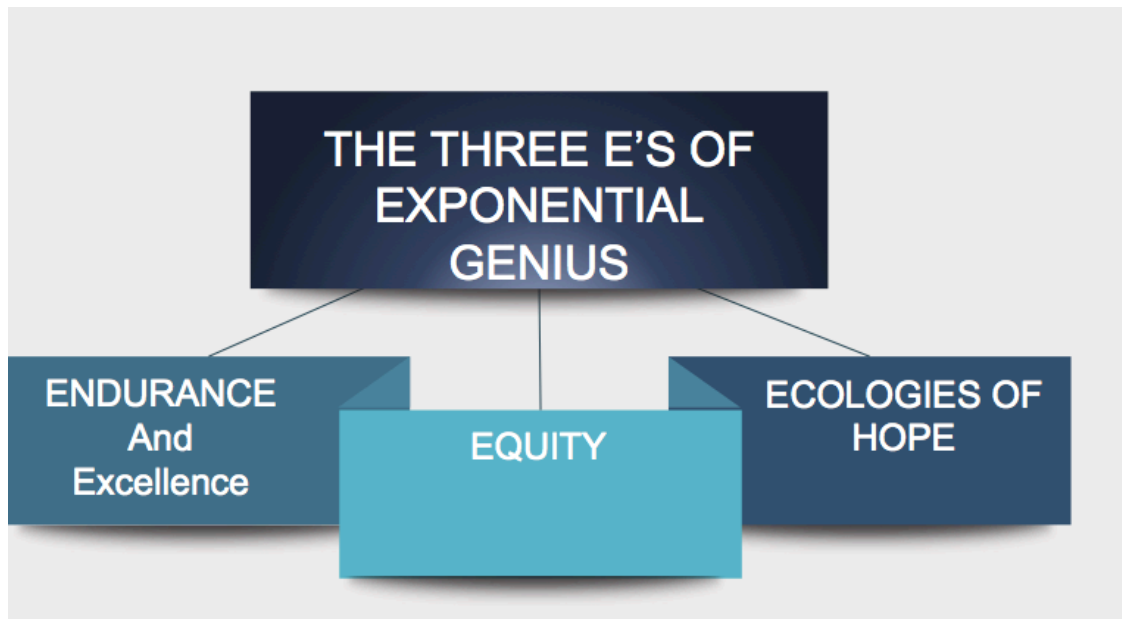
Understanding the nature of any common formative experiences can serve as a foundation for interventions that can be replicated in schools to increase the likelihood of mathematical success among African American males.

The major construct that emerged from the lived experiences of successful mathematicians is entitled *Exponential Genius*. It reflects the holistic interaction of the personal, intellectual, cultural, and social experiences among the participants that yield mathematical expertise. Most critically these interrelated experiences were animated by a deep commitment to the application of mathematical reasoning bent towards social justice and the promulgation of the profession to those underrepresented in the field. This chapter will unpack the formative experiences constituting Exponential Genius among African American male actuaries.

The Three E's of Exponential Genius

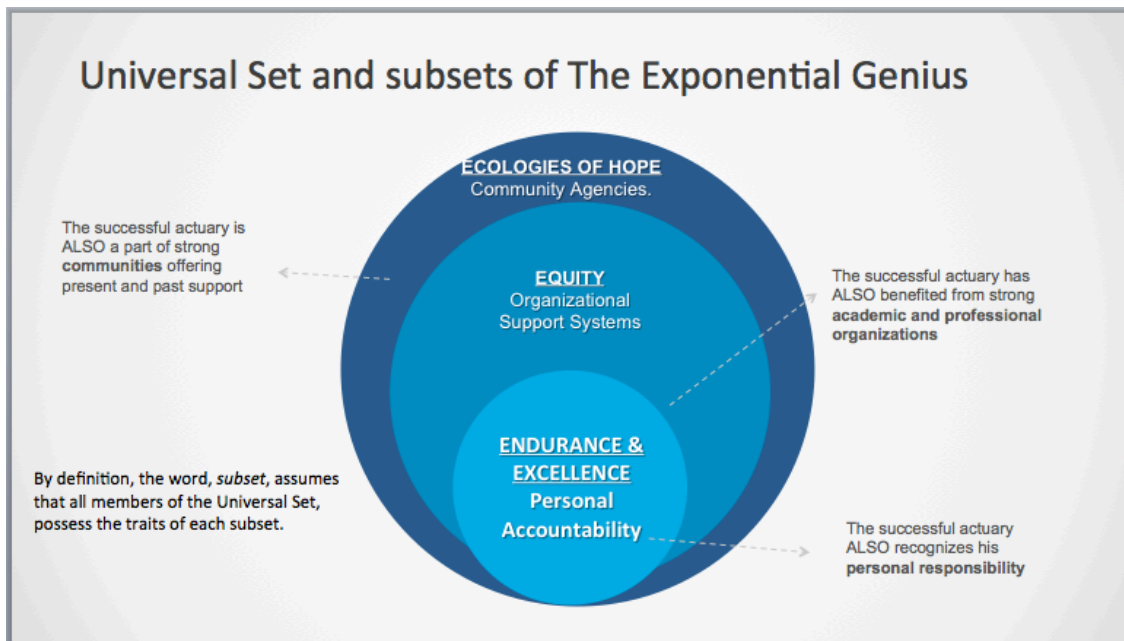
At the initial coding of interview transcripts and written follow-ups, the researcher identified 193 codes. These codes were later consolidated into 32 parent codes with several sub codes. When the 32 main codes were examined for thematic commonality it was found that they belonged to one of three main themes or meaning units. However, there were occasions where there was overlap between the main themes and some codes therefore belonged to more than one meaning unit. The main themes, which the researcher dubbed, **The Three E's of Exponential Genius**, are as follows: Endurance and Excellence, Equity, and Ecologies of Hope (see Figure 1).

Figure 1
THE THREE E'S OF EXPONENTIAL GENIUS



Another way of interpreting the Three E's of Exponential Success is to consider each of the E's as being subsets of a universal set called, The Exponential Genius of African American male mathematicians (see Figure 2).

Figure 2
UNIVERSAL SET AND SUBSETS OF THE EXPONENTIAL GENIUS



By definition, a subset of a set is only possible if ALL the elements of the subsets can be identified in the universal set. By that logic an individual who is in possession of traits not belonging to any one of the subsets, does not belong to the universal set. For example, if a participant indicated that he is a good geometry student but that trait is not found to exist in each of the other participants, then it cannot be assumed to be a common trait of the successful male African American mathematician.

The subsets, or Three E's, offered here highlight the common formative experiences of African American mathematicians but taken together they constitute the elements required to promote the development of Exponential Genius. The Three E's of Exponential Genius are as follows:

- Endurance and Excellence (individual accountability)
- Equity (organizational or systemic support)
- Ecologies of Hope (community support structures)

In short, the Three E subset highlights how individual, organizational, and community factors work together to yield the social-cultural inputs to Exponential Genius. In the forthcoming section, each subset will be briefly defined, and then further conceptualized in separate sections featuring the voices and experiences of the participants.

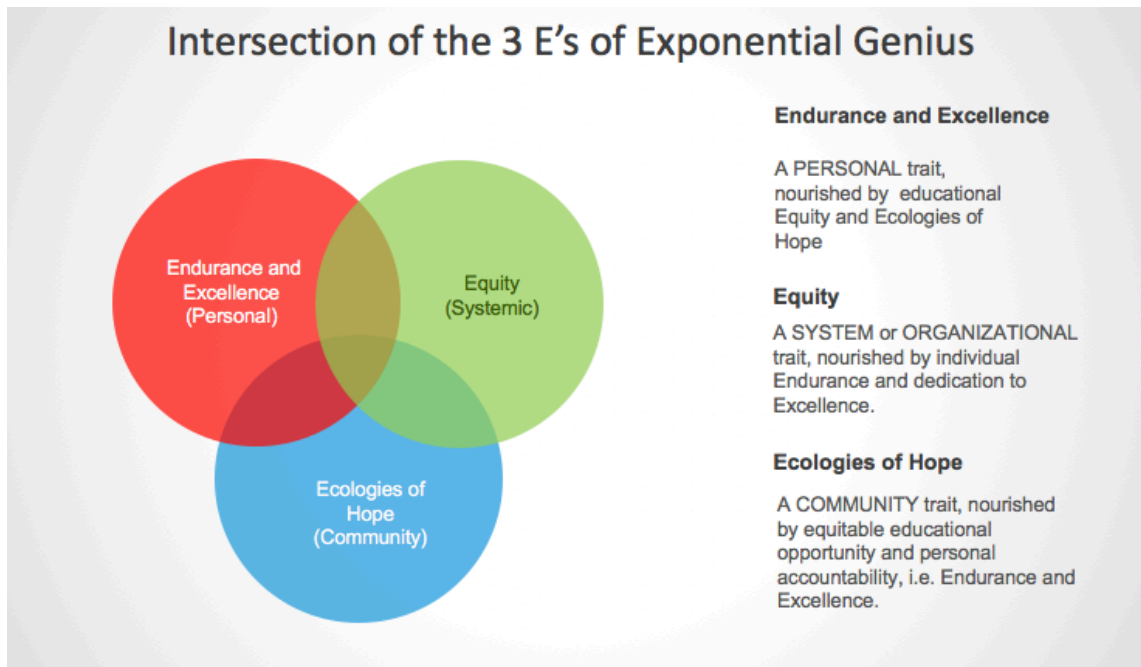
Endurance and Excellence refer to the personal or individual traits of the actuaries which contributed to their success. Equity, the second subset, shifts focus from the individual to the systems or organizations to which the actuary is aligned, and in which formative experiences occurred. As will be seen, the actuaries were all found to not only have personal strengths (Endurance and Excellence) but were also fortunate to benefit from strong institutions (Equity) that they identified as contributors to their success.

Finally, the subset of community agents termed, Ecologies of Hope, which represents the junction of positive individual traits, supportive professional and academic institutions, and community agency. The success of these men is therefore not a solitary

event, but rather the compilation of personal traits (Endurance and Excellence), refined in equitable institutions and professional contexts (Equity) and nourished in strong supportive communities (Ecologies of Hope).

While each subset is a part of the larger universal set of The Exponential Genius of African American male actuaries, the subsets do not exist in isolation but are interconnected. Figure 3, demonstrates the interaction and interdependability of the Three E's of the male African American mathematical genius. The coming sections will further conceptualize the common formative experiences that promote Exponential Genius.

Figure 3
INTERSECTION OF THE 3 E'S OF EXPONENTIAL GENIUS



Endurance and Excellence

Endurance as defined by the researcher and implicit in the comments made by the actuaries, is a reference to the actuary's ability to persist even in the face of personal setbacks and systemic resistance. Endurance, like any noun is attached to a context. We endure challenges, we endure a race, and we endure setbacks. Endurance as contextualized by the actuaries was affiliated with the harsh academic demands and realities of schooling in the US, and later in life, the academic rigors of the profession. Endurance allowed the actuaries to be resolute in their commitment towards the fulfillment of their academic goals and their commitment towards excellence in their professional endeavors. Excellence is also a reference to a personal trait that the actuaries all seemed to possess. Excellence can be defined as the actuary's personal commitment to high academic and personal standards.

The following are the terms used to operationalize the theme of Endurance and Excellence. The terms were pulled from comments made by the actuaries.

Endurance is inspired by:

- Natural aptitude in the subject area
- Setbacks as a driving force
- Networking in the profession and at the college level
- Recognition of a Higher Power

Excellence is inspired by:

- Historical Success
- Philosophical views

Whereas these two terms are here separated, there exists a natural synergy between them in reality and as such were placed in one category.

Early Mathematical Awareness

One of the more prominent expressions of Endurance and Excellence seemed to be the repeated referral by the actuaries of their early mathematical awareness. This early mathematical aptitude was categorized as belonging to the category of Excellence and Endurance in the Exponential Genius framework because according to the operational definition, themes were categorized according to their source of origin. Thus themes, which originated from internal dynamics, traits or personal experiences, were all placed in the category of Excellence and or Endurance.

While the actuaries all agreed that hard work was essential, they were all able to describe with great clarity and detail their earliest experiences and success with mathematics. Scooter, for example, said,

I always had this fascination with counting things. Steps for example; so, if I would go up a flight of steps I would count the number of steps. It always seemed like if there was a collection of things, I almost unconsciously had a fascination with counting them. As I got older and started to get more into math it became more than just counting. Once I learned the divisibility rules... so if things were divisible by 3 or by 6 I would count and then quickly think about is it divisible by 3, is it divisible by 6? I almost felt weird doing it but it was almost a natural reaction.

I always seemed to do well in the math classes and it generally came fairly easy to me.

Jack, for example, when asked to describe his experiences with mathematics at the high school level referenced what he called a “handle on math” he said,

I would say about between 10 to 20 of us had a really excellent handle on math.

There were some topics that were difficult, but I think there was a group of us where it came almost naturally, and we were really good at it.

When Frank was asked to recall his earliest experiences with math, he said,

I had this toy where it was like a grid and it was the multiplication tables. I think it was either 1-10 or 1-12. (Inaudible) like the numbers would go down and then it would be multiplication. I want to say I was about seven. I may have not known all of them, but I remember that item in my hand and I remember just playing with that sometimes.

Jack also referenced his earliest recognition of his interest in mathematics by saying,

The first memory I have I was probably in the equivalent of pre-K or kindergarten and there was homework. You had to write $1+0=1$, $1+1=2$, $1+2=3$, all the way up to $1+9=10$. That’s my very first recollection.

Frank, who was the only first generation American and Associate actuary, added,

Up to Junior high I would say I was naturally gifted, but my curiosity fueled that as well.

While the actuaries did not all express the recognition of their giftedness in mathematics at an early age, they all seemed to express greater comfort with

mathematics than other subjects which might hint at giftedness. Cage, who is a Fellow actuary, said,

I got A's in my math classes, but everything else is what it is.

At another point, Cage said,

I was put in honors math classes. With everything else I was regular. I did regular English, Reading, History etc.

Denzel, the Enrolled actuary, when asked to identify his earliest recollection of experiences with mathematics, said,

I recognize it was something I was not only good at, but something I should probably pursue, was probably around sixth grade. I remember having a sixth grade teacher who just had an interesting way of how he wanted us to solve the problems of the questions he provided to us. I don't remember what that way was. I do remember getting the answers correct, but I wasn't doing it the way that he wanted me to do it. That is the earliest recollection I have specifically of mathematics experiences.

Denzel also added an interesting component to the idea of natural ability in mathematics. He said,

My only recollection of mathematics is when I went to school that was a vast majority not African-American. I think that might have been the acceleration of me being good or recognizing that I am good at mathematics.

Denzel, seemed unaware of his mathematical giftedness from as an early age as the other actuaries. He appeared to believe that the school he attended helped him to

recognize that mathematics was an area of strength for him. This was one of the earliest indications that the second E of the Exponential Genius framework, i.e. Equity, had some bearing on the mathematical successes of the participants.

Scooter verified the idea that giftedness in mathematics was an innate quality as he spoke about his children. He said,

It's not like we pushed them in the direction of math. Early on they just displayed that natural gift for it.

Other participants mingled giftedness with supportive families, high quality schools and encouragement as factors linked to their mathematical abilities. Yet, the researcher wanted to honor how they saw and understood themselves as naturally good in math. The researcher did not want to impose her understanding of giftedness as a social construct upon them or during the interpretation process, which would have been a clear deviation from phenomenological methodology (Van Manen, 2014).

In an attempt to perform member checking, participants were asked in the written follow-up questions, to rank qualities, which they felt contributed most to their success. It was found that while natural ability was clearly seen as invaluable, there were other traits, which the participants believed, that helped them to optimize their natural giftedness. These other traits also contributed to and supported the role of personal characteristics in the manifestation of endurance and excellence in the actuaries. The question as asked follows:

Which of the following were the key factors in your success: curiosity, persistence, natural ability, hard work, family, fear of the future, or something else. If it is something else, what is that something else?

Scooter, whose historical experiences with mathematics were exceptional, engaged in the following dialogue around the question:

Scooter: I would definitely say persistence, natural ability, and hard work.

Interviewer: Which one would you rank first?

Scooter: I would say hard work first and then persistence second, and then natural ability.

Scooter: I use the sports analogy when talking to young students. There are a lot of naturally gifted athletes and they don't get very far because they don't have the work ethic to take full advantage of their natural abilities. There were times in elementary and junior high, and even to a certain extent high school, where natural ability was more than enough to help me be successful, but later on in high school and into college and certainly through the exam process, natural ability won't be enough without the hard work and persistence. The natural ability is not an absolute prerequisite, but having natural ability certainly helps, but it's not enough. That's why I ranked the persistency and hard work a little bit higher than that.

This expressed knowledge of their mathematical ability was what allowed the actuary to press on towards excellence regardless of setbacks. For example, when Cage was describing his reaction to being unsuccessful in one of the Actuary examinations, said,

I knew that I could do it, it was simply a matter of adjusting something, and I was determined to figure out what it was that I needed to adjust. It always seemed to work so I just pressed on.

Jack, speaking of a similar reaction to a challenge, did not question his mathematical abilities and said,

Honestly, sometimes I look back over it. It took me about seven years to complete all of the tests. I look back, and I am amazed that I actually had the discipline to do that. But I was always able to figure things out, so I just kept trying. It's a great feeling knowing that I did have that at that point in time in my life, so that I was able to become a Fellow of the Society of Actuaries.

As will be detailed in another section, Jack also had a particularly distinctive experience, which he identified as having been a source of motivation.

Scoter was in some ways an anomaly because he was the only actuary who had only one failed attempt as he progressed through the Actuary professional exams. One way of checking to see the authenticity of his comments about his giftedness in math was to enquire about how he dealt with the setback caused by unsuccessfully completing an exam. The actuary who is truly convinced of his mathematical ability is likely to approach failure not as a function of their lack of ability but as a result of other factors. Thus, one follow-up question, which sought to gauge the authenticity of their belief in their giftedness was, "how did you deal with failure?"

Setbacks as a Driving Force

The actuarial profession is a very demanding and competitive field. Thus, the journey towards completion of the licensing process is likely to be fraught with powerful illustrations of how these men were able to persist. The men did not seem to view failure on the professional exams as failure, but rather as learning opportunities. Rather than becoming discouraged, they all seemed to be able to perform some sort of internal gymnastic, which gave them the impetus and confidence to continue.

Scooter's response to the question of how he dealt with "failure" was simple and reflected his genuine lack of unfamiliarity with failure. Instead of answering the question about failure in the examinations, he talked about failure on the professional level. His response was,

On the exams, I was fortunate to not experience much failure only that one examination. In my career, I do consulting work now. Unfortunately, I don't have as much... No one has 100% success rate in winning projects. The thing that I think motivates me is my academic success.

Scooter, because he had not experienced much failure in the academic realm seemed to use those successes to help put professional challenges in the perspective that he was fully capable of comparable success in his professional life, thus the theme of excellence.

When speaking about his one failure, Scooter said,

It upset me, and it motivated me. I kept the grade from that exam. I folded it up and kept it in my wallet until I passed it. It was my motivation because it just bothered me that much because I should not have failed that exam.

Scooter made the most number of references to themes associated with Endurance and Excellence; however, most of his remarks were heavily skewed towards the Excellence portion of the theme. The following are some of Scooter's quotes, which exemplify his heavy commitment to excellence.

By the time, I got to high school I was at the point that it didn't really bother me. I just did what I had to do, and made sure I did what I needed to do in order to be successful.

And,

I either fought through it or called one of my classmates on the phone and would talk through it with them, but most of the time I think I just fought through it and got it the best I could. If I messed it up, I just went in and asked the teacher the next day.

And again, he said about his reaction to failure and how it inspired him towards excellence,

It's not a fear of failure; it's I almost just hate to fail. Hate probably isn't the right word. Failure motivates me.

Jack and Kevin who were both from the same territory in the Caribbean also spoke about how their failures served to inspire them. Kevin spoke from a financial perspective and Jack from the perspective that he did not feel that turning back was an option for him.

Kevin said,

I knew that my options were limited, so I had to continue along this path. I was at the time a father of two small kids, and my family depended on me.

Jack, in response to the question of how he dealt with failure, said that he reminded himself,

I could not turn back because I invested too many years of his life pursuing this thing.

One of the four actuaries couched failure in terms of defiance to the stereotypes of African American males as poor students of mathematics. Thus, as Denzel recalled,

I went to meet up an interview. He wasn't expecting a black person. He was expecting an older White male to show up. That's why we stood around for so long because the expectation was that it wasn't going to be a young, African-American guy there for the interview, and he also said that which kind of rubbed me the wrong way. And I decided then that I would live to give a different view of my race.

Others associated failure with financial struggles from childhood or a present desire for financial success. These actuaries also all seemed able to recognize what was needed in order to be successful and could put those thoughts into actionable behaviors. In other words, personal accountability was a feature of how they reacted to failure.

Cage, for example, said,

You need to actually study to understand. You need to understand how to push yourself and almost overexert yourself when it comes to academics.

In another context, Cage also said,

It was like there was a lot of distraction, and I was easily distracted as well. Even though outside of class, I made sure that I tried to do my homework, and I read a lot. I was naturally curious and knew that, if left alone, I could figure it out.

Cage also talked about his preparation for exams clearly evidences and supports the theme of endurance, which is essentially a function of individual accountability. He said,

When it came to studying for exams, when it came to my homework to just understanding the material and assignments, I always thought that I could not work well in groups because I felt like I'm a slower learner than others. If you give me a day, just one day to do what I can, like to burn the midnight oil, and to study a little bit, then I would get there. So, it's my persistency. It's my drive to keep going. I don't know another way.

Frank also spoke of a similar reaction to challenges and said,

When I failed, it was my fault. It wasn't like I couldn't do it, it was just I didn't work smart enough, I didn't work hard enough, or I just didn't pick out the right strategy in order to be successful. That's why I said I've learned from my failures and just use that as leverage to say this is what you need to work on, this is what you need to do in order to be successful. Although there were times where I doubted myself saying I don't know if I can do this, but that was more in the moment versus I never felt that I can't do this. I always knew I had the capability, and I just had to put my mind to it in order to be successful.

And again, he said,

That was the first exam I almost failed and got like a 60. I don't know the exact number. That really was kind of a wake-up call for me. I remember my second exam. I remember just studying late for nights on end and just really put in the work to make sure I did well on the second exam. I think I got a 92 on the second exam. That was kind of like the wake-up call for me to say, "If I'm doing this I've got to be serious."

Interestingly, being unsuccessful on one exam seemed to prompt a response from the lowest ranked actuary different from the other actuaries. While he did seem to have similar early memories of success in mathematics, he did not seem to have the same level of endurance as the other actuaries as indicated by his considerably fewer comments associated with the themes of Endurance and Excellence. The following comment made by Denzel is noteworthy,

No, my firm only needed me to get my enrolled actuary (inaudible), which is great because, although people think I am smart, I am not as smart as the folks who pass their FSAs. My exam track was taking longer than those folks, and I recognized it. I recognized that I was really stressing out over them, so I got my enrolled actuary.

Networking in the Profession and at the College Level

Four of the actuaries identified networking at the college and professional level to be part of their success in the profession. The ability to network was for most of the actuaries something that they learned during their undergraduate experiences. The two

actuaries who did not reference networking experiences at the undergraduate level were the two actuaries from the Caribbean.

Of great interest is the following quote, which exemplifies one of the differences between how the native born African American actuaries and the actuaries from the Caribbean area used the term 'network'. Here is how Kevin, who is from the Caribbean, used the term:

It was also important to make sure that you were connected with actuarial community in terms of which study materials were better than others, which questions were more likely to appear on the exam.

Kevin's references to networking were not as many as the other actuaries. Instead of referring to networking in the context of the profession, he spoke of networking in the context of preparing for the professional examinations. His peer, Jack from the Caribbean, also did not seem to allude to the term as often or in the same way as his American born peers. Jack was, however, clearly more involved in mentoring and organizational affairs, which can be considered to be a form of networking. However, as the following quote reveals, Jack did not use the term *network* nor did it have the same meaning as it had for his US born peers even though it is clearly a form of network in which he is engaged.

Currently I am involved with a committee between the Society of Actuaries and the (inaudible) Actuarial Society. That committee, the goal is to promote the actuarial profession amongst minorities, namely black, Native American, and Hispanics. I am involved in that committee, and there are several initiatives that

we have going on to help promote the actuarial profession among minorities.

That is my involvement currently. That committee is a national committee.

Denzel spoke at length of his networking experiences, maybe more so than his US born peers. Denzel clearly understood networking in his college days as he said,

Originally it was just wanting to be in contact with like-minded folks that have similar backgrounds. When you are a college student, it's all about building your network. I was trying to put myself in the best position to essentially have an offer upon graduation.

The following conversation exemplifies Denzel's active pursuit of networking opportunities which his college days prepared him for:

Interviewer: A while ago you said that your school gave you the scholarships to do summer school, you did an internship during the summer, and you could meet these people and move around and that's what helped, was the networking.

Respondent: Oh yeah. When I was at Allstate, I would seek out the higher up African-Americans I knew.

Interviewer: So that was deliberate.

Respondent: Yes, because I wanted to know what the steps were that they took to be where they are.

Cage, one of the other US born actuaries and a Fellow actuary, spoke of his attending professional conferences, which is a requirement for productive networking. Scooter, who was the most senior of the actuaries, did not reference his networking involvement,

but by virtue of his twenty-three years in the field, it is likely that he would have had to do quite a bit of networking.

Recognition of a Higher Power

Since Scooter did not comment much on his responses to academic setbacks, he was asked to describe what he felt contributed most to his success. He responded by saying,

I believe that my success has come from God, and living each day with my faith in Him has absolutely been the reason for my success.

This reference to God was considered to contribute to Scooter's ability to endure and his insistence on excellence because this belief originated in the participant himself. It is true that recognition of a higher power may also be included in the Ecologies of Hope category, but because it originated from the participant's internal value systems, it was categorized as contributing to the actuary's ability to endure. As Scooter clearly stated in the quote, he believed his success to be attributable to God. All of the actuaries identified the existence of a *higher* power. When asked to rank their personal traits, that they felt contributed most to their success, Jack listed, "Trust in God" as his number one source of success. Interestingly Scooter, who previously attributed his success to God, did not, in this question, insert his belief in God as being a significant contributor to his success.

Frank gave a more detailed answer when asked, "Are you an atheist, agnostic, or believer in God? He responded in writing by stating:

I do believe in God and do identify as a Christian given my upbringing, but I am not a religious person and do not attend church. I personally don't see a preference between any of the religious groups and find it more important to have a spiritual connection with a greater being rather than identifying a certain savior for my religion (i.e., Christ, Allah, Buddha, etc.).

Denzel, the enrolled actuary, when given the written follow-up question: Are you an atheist, agnostic or believer in God? Responded that he was an atheist. Denzel was the only actuary who stated this viewpoint.

Historical Success

The second part of the two-part unit of Endurance and Excellence is also designated on the basis of its locus of control, or from whence the theme originates. Each of the actuaries boasted of historical success in mathematics, which was clearly related to their belief in their mathematical giftedness. However, they all admitted that they would not have been successful if they were not committed to hard work and high academic standards.

Excellence, for some of the actuaries, seemed to be related to cultural experiences. Frank for example, who is a first generation African American who still clearly identified himself as an African, said,

For me it's probably my upbringing of having African parents. Being lazy was never something, especially in school, was never something that I kind of exhibited.

Later, Frank referred to an immigrant mentality, which he felt was his impetus to success.

He said:

That immigrant type of mentality makes a huge difference in general, especially when your parents came from another country.

In a follow-up conversation, when Frank was asked to further explain his use of the term, immigrant mentality, he responded by saying,

Children of immigrant parents are always reminded that we were brought here to secure better educational opportunities. My siblings and I would hear it almost every day. So, that is what I mean by an immigrant mentality. We were reminded every day that we had to be successful.

Frank like the other actuaries was able to recount historical experiences of success in mathematics and in the academic arena.

Fast forward to sophomore year, I was taking calculus 3. At first I was a little bit worried because that semester I was taking 18 credits and taking an accounting course, a statistics course. And prior like, 18 months before I actually did really well with another Calculus course, so that kind of bolstered my confidence and reassured me that I could do this.

Jack, one of the Fellow actuaries from the Caribbean, had his own special story which captured the impact of past successes on his ability to persist.

The second thing that comes to mind was also the 10th grade examination.

Those examinations are actually nationwide and Caribbean wide, so that's of course the Caribbean and my country takes the same test. Within (name of

country deleted) of that year I actually placed first.... There was a euphoria that I can't really describe because it was totally unexpected. For a while I was a little bit of a mini celebrity in my community. It really was a great feeling. I still think about it every now and then. My five minutes of fame. But I think it kept me believing in my ability to do just about anything I put my mind to.

Another way to view the influence of the role of historical success is seen from the perspective of how the success of siblings inspired the participant. Jack spoke of his brother's success and how it helped him:

What benefited me was my older brother is even better at math than I am. He is four years older, so I had someone I could go to at home who could explain everything to me. He also went to the same schools that I went to. I kept saying to myself if he could do it, I certainly could as well.

The siblings of the actuaries were all very qualified and successful professionals. The actuaries did not all, like Jack, assert that the example of their sibling inspired them, but it was noteworthy that all of the siblings were successful professionals in their own realms.

Cage did not clearly attribute his previous success in mathematics to be the source of his ability to endure or persist, but he did say,

The joy that I felt in my whole academic career has always been focused around math and the math subjects.

This statement, though it was not pursued to determine its connection to Cage's ability to endure, does suggest that the "joy" he experienced from his study of mathematics kept him devoted to his interest in a mathematical field of study.

Denzel also alluded to his past successes in mathematics by saying,

There was never a ceiling for me with mathematics. As a kid, I set my sights to be an actuary when I was really young. I felt that I could because mathematics was the easiest thing for me.

Kevin, who grew up in the Caribbean, shared an experience of success not unlike Jack's. Both Jack and Kevin attended two of the most prestigious schools in their country. Both schools were described by Jack and Kevin as "private, denominational, Catholic, all boys' schools." With regard to his historical successes, Kevin said,

The end of elementary school I had the common entrance exam, which is an exam delivered nationally where you would take a standardized test in a number of different topics, and based on that score, you would be placed into a school that is consistent with your aptitude. It was very competitive, and you didn't want to have to repeat this exam. It was a very nerve-racking experience, to say the least. I felt very comfortable with my math skills, but English was something that I did okay on, but I was strongest in math. I ended up passing for St. Mary's College, also known as the College of Immaculate Conception, which was one of the top boys' schools, in (name of country deleted).

The following question was asked to assess if there were other models of success in the life of the actuary, which may have contributed to his belief that he, too, could be successful in whatever career path he chose.

Were there any males in your life whose lives mirrored the success you now experience? What was their success? How did it impact you?

In response to the question, Kevin said,

I had many examples because I saw that the highest office in the land was occupied by somebody who looked like me. It was always easy for me to believe that I could be successful. My dad was also an Alma Mater of my school, and he was an engineer.

Jack responded similarly:

For me growing up, that's all I would see. When I would look at who was on top, it was people who looked like me. People, who are East Indian and you are black. My dad was also a math teacher, and this certainly helped.

Denzel shared a thought, which complimented the view that examples of success helped to nurture a desire for excellence.

I was a kid; my uncle had a very vibrant personality. He has a nice house, he has a nice car, and he's an accountant. As early as I can remember, I wanted to be an accountant. I never wanted to be a police officer. I never wanted to be a fireman. I didn't want to play basketball; I never wanted to be a rapper or a singer. None of that stuff was on my horizon. I was going to be an accountant. I remember playing around when I was a kid, and I set up paper around and grabbed a

calculator, and I would act like an accountant. That's what I did. I was introduced to someone who had a professional career dealing with mathematics, and it was someone I looked up to. I knew that I wanted to live like he lived.

Additionally, Denzel made the following comment that demonstrates the role of successful role models in nurturing his belief that he could be similarly successful:

My high school had African-American teachers. As a matter of fact, one of my African-American teachers was a math teacher. When you see these individuals like this, then it is attainable. It's not something that is so far-fetched. When I could see that my uncle had a nice life and he selected a regular career and he didn't focus on playing basketball, then things like that become a lot more... It's not out of reach.

The preexistence of successful experiences, or relationships with significant others, was common to all of the actuaries and thus included as contributors to the participant's ability to endure towards eventual achievement.

Philosophical Viewpoint

The actuaries each expressed some version of a life or professional philosophy, which guided or influenced them towards excellence. The following are the primary philosophical statements made by the actuaries. First, Kevin:

Hopefully with each passing generation, you could create something better for the upcoming generation. That gave me confidence and the drive necessary to do what I had to do. Without those examples, I don't know if I would've had the

confidence, or if I would have thought on such a grand scale, or been as ambitious as I have been so far.

Scooter:

There are a lot of naturally gifted athletes, and they don't get very far because they don't have the work ethic to take full advantage of their natural abilities. I have lived by this and used it when my kids were growing up. You cannot excel if you are not driven.

Jack:

I believe it boils down to parents. A parent, no matter what their background is, you can tell your child to sit down and do your homework. A parent might not be able to read, but make sure that your child sits down and does their homework every day. Keep up with their teachers because you don't know what is going on at school, so they need to keep in touch with the teachers. There are several stories out there of poor black or other minorities that made that dedication to come out of poverty. More often than not we always speak about their parents. Those parents from an early age can talk to their children and say you need to focus on this, focus on school, and it can help get you out of your current situation. Not only talk to them about it, but facilitate as well. There are a number of resources out there that people just need to hear about and (inaudible) to their children. My parents did this for me, and I know that it helped me.

Frank:

I feel like the mentality really does shape the way children kind of perceive themselves. If you're not confident in yourself and you don't believe in yourself, then how can you expect to do well because a lot of times the teachers get frustrated, and they just want to move forward. It's kind of like a cyclical effect where the child is falling behind, the teacher gets frustrated so they just keep on moving, but the child still needs assistance and there is no one there who can help catch up. Parents have to learn to speak up for their kids and to teach them how to do that. I never really had to do that, but I think it will make a big difference.

Denzel did not clearly articulate a philosophical statement that functioned as a motivating force directly related to his success. He was, however, very dedicated to his community. His thoughts on the role of community involvement will be detailed in the section having to do with Ecologies of Hope. Cage also did not seem to have as well defined a philosophical statement. He said,

Cage: The thing that makes me above average is probably my persistency.

And then later, he reaffirmed that his persistence was an integral part of his success by saying:

If you give me a day, just one day to do what I can like to burn the midnight oil and to study a little bit, then I would get there. So, it's my persistency. It's my drive to keep going. I don't know another way.

This quote also shows the personal accountability and levels of endurance, which are hallmarks of the Endurance and Excellence theme.

On further reading, it will become clear that Endurance and Excellence cannot be easily separated from Ecologies of Hope and Equity (terms which will be defined in the next section); the three E's are, in fact, interconnected and interrelated concepts.

Endurance and Excellence were examined in detail for the sole purpose of analyzing its constituent parts. The two-part term, Endurance and Excellence in the Three E's model of Exponential Genius also satisfies the organizational structure imposed by the researcher because the term refers to factors directly related to the personhood and cumulative experiences of each participant.

Equity

Equity represents the second component of the Three E's of Exponential Genius framework. Equity in educational opportunity was a theme, which occurred frequently when the following question was asked:

A review of the published research reveals that African American males in the US are not as successful in mathematics as other racial groups. Why do you think this is so? What suggestions would you give to educational enterprise to support more African American males in their pursuit of mathematical expertise or to encourage them to pursue careers in mathematics?

Equity, as defined by this model, is a reference to organizational or systemic institutions, that the actuaries identified as crucial components of their success or facets they felt were not equitably accessible for all African Americans.

The following were the codes used to operationalize the theme of Equity and were based on the context of the comments made by the participants.

- Exposure to the profession
- Exposure to honors classes or actuarial classes
- Exposure as a lack of resources, including curriculum
 - Algebra
 - Successful schools
 - Gender or race of mathematics teachers

In one form or another, the actuaries all commented on what can be called the lack of exposure to honors math classes and to knowledge about the actuarial profession in educational institutions. It is important to note that Equity was not only viewed in the educational context, but also referred to the lack of exposure to the profession for many African Americans.

The word, exposure, was first used by Jack to specifically describe the limited information African Americans had about the profession. The term was then repeated one other time and was a reference to the lack of exposure many African Americans had to honors mathematics classes. The researcher then opted to apply the term to encompass any comments that dealt with African American males not having access to rigorous academic opportunities, information to and access to honors math classes, access to strong curriculum and good schools and access to professional opportunities.

Exposure to the Profession

Jack, Cage, and Denzel said that they became aware of the profession during their high school years or towards the end of their high school careers. Jack heard of the profession when individuals from the regional university came to recruit students for the actuarial program.

Cage, when asked when he first became aware of the profession, said:

Yeah, I stumbled on it because when I decided I didn't want to do engineering and I wanted to do something in math, me and my dad started going through a catalog. We literally went through the catalog of the math department. He was like, "I heard about this actuary thing. Let's check it out and see if you are interested in it." And that's how it happened.

In another context, Cage recounted a very significant experience, which highlights how little African Americans know about the profession:

First, I think it's just a matter of just the awareness that the field exists. Even now if somebody asks me what I do if it's someone who is White I will probably just say I'm an actuary. I've gotten to the point where I have actually learned that they know what it is regardless if they are in the field or not... When I am talking to somebody who is Black, actually even a math teacher, I was actually talking to a math teacher on my way to an IABA presentation last year. She was a retired math teacher, and she was an Uber driver. She didn't even know what an actuary was, and she was a math teacher for so many years. She was African-American. I don't know how that happens.

While all of the actuaries were clear about the importance of fairness and access to educational opportunities, Jack was the most vocal on equity in terms of the lack of exposure to the profession for people of color. The following is a compilation of statements made by Jack who was clearly very passionate about the issue of exposing more African Americans to the profession:

It's a pipeline. The majority of African-Americans, who are being pushed and who have gone on to careers that are math-based, tend to do engineering or computer science. They don't necessarily know about becoming an actuary so part of it is informational. Even that pipeline of Black males going to do engineering and computer science is still pretty small. It's already a small pipeline and then out of that pipeline very few even hear about becoming an actuary.

Over the years, I have only seen my company interview one Black person. I have been working in my department for almost 12 years now, and there was one Black person interviewed. And they were not successful either.

It is also worth mentioning here that Jack's passion about educational and professional equity or exposure, as he called it, was evident by his involvement at the organizational level to promote the spread of information about the profession. Here, he speaks of his involvement:

Currently, I am involved with a committee between the Society of Actuaries and the (inaudible) Actuarial Society. That committee, the goal is to promote the actuarial profession amongst minorities, namely Black, Native American, and

Hispanics. I am involved in that committee, and there are several initiatives that we have going on to help promote the actuarial profession among minorities.

That is my involvement currently. That committee is a national committee.

Kevin, Frank and Scooter all discovered the profession while they were already enrolled at a university. In the absence of programs at the high school, which provide the exposure to lucrative professions such as the actuarial field, mathematically gifted male students will continue to be poorly represented in fields such as actuarial science. The Exponential Genius framework recognizes that exposure to highly mathematical fields, such as actuarial science, is a necessary component for the upward mobility of the African American male.

Exposure to Honors Classes or Actuarial Classes

All of the actuaries, when prompted, indicated that they were either the only, or one of a few, African Americans in their high school honors classes or in their actuarial level classes. Reference to the underrepresentation of African Americans in their honor classes then became coded under Lack of Exposure or an issue of Equity. Scooter, for example, when asked the following question, responded:

How did you feel being in a class and you are the only African-American there and you are doing these upper-level classes? What feelings come to mind?

Scooter responded by saying:

In high school by that point, I had been essentially in that situation for so long that it didn't really bother me.

Scooter's remark is also indicative of traits that allow the individual to persist even in circumstances where he is seen as an outsider or an exception. Scooter's ability to push aside feelings of isolation to remain committed to his goals is reflective of valuable personal traits.

It cannot be easy to survive in classes where you are viewed as an "other". Additionally, feelings of isolation are sure to be experienced. Scooter's response was coded as a manifestation of Equity because of his responses to two related questions. His response was in line with what the other actuaries identified as some sort of unfairness in educational opportunity as evidenced by the underrepresentation of Blacks in honors mathematics classes and in their actuarial classes.

When speaking about equity in educational opportunity, Cage said:

I know when I was at U of my first year there were a ton of students there my very first year that ended up having to leave because they weren't prepared even though they were A or B students. They were students who had way much better GPAs than I did, but they didn't have the programs to challenge them. I feel like the African-American students nowadays are not put in a position to challenge themselves.

Another way of verifying the apparent lack of equity or access to honors classes can be seen in the racial demographics of honors classes at the high school level, and in the actuarial level classes, the actuaries attended.

Jack and Kevin, who attended high school in the Caribbean, spoke of a more equitable racial composition in their honors classes; however, when at the university

level in the US, they admitted to being somewhat shocked about the underrepresentation of Blacks in their actuarial classes or even in the profession. Each of the American born actuaries spoke of being one of a few in each of their honors math classes or in the actuarial programs or classes they attended.

Denzel, who was one of the American born actuaries, made this comment which reflects the comments and experiences of the other American born actuaries:

In high school as the courses got more challenging, I started off high school with honors algebra. Even with honors algebra, it was relatively a small population. When I went to advanced placement calculus, the difference in the advanced placement statistics course. Those numbers kind of dropped off in high school then when I went to college. When I went to college, the first class I took was like calculus 100 or 101, but by the time I got to 3 it was dwindling. By the time, I got to my actuary courses, I would have a class of about 60 students, and I might see three or four African-American individuals. When I got even further up in my actuary classes, I was just looking at me and another person.

Exposure to a Strong Curriculum

Jack also couched Equity issues in terms of a “lack of resources” in schools. Denzel framed it in a positive way and identified “a strong curriculum” as something which all kids did not have access to. A strong curriculum can be considered to fall under the general umbrella of school resources, which are not available to all schools and thus becomes an issue of equity.

Cage, whose father recognized the importance of a strong curriculum and being enrolled in honors math classes, was very influential in his life. His parental advocacy and understanding of the system were identified as factors in his success. Cage's father also was instrumental in helping him to discover the profession. Speaking of the lack of exposure to honors classes and how his father fought to get him certain educational opportunities, Cage told this anecdotal story:

He was up there every day talking to the principal, to math teachers, and they were basically being pessimistic about, "We don't think he is ready for this class." My father said he didn't care. He was basically acting up. He didn't care what they thought I could do. He was telling them put me in these honors classes. "You're not going to put my son in these regular classes." With his help, I was able to be put in the classes he wanted me to. I was put in honors classes with math only.

While this reference was considered to be a manifestation of the need for equity in educational opportunity, it can also belong to Ecologies of Hope, which will be defined at a later stage.

Frank spoke of the tone in the regular education classes and recognized that learning was not a serious endeavor in those classes. But he was able to focus on what he knew to be important. He said,

In those regular classes, the focus wasn't on what was going on as far as learning. It wasn't on that. It was kind of just on whoever the clown of the class was. It was like there was a lot of distraction, and I was easily distracted as well.

Later, Frank explained that his upbringing helped him to stay focused and he soon realized the difference in attitude between kids in the regular classes and those in the honors or gifted classes. This lack of consistency in curriculum, access to honors classes, and the culture of regular classes were coded as measures that reflect the construct of Equity.

It is important to insert, at this point, one final comment by Jack on the issue of exposure because it evidences that he thought deeply and read about this issue since he was not a native born US citizen:

Back in the 50s or the 60s or the 70s, the federal government actually had policies in place where they would grant loans to Whites, but they won't grant loans to Blacks or other minorities. They had different zones. For a green zone, they would have a good interest rate. The red zones would have a horrible interest rate. (Inaudible) even grant loans to anybody who lived in a red zone. They automatically red zoned all of the Black areas. Over the years, the sought after areas by the Whites became more developed; the Whites actually had more ownership than the Blacks over the years. The reason I mention that is today education funding is linked to (inaudible). Obviously, the areas where Whites were able to get the housing (inaudible). In those areas, the property values went up. Those areas that are more White get more educational funding and that is all because educational funding is (inaudible) tax. There are some conspiracy theorists, but there are people who believe that is actually done intentionally.

All of the participants attended schools that had strong academic reputations. Frank's family moved to another area when he was six, so that he would have access to better schools.

The two actuaries from the Caribbean attended the best schools in their country. Both schools were all male, Catholic, government assisted schools. In speaking of his high school, Jack said,

It was a Catholic, public school and considered one of the top schools in the country. From that school alone, there have been at least two prime ministers and at least one president from that school.

I understand the system. My wife and I are already making plans for where we will relocate when she is ready for school. You have to do that if you want your kids to get the best chances.

Strong curriculum and by extension strong schools in the Exponential Genius framework fall under the umbrella of Equity because they are directly related to the unfairness in educational institutions that critical race theorists identify as being foundational to the maintenance of academic gaps.

Algebra

The Partnership for Learning has indicated that Algebra is regarded as the gateway to success in mathematics (American Institutes for Research, 2006).

If we want to dramatically increase the proportion of students graduating from high school with high-level, globally-competitive skills, then we must dramatically increase the number of students who achieve proficiency in Algebra

in their middle school or early high school years as a gateway to the advanced high school coursework that is the driver of high school graduation, college readiness, and post-secondary completion rates. (Evan, Gray, & Olchefske, 2006, p.2)

As a result of this published statement, the following question was asked in written form of the actuaries:

Do you consider this statement to be true or false? Algebra is the gateway to success in mathematics.

All of the actuaries agreed with the premise of the statement and most responded with a simple and categorical yes without supplying additional commentary. Scooter, however, gave a more detailed response by writing:

I believe algebra is foundational, in other words it would be very difficult to be successful without it. So, I suppose in a way that makes it a gateway. Success in algebra, however, does not automatically imply success in mathematics.

Kevin also gave a more nuanced response and wrote:

I would say true though incomplete. It is a crucial part of success in mathematics but so is addition, subtraction etc. Math requires many foundational skills; any weakness in your foundation will create problems.

Frank, the Associate actuary, agreed that Algebra was key; however, in the initial interview, he expressed his enjoyment of geometry. He said,

I really enjoyed geometry. In fact, I think it was my favorite during my high school years.

Since both the acturaries and the Gateway to Student Success in mathematics have identified Algebra as a crucial precursor to success in mathematics, it was included as an important component of the framework.

Gender or Race of Mathematics Teacher

Frank felt that the presence of African American male teachers contributed in part to his success. This reference and others made about the gender and race of the teacher was included under the theme of Exposure because Frank and the other participants felt that their exposure to a teacher that looked like them helped them to conceptualize that they could pursue a career in mathematics. Frank said:

I had the same Black male teacher my senior year for calculus, and that's when I really had a good relationship with him and that year was actually what sparked me to think more about mathematics in college.

This comment was also considered to be an issue of Equity because if educational equity were a national norm, there would certainly be more male teachers of color teaching mathematics at the high school level. Scooter also commented on this issue by saying:

If it's not a Black male teaching it to them, if somehow that could be supplemented with peers, Black males in math related professions that you can look up to. In an ideal world, we would have more Black males teaching math, but practically I'm not sure how fast or how quickly that might happen.

Frank also referred to a mathematics teacher he had who was of African ancestry.

My statistics course, the hardest one that I took, the professor was also a Jamaican male, so a black male.

Stereotypes.

The participants did not comment with equal voracity about stereotypical views of their mathematical abilities. Kevin, however, in speaking about one of his college experiences with a mathematics teacher at his HBU, said,

He seemed dismissive of us breaking into the actuarial science field. He just looked around the room and said, “Yeah, but probably none of you will want to go through the exam process.” I’m not sure if it was directed towards the school or directed towards our ethnicity. I really couldn’t differentiate if his comment was racially motivated or because our school wasn’t synonymous with some who had actuarial programs. If I had to guess, I would say it was more racially motivated.

Ecologies of Hope

Ecologies of Hope refers to those circumstances outside of the individual’s personal influence and institutional supports identified to be central to the actuary’s success. Ecologies of Hope were operationalized to include the influence of community and family support systems that helped the individual succeed.

School systems, though an integral component of success, were not included as an Ecologies of Hope but were categorized as belonging to Equity. Based on the organizational sorting of the themes, schools belonged to an institutionalized system and thus were categorized as an issue of Equity. All influences, which were inspired by or

originated from an institution or organizational system, were housed under the heading of Equity and not as Ecology of Hope. Yet, nowhere is the interconnectedness of The Three E's of Exponential Genius quite as clear as in the Ecologies of Hope. The criterion used to delegate themes was most helpful in determining to which category a theme should be housed.

Based on participant comments, Ecologies of Hope were found to exist under the following headings:

- Black Leadership, Role Models
- Community Participation
- Family support

Black Leadership, Role Models

Actuaries identified Black leadership at the community level to be experiences that engendered feelings of hope directly contributing to their success. The other four actuaries identified the presence of Black leadership or role models as incentives that spurred them on to personal community involvement with the hope of fostering the same spirit among other young African Americans.

Jack and Kevin, who both came from the same Caribbean territory, spoke of how the leadership roles they saw in their communities had an effect on them. Jack said,

My country is very multicultural, but our Presidents and Prime Ministers have always been either East Indian or Black. It was kind of a culture shock when I came to this country and saw just how segregated power was. I have had to learn a lot about those issues. I read about them but did not experience it like I do now.

Kevin, also speaking to the same issue, echoed similar thoughts,

I'm glad that America has had a Black President. It is important that kids see their faces in leadership roles.

Denzel provided an example of how the influence of a family role model served to spur him onto greater community service or to the creation of Ecologies of Hope. Denzel's example is instructive of the intermingling of the Three E's of Exponential Genius. While Ecologies of Hope is a reference to community systems that supported the actuary, Denzel's example demonstrates how a family role model propelled him to become more involved in his community thereby creating for others an Ecology of Hope. Denzel's comment is a perfect example of the interconnectedness of the Three E's of Exponential Genius. Speaking of how his uncle's influence inspired him towards community involvement, he said:

We would go to soup kitchens or we would stuff backpacks and we would do this a couple times a year. When I went to high school, I joined the National Honor Society, and one of their key things is service projects. In college, I joined a fraternity that was really focused on service. I maintained this whole service focus throughout my life, but it really started from my uncle taking me to soup kitchens. There are a lot of people who had different influences on me. It all didn't come from one individual. I kind of pulled it from different people.

In another context, Denzel said:

Along my journey I got scholarships, and I had mentors, and I had people that encouraged me along the way. I want to be an individual that provides those

scholarships, that encourages those, and can help individuals attain their goals because I got a ton of help for me, and so it's only right for me to do the same for those that are striving.

Scooter also recognized the importance of having examples in the community of Black leadership and, with some consternation, said:

In an ideal world, we would have more Black males teaching math, but practically I'm not sure how fast or how quickly that might happen.

Actuaries all recognized that role models and leaders in the community are important seeds for aspirational thinking.

Kevin, while he did not identify the influence of Black leadership towards his personal success, stated that he felt that it was a necessary for success. He said:

Another thing that is important is there are a lot of African-American intellectuals, and they are sometimes not as highlighted or well represented. (Inaudible). They've made significant contributions in literature, mathematics; those stories are still coming out, but they are still not being widely circulated. There is that story coming out about the mathematician, the Black female mathematician that's coming out at the end of the year. That needs to be promoted and needs to be supported.

Jack, like Kevin, when asked about role models, responded,

The only person that comes to mind is Ben Carson. When I was a child, my parents gave me his book to read. I saw how he went from being at the bottom of his class to the top of his class to become a world-renowned surgeon, and I

thought to myself, “He was at the bottom of the class and he came to the top. I’m already at the top of my class so I can do something even greater.”

Frank represented an interesting departure from the role of Black leadership or role models in the life of the actuary. Frank said:

I have to be honest, I don’t have role models. I have mentors; I have coaches, I have many people, but I can’t say I have role models, especially for black males because for me if I want to look at role models I want that person to be someone I could see myself being. When I take a step back and say what have Black males done to Black females, then I really can’t say I would look at that person is a role model (inaudible) that human connection. I have trouble with that and that’s probably why, going back to your question about people that I saw because there are people that I respect that are Black males, but for them to be a role model I can’t say I would be comfortable saying that were confident saying that.

This is not to say that Frank did not appear to contradict himself because he also said,

I had the same Black male teacher my senior year for calculus and that’s when I really had a good relationship with him and that year was actually what sparked me to think more about mathematics in college.

The comment, previously attributed to Frank, seemed to be more a reflection of the context of our conversation rather than a reflection of some sort of ambivalence about the presence of role models in the community. Frank was at the time speaking somewhat despairingly of the stereotypes of Black males that are prevalent in the media.

Scooter spoke of how one of his teachers at the college level helped him to endure and continue:

There was one particular day I came to class and it may have been a test or an exam or something, and the teacher actually came and found me. It may have been the first time he and I ever talked. He singled me out and said I have been noticing your grades in math and I think you are really gifted, and I also noticed that you don't come to class every day. He said, "I don't really care about that because it seems like you have a natural ability, and I want to encourage you to keep at it." He kind of sought me out to encourage me to keep on even though I wasn't actually showing up to class every day. He didn't have to do that, but he did. That gave me some encouragement to keep going.

Frank, who was the lone first generation American, spoke about the support he received from his family and said:

Growing up my mom didn't really work. She stayed home and took care of me and my sister. My dad was always the one that worked, and my dad always did different types of jobs. He was a security guard for different places. He worked at parking lots. Now he works as a security guard at the Hilton in Philadelphia. My mom is trying to find employment. I guess growing up work like career/job I wouldn't say looking to my parents was kind of motivating. They wanted a better opportunity for me and my sister.

One interesting deviation from the theme of Black leadership is found in a comment made by Cage. He said,

All of the sponsors there were represented by mostly White people. It was like. “Wow, I am at an IABA leadership conference, and it was all White folks. So that’s even kind of run by Whites.” It’s kind of frustrating a little bit. Not even frustrating, but it’s like there needs to be something that needs to be done.

In looking over the transcript, the researcher found that this comment was unusual and sent an email to Cage in an effort to conduct a member check for accuracy. The question sent via email follows:

Can you verify if this quote accurately represents your words? Your words were transcribed by a professional transcriptionist, but before I use the quote I wanted to verify from you if these words accurately reflected your thoughts.

His response was a simple, “I’d say yes”. This was an odd perspective because not only does the IABA represent Black Actuaries but also the remark was not echoed by any of the other actuaries. In hindsight, there might be been merit in following up on this comment, if not for this study but as a contribution to the work of critical race theorists who examine power structures as they exist even in enterprises that are predominantly Black.

There is arguably considerable overlap between the existence of Black leadership/role models and its relevance to the themes of Ecologies of Hope and Endurance and Excellence. It is clear that the existence of exemplary Black leaders in the community influenced the participants.

Community Participation

All of the participants seemed to have an awareness of the importance of being a mentor or mentoring other young African American males to strengthen the community of African Americans. Frank and Kevin, who attended schools in the Caribbean, said that seeing authority figures in their country that were Black was helpful to them. When they arrived in the US and did not see a similar representation, it did not deter them because they were familiar with seeing Black males in positions of authority.

One noteworthy difference between the African American actuaries and the Caribbean born actuaries seemed to be that the African American actuaries all seemed to be more involved in their communities either volunteering or mentoring students which was born out of their personal interactions with role models or Black leadership. Jack, one of the two Caribbean born actuaries, did speak of some organizational involvement, but it could not be categorized as being related to a community-based project. His reference was to his involvement at the organizational level to recruit more people of color to the organization. He did, however, admit to having a leadership role in his church but with the birth of his daughter some of his responsibilities had to be curtailed.

Cage, who like the other American born actuaries and was very much involved in community work, made this comment as he spoke about his voluntary participation in an area charter school:

It's in the heart of Chicago, and they have great programs. This is one of the few. The only issue that I will say is that even though it is predominantly Black they don't have Black leadership. I was exposed to seven different directors and

teachers and only one of them was Black. So, they go to these youth centers and they have the programs, but they don't have the examples or the coach to say that they could do it. These teachers and these directors are working in the inner city, so they have good hearts. I don't want to say it's kind of a misplaced thing, but it says something. I feel like there is some type of subtle message when it's coming from a White versus a Black student or a Black teacher.

The construct of Ecologies of Hope was included as a category because it was the category that had the next highest frequency. Additionally, because of the circular logic of the Three E's of Exponential Genius, there was significant overlap with the two other E's. In many ways, the existence of Endurance and Excellence and Equity fuel and give rise to Ecologies of Hope.

Family Support

The influence of the family is another theme, which did not fall neatly into one of the three categories of the Exponential Genius framework. Each of the actuaries referred to family members. The following is a compilation of comments made by each of the actuaries as it relates to the impact of the family on their success.

Scooter: My mother taught me how to read before I got to preschool. She would read with me every day and every night. At some point early on, I just got to the point where I didn't need her to read with me; I could just do it on my own. It started with that desire to read, and once I learned how to read and developed a love for reading, I would read everything I could get my hands on. She would literally take me to the library on a Saturday. I would stack up on whatever the

limit was on books and be done with them in the next two or three days and be begging her to take me back to the library. So, it sort of began there and then once it began there you sort of realize that once you got this thirst for knowledge you can pretty much read up on anything and become knowledgeable about it. So, it started there, but it really just translated to if I heard about something I would just go to the library and try to read up on it. It was just a desire to learn and to understand things. To your question about my children, my wife and I were very intentional about doing that, and we established the same things in them and so they all were reading before they got to preschool. They all developed this thirst for learning and have all done extremely well academically.

Kevin, the other actuary from the Caribbean area spoke at length about the role of his father. He said:

My dad was also part alum of my high school. As far as he was concerned, if he did it, I could do it as well. He set a very high bar for me. My mom was also very adamant and in making sure I did my homework. They didn't monitor me as much in high school as they did elementary school, but they made sure that anything I needed in terms of lessons and any extra tutoring was provided. My parents made great sacrifices for me to get a good education. They paid for all of my extra lessons-they left no stones unturned when it came to education.

Jack: As I mentioned earlier, [my mother] had the connections for my elementary school, so she made sure I got into that school. As time went along she was

always encouraging. She provided an environment where I could focus on studying and do well. Both of my parents did that.

Previously mentioned, Frank who seemed to have in many cases a perspective somewhat different from the other participants speaking of his family said:

Growing up my mom didn't really work. She stayed home and took care of me and my sister. My dad was always the one that worked and my dad always did different types of jobs. He was a security guard for different places. He worked at parking lots. Now he works as a security guard at the Hilton in Philadelphia. My mom is trying to find employment. I guess you might say that my parents were simple hard working people who wanted a better opportunity for me and my sister and they worked wherever they could to support us.

When Cage was asked about the influence of his family said:

I would actually say my father... He was extremely strict when it came to mathematics in academics. My mom helped out with everything. She was the one that saw where would I develop and where my strong points would be and then she would tackle it from there. My father, on the other hand, and I feel like even from a young age I was always better at math than everything else. I was actually poor performing in everything else. I think I was below average in everything else and probably a little bit above average in math. Regardless, if I was good or bad at math, he was always going to make sure that I was better at math than everything else. That's where he was always strict. I had two older brothers, and it was always math, math, math that he tackled. Even though we had history

homework or even though we had social studies homework or English homework, it didn't matter. It was, did we do our math homework? Are we ahead in math?

The actuaries who had children, without admitting to it, all modeled their parenting style and practices from their family of origin. It is true that not every family conforms to the same mold of the men in this study and for that reason it is important that society provide adaptations to meet the needs for structure and consistency which characterized the childhood of the participants.

Conclusion

The Three E's of Exponential Genius provides a framework through which the success of African American male actuaries can be analyzed. This framework provides a clear counternarrative to the pervasive image of social pathology and mathematical inability among African American males. More importantly, Endurance and Excellence, Equity, and Ecologies of Hope provide a roadmap of sorts to cultivate and nurture mathematical potential into expertise. In the following chapter, recommendations, limitations and future research will be discussed.

CHAPTER V

CONCLUSION

The Three E's of the Exponential Genius framework provides a useful and cogent tool for understanding the mechanisms and experiential differentials that promote mathematical expertise among African American males. The value of such a framework cannot be overstated because of its potential to impact the social and financial mobility of a demographic group assumed to be deficient in mathematics. The Three E's of Exponential Genius: Endurance and Excellence, Equity, and Ecologies of Hope offer a plausible framework for modeling and replicating the mathematical exceptionalism of African American male actuaries.

There is evidence in the literature that social practices are transferred from one generation to another with far greater ease than is factual and empirical information (Mesoudi, Whiten, & Dunbar, 2006). Mesoudi et al. wrote, "cultural transmission might be biased toward social over non-social information" (p. 405). It can therefore be argued that within an intimate understanding of the social strategies, internal dialogues, and experiences of highly successful African American male mathematicians lies the opportunity for the reproduction of the critical support structures integral to the promotion of mathematical expertise among African American male youth.

The Exponential Genius model is predicated on the existence of three foundational pillars-Endurance, and Excellence, Equity, and Ecologies of Hope. There is support in the literature for the foundational concepts of the framework, however, the

verbiage for the individual components of the model are somewhat different. In the literature, the terms resilience and grit are used to describe the similar traits of endurance and excellence manifested by the actuaries. Academic resilience, as defined by Gayles, refers to “academic achievement when such achievement is rare for those facing similar circumstances or within a similar sociocultural context” (2005, p. 252). By virtue of their similar sociocultural context and historical group performance in mathematics, the mathematical success of the participants suggests that they are in possession of traits similar to the resilience and grit spoken of in the literature. The concept of grit also seemed to be related to the endurance and excellence component of the Three E’s Framework. Grit is the ability to demonstrate “perseverance and passion for long-term goals” (Duckworth, Peterson, Matthews, & Kelly, 2007, p. 1087) even in the face of considerable challenges. It takes approximately 6-10 years to become an actuary, (“Bean Actuary”, 2017), and for many the dream is an elusive one because of the difficulty of the qualifying examinations. Yet, the men in this study spoke at length about how they summoned the strength and courage to endure and persist despite marginalizing classroom spaces, racial stereotypes and the rigors of Actuary qualifying exams.

The Bureau of Labor Statistics (2014) approximated the national population to be 318.9 million of which 24,600 were actuaries. Actuaries therefore represent approximately 0.007% of the population and according to the host of this study, there are 228 African American male actuaries in the United States, which means that of the actuaries in the country 0.9% of them are African American males. Actuaries then, clearly belong to the nation’s educational and professional elite. The African American

men, who have managed to realize this professional accomplishment, are thus without doubt men of remarkable stature whose traits and life experiences are worth emulating and modeling. There can therefore, be little doubt that the fully credentialed actuary must be an individual endowed with the qualities of endurance and excellence, which are primary components of the Exponential Genius framework.

The second subset of The Exponential Genius framework surmised that Equity is a necessary component for mathematical success. It is important, to note however, that though the emphasis in the literature has generally focused on general educational equity, for reasons cited in Chapter I, equity has broader applications for African Americans. Educational equity for African Americans in the field of mathematics has components that may not apply to other racial groups.

Historically Black Colleges and Universities (HBCUs) are actively working to propel more African American males into STEM majors, and they are able to do so with students who enter collegiate classes with clear deficiencies inherited from the inequity in access to honors mathematics classes from high school (Jett, 2013). Regardless, these schools are able to prepare and graduate more African American males from STEM professions when compared to predominantly White institutions. Jett (2013) notes that specific techniques are employed at HBCUs that are helping to boost the performance of African American males in STEM professions. It is interesting that of the six study participants, three attended historically Black institutions of higher learning. Equity therefore for African American males might mean having the opportunity and access to

HBCU's that are uniquely prepared and historically able to prepare African Americans for STEM professions.

Dee and Penner (2016) writing about a related issue, identify the positive impact on the academic achievement and attendance rates of students of color, enrolled in ethnic studies. Their findings provide an additional perspective related to the importance of a curriculum known to have an impact on educational outcomes, particularly for persons of color. Educational equity therefore, may refer also to the need for curriculum such as ethnic studies because of causal links to academic success identified by researchers such as Dee and Penner (2016).

Educational equity requires that all students have access to an appropriately rigorous mathematics curriculum (Darling-Hammond, 2010). Thus, in the same way that provisions are made for special education students, the mathematically gifted student is entitled to receive specialized services, presented by exemplary teachers. Yet, based on the reports of the actuaries who all identified themselves as gifted in mathematics, there rarely were more than two or three African American males in their honors math classes. This general statement made by the actuaries is supported by The Open Society Foundations report (Tsoi-A-Fatt, 2010), which states that: "Black boys are 2.5 times less likely to be enrolled in gifted and talented programs, even if their prior achievement reflects the ability to succeed" (p.9). Access to and high quality educational experiences are critical inputs, and seemed to provide a pathway that led all participants towards mathematical expertise.

One of the fundamental truths of the Individuals with Disabilities Act (IDEA) (originally passed in 1975), which has had several reauthorizations, is that the Act required that children with disabilities must have, at no cost to parents, services and access to educational opportunities tailored to the specific needs of the child. Thus, students who have disabilities are provided with accommodations that help them to acquire the same knowledge and skill sets as their peers who may not have their particular challenge. That same logic should demand that mathematically gifted students have access to specialized instruction and highly qualified teachers able to nurture their mathematical aptitude, regardless of their race or gender.

The illustration, which comes to mind is that of three individuals of various heights who are all trying to look over a barrier to view an important activity held beyond the barrier. In the illustration, everyone is provided with a stool which allows them to see beyond the barrier, thus the issues of curriculum, school reputation, teacher quality and educational rigor are fundamentally questions of access-what should or what can be done to allow everyone the same access and opportunity to experience success? What are the specific adaptations that are needed to facilitate the success of African American males in mathematics when their particular circumstances, gifts, and learning styles are considered? The adaptations received are not perceived as unfair advantages but merely as tools tailored to meet their specific needs. While the illustration to a certain degree holds true, the illustration fails in that African American males are in no way disabled. Rather the deficiencies lie in the external limitations forced upon the African American male learner by the sociocultural traditions of the United States.

African American males, like all sub groups should be entitled to the rigors of programs for gifted mathematics students, quality teachers, rigorous mathematics curriculum in the regular education setting and research based curriculum that meets their specific needs and learning styles.

Sometimes reference to the effect of context on academic achievement can be construed to be a challenge to the status quo, and therefore an unpalatable discussion that is rarely discussed. At other times in an educational enterprise, context is assumed to be causative and fatalistic thus solutions are assumed to be limited in scope and effect. The Three E's of Exponential Genius assumes neither of the two options. The framework does not solely focus on the inequities known to exist in education in the US; neither does it assume that solutions are impossible. The change in perspective, which this investigation proposes, remains in keeping with the generally accepted understanding that context is valuable. Therefore, rather than a focus on the systemic and sociocultural issues, which are fraught with uncomfortable political whisperings or the focus of problematic roots, this investigation proffered that there is considerably more value in focusing on the contextual factors known to be common to African American males who have been successful in mathematics. Identifying those factors that facilitated success even in the face of challenges provides a valuable point of access for those who seem unable to navigate the complexities of schooling in American. Those factors and experiences find their voice in the Exponential Genius framework. The focus on the negative antecedents to the problem of underachievement in the African American

population is instead replaced by perspectives of success found in the Three E's of Exponential Genius.

The last of the E's in the Three E's Framework, Ecologies of Hope, is in many ways related to the existence of the other two pillars of the framework, i.e. Endurance, and Excellence and Equity. Ecologies of Hope are the natural byproducts of the support provided by the individual's community, which would include the influence of the church, adequate and affordable healthcare, and safe communities. Ecologies of Hope therefore exist because of the existence of strong and healthy individuals and institutions. There is a natural interconnectedness among the three prongs of the Exponential Genius framework.

Support for the Exponential Genius framework can be found in the work of Berry, Thunder, and McClain (2011) who have written extensively about mathematics achievement for African American males and like this investigation, they have historically focused on models of success in mathematics rather than failure. They identified six key traits or characteristics of successful African American males at the 5th grade. The six key traits, which were detailed in Chapter III, are as follows: computational fluency, extrinsic recognition, awareness of their status in the tracking system, relational connections, engagement with the unique qualities of mathematics, and involvement in out of school activities. Interestingly, of these six characteristics five of the six were confirmed in this study but were assigned different labels. They were all also grouped into one of the three E's of the Exponential Genius framework. Thus, Computational Fluency was labelled in this study as Mathematical Awareness and a

necessary component for Endurance and Excellence. Extrinsic Motivation was identified in this study to be Historical Success and placed in the category of Endurance and Excellence. Awareness of their status in the tracking system was in this study called Exposure to Honors classes and part of the Equity tenet. Relational connections clearly belonged to the Ecologies of Hope pillar of the Exponential Genius framework and included each of the relationships identified by Berry, Thunder, and McClain to be important contributors to success in mathematics. In this investigation, the researcher used the heading, attitude towards setbacks to refer to how the actuaries dealt with challenges in mathematics and this attitude was called by the researchers, Engagement with the unique qualities of mathematics. The final characteristic identified by Berry, Thunder, and McClain was labelled, Out of School Activities. While thoughts related to this experience were not clearly expressed by the actuaries in this study, it does not mean that this trait/experience did not characterize the experience of the actuaries, it may have not been sufficiently explored.

An underlying assumption of the framework is that the exponential genius personality is not a stable or duplicable persona if any one of the cornerstones of the framework is missing. Consider for example, a three-legged stool-a three-legged stool is of no use, if any one of the legs are impaired. Likewise, the Exponential Genius schema is predicated on the view that each of the three E's of the framework is indispensable to the realization of mathematical genius among African American males.

Yet, while the framework insists on the existence of each of the three E's, it is important to remember that each of the legs of the Exponential Genius framework are

not definable points but rather points on a continuum. The aim is to encourage and nurture each of the main components; the degree to which each of the prongs are developed may hint at the measure of success in mathematical pursuits for the individual.

Limitations

The Three E's of Exponential Genius tie together the formative and summative experiences of African American male actuaries. It is a useful framework for understanding how African American males acquire mathematical expertise in the context of American educational policy and the socio-cultural history of the African American. While useful, there are limitations to the approach.

One limitation of the study was the small sample size. Qualitative research is concerned with “an in depth understanding” (Hesse-Biber & Leavy, 2010) and in-depth analysis, by logic is best facilitated through smaller samples. However, this does not exclude the underlying assumption that the sample population must be representative of the target population. While it is true that the selected sample was somewhat representative of the male African American student of mathematics in the United States and African American actuaries, I would have preferred to include interviews with actuaries who had a broader breath of experience in the field. It is certainly a legitimate possibility that more experienced actuaries could have possessed adaptive skill sets and formative experiences that were notably different from the less experienced and younger actuaries. One of the premier actuaries in the country who is highly regarded in the actuarial community responded and expressed his willingness to participate; however, he did so at the time when analysis was complete. I have no doubt in my mind, that he

would have been able to provide some very valuable context. It is my intention to follow-up with him to see how his experiences are in accord with or differ from, The Three E's of Exponential Genius.

Another possible limitation lies in data collection logistics. There were times when the researcher felt that a face-to-face conversation might have been more authentic than the phone conversations or more may have prompted more reflective thought. My interview with one participant was particularly disruptive. To his credit, it was conducted on a Sunday, and he was running errands with his wife and kids. The conversation started at the house, and then later while they were running errands, he spoke with me while he was in the car. I feel that he might have been a little distracted and not quite in touch with his latent feelings on some of the issues discussed. During the interview, I was keenly aware of the fact that the experience may have been an imposition on his family. There were times when I consciously chose not to delve deeper into issues that had the potential to force the interview into overtime. If I had the opportunity to be near the participants, I believe that our conversations could have yielded even more useful perspectives or added to support to the findings.

Summary and Implications for Future Research

Future research projects which delineate the specific components of a strong school, or a strong mathematics curriculum, is warranted. The question: "If you had to teach mathematics to a young African American male, how would it be similar or different to how you were taught?" (See Appendix A, Question 6) seemed in hindsight insufficient since this research is very much concerned with the subject area of

mathematics. The question came later in the interview and was usually presented when much of the time had elapsed. Since, the question was asked towards the end of the interview, I intentionally chose to simply record the responses without pursuing any follow up questions.

Ethnomathematics (Valero, 2008) is a pedagogical strategy for teaching mathematics and belongs to the culturally relevant pedagogy movement (Ladson-Billings, 1995a) and when implemented has demonstrated gains in mathematics achievement. I would be interested in investigating how the principles of Ethnomathematics line up with the experiences and perspectives of the participants. This line of enquiry, though important may not have been best suited for this investigation since the question is fundamentally one of pedagogy; and pedagogical questions may be best answered by mathematics teachers. A follow up investigation which therefore seeks to combine the principles and methodology of Ethnomathematics with what the actuaries thought to be components of effective mathematics content/instruction could well lead to a hybrid pedagogy embracing the principles of Ethnomathematics and the unique perspectives of the actuaries. The impact of this imagined pedagogy can then become a part of teacher preparation programs.

There is extensive support in the research literature for the existence of a trait called *verve* found to be common to African Americans. Kunjufu (1988) argues that African American children are harmed by a curriculum that fails to account for and consider their “higher *verve*” and relational learning styles. An investigation which explores the relationship between this *verve* and mathematics instruction may yield

useful tools for closing of the mathematics gap. Questions to consider might be: Is it possible that the disparity in mathematics achievement of African Americans might be related to the curriculum's failure to address the verve of the African American student? Or additionally, are there unique characteristics of mathematics that are specifically compatible with this verve that is underappreciated in mathematics instruction as it is traditionally delivered? Urban classrooms where failure rates are high, may well be primary beneficiaries of an in-depth examination of the relationship between verve and mathematics achievement.

Support and encouragement from family (an Ecology of Hope or Endurance/Excellence) was without doubt one of the more clearly expressed themes of the participants. There was evidence of deliberate actions on the part of relatives/parents to invest, not only in the education of their children, but also in their moral and social development. The parents of the participants seemed to be prepared to relocate in search of better educational opportunities, willing to explore career paths with them, remain adamant that they do their homework, insist that they become involved in some form of community service, or insist on a religious or moral dimension to their upbringing. Each of these parental or familial influences, though different, all provided feelings of security for the participants and reinforced their feelings of competency and worth.

Jeynes (2007) conducted a longitudinal study, which brought together the findings of 52 related studies, which measured the impact of parenting on academic success. The results indicated that "the influence of parental involvement overall is significant for secondary school children" (p. 82). If as suggested by Jeynes, that parental involvement

significantly impacts student achievement, I would be interested in research, which measures the impact of a parenting program whose curriculum is informed by the Exponential Genius model.

Another useful addition to a parenting program might include information for parents about steps they can take to obtain educational opportunities for their children. All too often, educational opportunity is stratified along wealthy communities. Another follow up investigation, not addressed in this study, is therefore, how can parenting programs using the Exponential Genius framework include in its curriculum, practical advice to parents, which will inform them of strategies to secure better educational opportunities for their children considering possible financial limitations and what would be the long-term impact of such programs (Teske, Fitzpatrick, & Kaplan, 2007)?

The participants indicated that they felt that having a male mathematics teacher of their race would help young African American males. Frank, Jack, and Kevin had the benefit of that experience but the others not having that experience identified without being prompted that they felt that having a male mathematics teacher of their race would be helpful for the academic success of Black males. Thus, research which attempts to ascertain the impact on mathematics performance for African American male students when the teacher is also male and of their race, can prove useful in breaking the cycle of underachievement in mathematics for African American males. Investments in teacher training programs which deliberately recruit and train African American male teachers to teach mathematics to African American youth also holds the promise of improving mathematics performance.

My personal experience with African American male students of mathematics (as shared in Appendix F) has suggested that African American male students benefit academically from aspirational and inspirational story telling. As a teacher, I told stories of the successes of African Americans in mathematics and other fields. I also told stories that had no racial component but were told for their motivational effect and affect. Over the years, my African American male students always performed outside of the school's norms for that group in mathematics. Whether their success was influenced by the motivational stories, or the stories of successful African Americans, or the combination of both kinds of stories, or neither is unknown to me. What I do know is that, an answer to that question will likely characterize the rest of my professional life.

All research holds the potential for further investigation. This investigation represents my first formal investigation into the African American male student of mathematics. I look forward to and expect this to be my life long work. The Three E's of Exponential Genius will likely go through many iterations, but I am confident that it has provided a framework or lens through which I may continue this interest.

REFERENCES

- Alexander, M. (2012). *The new Jim Crow*. Revised Edition. New York, NY: The New Press.
- Anderson, J. D. (2004). The historical context for understanding the test score gap. *National Journal of Urban Education and Practice*, 1(1), 1-21.
- Anderson, S., Medrich, E., & Fowler, D. (2007). Which achievement gap? *Phi Delta Kappan*, 88(7), 547-550.
- Baldrige, B. J. (2014). Relocating the deficit: Reimagining black youth in neoliberal times. *American Educational Research Journal*, 51(3), 440-472.
- Berry, Thunder, & McClain, (2011). Counter narratives: Examining the mathematics and racial identities of black boys who are successful with school mathematics. *Journal of African American Learners in Education*, 2(1), 10-23.
- Boykin, A. W., & Allen, B. A. (1988). Rhythmic-movement facilitation of learning in working-class Afro-American children. *The Journal of Genetic Psychology*, 149(3), 335-347.
- Brown, K. (2008). Employing mathematical modelling to respond to Indigenous students' needs for contextualized mathematics experiences. *Navigating currents and charting directions*, 93-99
- Bureau of Labor Statistics, U.S. Department of Labor. (2014). *Occupational Employment and Wages*. Actuaries. Retrieved from <https://www.bls.gov/oes/current/oes152011.htm>
- Cammarota, J. (2004). The gendered and racialized pathways of Latina and Latino youth: Different struggles, different resistances in the urban context. *Anthropology & Education Quarterly*, 35(1), 53-74.
- Careercast.com. (2015). *Jobs Rated | CareerCast.com*. Retrieved from <http://www.careercast.com/jobs-rated/best-jobs-2015>
- Children's Defense Fund. (2007). *America's cradle to prison pipeline*. Retrieved from <http://www.childrensdefense.org/library/data/cradle-prison-pipeline-report-2007-full-lowres.pdf>

- Chubbuck, S. (2014). The intersection of identity, beliefs, and politics in conceptualizing 'teacher identity'. *International Handbook of Research on Teacher's Beliefs* (2014): 173.
- Cole, M. (2017). Introduction. In *New developments in Critical Race Theory and Education* (pp. 1-10). Palgrave Macmillan US.
- Cook, A. E. (1990). Beyond Critical Legal Studies: The Reconstructive Theology of Dr. Martin Luther King, Jr. *Harvard Law Review*, 985-1044.
- Crenshaw, K. (1991). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Review*, 1241-1299.
- Dee, T.S., & Penner, E.K. (2016). The causal effects of cultural relevance evidence from an ethnic studies curriculum. *American Educational Research Journal*, (2016): 0002831216677002.
- Delgado, R., & Stefancic, J. (2012). *Critical race theory: An introduction*. NYU Press.
- Dalton, H.L. (1995). The clouded prism: Minority critique of the critical legal studies movement. In K. Crenshaw, N. Gotanda, G. Peller, & K. Thomas (Eds.), *Critical race theory: The key writings that formed the movement* (pp 80-84). New York, NY: The New Press.
- Darling-Hammond, L. (2010). *The flat world and education*. New York, NY: Teachers College Press.
- D'Ambrosio, U. (1985). Ethnomathematics and its place in the history and pedagogy of mathematics. *For the Learning of Mathematics*, 5(1), 44-48.
- DeCuir, J. & Dixson, A. (2004). So, when it comes out, they aren't surprised that it is there: Critical race theory as a tool of analysis of race and racism in education. *Educational Researcher*, 33(5), 26-31.
- Dee, T. S., & Penner, E. K. (2016). The Causal Effects of Cultural Relevance Evidence From an Ethnic Studies Curriculum. *American Educational Research Journal*, 0002831216677002.
- Delgado, R., & Stefancic, J. (2001). *Critical race theory*. New York, NY: New York.
- Delgado, R., & Stefancic, J. (2012). *Critical race theory: An introduction*. New York, NY: New York University Press.
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality & Social Psychology*, 92(6), 1087-1101.

- Edelman, W. (2007). *Losing our children in America's cradle to prison pipeline*. New York: *National Urban League*.
- Erlandson, D. A., Harris, E. L., Skipper, B. L., & Allen, S. D. (1993). *Doing naturalistic inquiry: A guide to methods*. Newbury Park, CA: Sage Publications.
- Ernest, P. (2002). *The philosophy of mathematics education*. New York, NY: Routledge.
- Evan, A., Gray, T., & Olchefske, J. (2006). The gateway to student success in mathematics and science: A call for middle school reform—the research and its implications. Washington, DC: American Institutes for Research. Retrieved from http://www.partnership4learning.org/docs/reports/The_Gateway_to_Student_Success_in_Math_and_Science_Microsoft.pdf
- Fantuzzo, J., LeBoeuf, W., Rouse, H., & Chen, C. C. (2012). Academic achievement of African American boys: A city-wide, community-based investigation of risk and resilience. *Journal of School Psychology, 50*(5), 559-579.
- Feagin, J. (2013). *Systemic racism: A theory of oppression*. New York, NY: Routledge.
- Finlay, L. (2014). Engaging phenomenological analysis. *Qualitative Research in Psychology, 11*(2), 121-141.
- Fortin, N., Oreopoulos, P., & Phipps, S. (2015). Leaving boys behind. *Journal of Human Resources, 50*(3), 549-579.
- Fryer, R., & Levitt, S. (2004). Falling behind: As children move through school, the Black White achievement gap expands. *Education Next, 4*(4), 64-72.
- Gay, G. (2010). *Culturally responsive teaching: Theory, research, and practice*. New York, NY: Teachers College Press.
- Gayles, J. (2005). Playing the game and paying the price. *Anthropology & Education Quarterly, 36*(3), 250-264.
- Giles, D. (2010). Developing pathic sensibilities: A critical priority for teacher education programmes. *Teaching and Teacher Education, 26*, 1511-1519. doi: 10.1016/j.tate.2010.05.007.
- Gorski, P. (2008). The Myth of the “Culture of Poverty”. *Educational Leadership, 65*(7), 32.
- Hale, J. E. (1986). *Black children: Their roots, culture, and learning styles* (Revised edition). Baltimore, MD: Johns Hopkins University Press.

- Hesse-Biber, S. N., & Leavy, P. (2011). *The practice of qualitative research* (2nd ed.). Los Angeles, CA: Sage.
- Holzman, M. (2015). *Yes, we can: The Schott 50 state report on public education and Black males*. Retrieved from Schott Foundation for Public Education website: <http://schottfoundation.org/resources/yes-we-can-schott-50-state-report-public-education-and-black-males>
- International Association of Black Actuaries, IABA (2017). [*Homepage*]-Retrieved from <http://www.blackactuaries.org>. 17 December 2015.
- Irvine, J. J. (2010). Culturally Relevant Pedagogy. *Education digest: Essential readings condensed for quick review*, 75(8), 57-61.
- Jackson, J. H., & Beaudry, A. (Eds.). (2015). *Invisible men*. Retrieved from Schott Foundation for Public Education website: <http://blackboysreport.org/national-summary/invisible-men/>
- James, M., & Lewis, C. (2014) Kindling the spark of Black male genius through education. *Journal of African American Males in Education*, 5(2), 267-282.
- Jett, C. C. (2013). HBCUs propel African American male mathematics majors. *Journal of African American Studies*, 17(2), 189-205.
- Jeynes, W. H. (2007). The relationship between parental involvement and urban secondary school student academic achievement: A meta-analysis. *Urban Education*, 42(1), 82-110.
- Kena, G., Musu-Gillette, L., Robinson, J., Wang, X., Rathbun, A., Zhang, J., Wilkinson-Flicker, S., Barmer, A., & Dunlop Velez, E. (2015). *The Condition of Education 2015* (NCES 2015-144). U.S. Department of Education, National Center for Education Statistics. Washington, DC. Retrieved from <http://nces.ed.gov/pubsearch>
- Krezmien, M. P. "Multilevel analysis of suspensions in Maryland. *Unpublished manuscript, University of Maryland, College Park* (2006).
- Kunjufu, J. (1988). *Developing positive self-images and discipline in Black children*. Chicago, IL: African American Images.
- Ladson-Billings, G. (1994). *The dreamkeepers: Successful teachers of African American children*. San Francisco, CA: John Wiley & Sons.

- Ladson-Billings, G. (1995a). But that's just good teaching! The case for culturally relevant pedagogy. *Theory into Practice*, 43, 159–165. doi:10.1080/00405849509543675
- Ladson-Billings, G. (1995b). Toward a theory of culturally relevant pedagogy. *American Educational Research Journal*, 32, 465–491. doi:10.3102/00028312032003465
- Ladson-Billings, G. (1997). It doesn't add up: African American students' mathematics achievement. *Journal for Research in Mathematics Education*, 28(6), 697-708.
- Ladson-Billings, G. (1998). Just what is critical race theory and what's it doing in a nice field like education? *International Journal of Qualitative Studies in Education*, 11(1), 7-24.
- Ladson-Billings, G. (2006). “Yes, but how do we do it?”: Practicing culturally relevant pedagogy. In J. Landsman & C. Lewis (Eds.), *White teachers/diverse classrooms: A guide to building inclusive schools, promoting high expectations, and eliminating racism* (pp. 29-42). Sterling, VA: Stylus.
- Ladson-Billings, G., & Tate, W. F. (2006). Toward a Critical Race theory of Education. *Critical race theory in education: All God's children got a song*, 11, 30.
- Ladson-Billings, G. (2014). Culturally relevant pedagogy 2.0: Aka the remix. *Harvard Educational Review*, 84(1), 74-84.
- Langdon, D., McKittrick, G., Beede, D., Khan, B., & Doms, M. (2015). *STEM: Good jobs now and for the future*. Retrieved from US Department of Commerce, Economics, and Statistics Administration website:
- Largest school districts in Texas. (2012-13). Retrieved from American School & University website: <http://asumag.com/top-10s/largest-school-districts-texas>
- Lawrence, C. R. (1987). The id, the ego, and equal protection: Reckoning with unconscious racism. *Stanford Law Review*, 317-388.
- Lewis, C. W., James, M., Hancock, S., & Hill-Jackson, V. (2008). Framing African American students' success and failure in urban settings: A typology for change. *Urban Education*, 43(2), 127-153.
- Lewis, S., Simon, C., Uzzell, R., Horwitz, A., & Casserly, M. (2010). A call for change: The social and educational factors contributing to the outcomes of Black males in urban schools. *Council of the Great City Schools*.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. (Vol.75). Sage, 1985.

- Lubienski, S. T. (2002). A closer look at Black-White mathematics gaps: Intersections of race and SES in NAEP achievement and instructional practices data. *Journal of Negro Education*, 269-287.
- Martin, D. B. (2000). *Mathematics success and failure among African-American youth*. Mahwah, NJ: Lawrence Erlbaum.
- Martin, D. B. (2009). Researching race in mathematics education. *Teachers College Record*, 111(2), 295-338.
- Martinez, S. M., & Rury, J. L. (2012). From "culturally deprived" to "at risk": The politics of popular expression and educational inequality in the United States, 1960-1985. *Teachers College Record*, 114(6), 1-31.
- Matsuda, M. (1995). Looking to the bottom: Critical legal studies and reparations. In K. Crenshaw, N. Gotanda, G. Peller, & K. Thomas (Eds.), *Critical race theory: The key writings that formed the movement* (pp. 63-79). New York, NY: The New Press.
- Maxwell, J.A. (2008). Designing a qualitative study. *The Sage handbook of applied social research methods*, 2, 214-253.
- McGee, E., & Martin, D. (2011). "You would not believe what I have to go through to prove my intellectual value!" Stereotype management among academically successful Black mathematics and engineering students. *American Educational Research Journal*, 48(6), 1347-1389. doi: 10.3102/0002831211423972
- McGraw, R., Lubienski, S. T., & Strutchens, M. E. (2006). A closer look at gender in NAEP mathematics achievement and affect data: Intersections with achievement, race/ethnicity, and socioeconomic status. *Journal for Research in Mathematics Education*, 129-150.
- Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass.
- Mesoudi, A., Whiten, A., & Dunbar, R. (2006). A bias for social information in human cultural transmission. *British Journal of Psychology*, 97(3), 405-423.
- Milner IV, H. R. (2012). Beyond a test score: Explaining opportunity gaps in educational practice. *Journal of Black Studies*, 43(6), 693-718.
- Mincy, R. (2006). *Black males left behind*. Washington, DC: Urban Institute Press.
- Moses-Snipes, V., & Snipes, P. (2005). The mathematics education and science education of African Americans. *The Negro Educational Review*, 56(2), 107-126.

- Nces.ed.gov,. (2015). *Table 2. Percentage distribution of school teachers, by race/ethnicity, school type, and selected school characteristics: 2007–08*. Retrieved 20 December 2015, from https://nces.ed.gov/pubs2009/2009324/tables/sass0708_2009324_t12n_02.asp
- Office of Civil Rights. (2012) *Civil rights data collection: Revealing new truths about our nation's school*. Retrieved from <http://www2.ed.gov/about/offices/list/ocr/docs/crdc-2012-data-summary.pdf>
- Powell, A. B., & Frankenstein, M. (Eds.). (1997). *Ethnomathematics: Challenging eurocentrism in mathematics education*. Albany, NY: State University of New York Press.
- Qualtrics Screening Survey. Retrieved 27 February 2017 from https://login.qualtrics.com/ControlPanel/?ClientAction=EditSurvey&Section=SV_ebPuDfufA2p68MI&SubSection=&SubSubSection=&PageActionOptions=&TransactionID=1&Repeatable=0.
- Rowley, S. J., Sellers, R. M., Chavous, T. M., & Smith, M. A. (1998). The relationship between racial identity and self-esteem in African American college and high school students. *Journal of Personality & Social Psychology*, 74(3), 715-724.
- Skrla, L., & Scheurich, J. J. (2001). Displacing deficit thinking in school district leadership. *Education and Urban Society*, 33(3), 235-259.
- Society of Actuaries. (2017a). Enrolled actuaries' examinations. Retrieved from <https://www.soa.org/education/exam-req/edu-exam-ea-detail.aspx>
- Society of Actuaries. (2017b). Associate of the society of actuaries. Retrieved from <https://www.soa.org/Education/Exam-Req/edu-asa-req.aspx>
- Society of Actuaries. (2017c). Fellow of the society of actuaries. Retrieved from <https://www.soa.org/Education/Exam-Req/edu-fsa-req.aspx>
- Society of Actuaries. (2017d). Fellow of the society of actuaries (FSA) requirements. Retrieved from <https://www.soa.org/education/exam-req/edu-fsa-req-archive.aspx>
- Solorzano, D. G., & Yosso, T. J. (2001). Critical race methodology: Counter-storytelling as an analytical framework for education research. *Qualitative Inquiry*, 8(1), 23-44.

- Steele, C. M., & Aronson, J. (1998). Stereotype threat and the test performance of academically successful African Americans. In C. Jencks & M. Phillips (Eds.), *Black- White test score gap* (pp. 401–428). Washington, DC: Brookings Institution Press.
- Stinson, D. W. (2006). African American male adolescents, schooling (and mathematics): Deficiency, rejection, and achievement. *Review of Educational Research*, 76(4), 477-506.
- Taylor, E. (1998). A primer on critical race theory: who are the critical race theorists and what are they saying? *The Journal of Blacks in Higher Education*, 122-124.
- Terry Sr, C. L. (2011). Mathematical counterstory and African American male students: Urban mathematics education from a critical race theory perspective. *Journal of Urban Mathematics Education*, 4(1).
- Teske, P., Fitzpatrick, J., & Kaplan, G. (2007). Opening doors: how low-income parents search for the right school. *Online Submission*.
- Thomas, A. J., & Speight, S. L. (1999). Racial identity and racial socialization attitudes of African American parents. *Journal of Black Psychology*, 25(2), 152-170.
- Thomas, A. J., Speight, S. L., & Witherspoon, K. M. (2010). Racial socialization, racial identity, and race-related stress of African American parents. *The Family Journal*. Vol 18(4), Oct, 2010. 407-412.
- Tsoi-A-Fatt, R. (December, 2010). *We dream a world: The 2025 vision for Black men and boys*. Retrieved from Open Society Foundations website: <https://www.opensocietyfoundations.org/publications/we-dream-world-2025-vision-black-men-and-boys>
- US Department of Education. (2015). *Achievement Gaps- How Black and White Students in Public Schools Perform in Mathematics and Reading on The National Assessment of Educational Progress*. 1-66.
- Valencia, R. R., & Solórzano, D. G. (1997). Contemporary Deficit Thinking. The Evolution of Deficit Thinking. *Educational Thought and Practice*, 160-210.
- Valero, P. (2008). Discourses of power in mathematics education research: Concepts and possibilities for action. 43-60.
- Van Manen, M. (1990). *Researching lived experience: Human science for an action sensitive pedagogy*. Albany, NY: State University of New York Press.

- Van Manen, M. (2014). *Phenomenology of practice: Meaning-giving methods in phenomenological research and writing*. Walnut Creek, CA: Left Coast Press.
- Wald, J., & Losen, D. J. (2003). Defining and redirecting a school-to-prison pipeline. *New directions for youth development*, 2003(99), 9-15
- Weisner, T.S., & Lieber, E. (2013). *Dedoose* [homepage on Internet]. Retrieved from <http://www.dedoose.com/>
- Whiting, G. (2006a). From at risk to at promise: Developing Scholar Identities among Black males. *Prufrock Journal*, 17(4), 222-229.
- Whiting, G. W. (2006b). Enhancing culturally diverse males' scholar identity: Suggestions for educators of gifted students. *Gifted Child Today*, 29(3), 46-51.
- Willis, M. G. (1989). Learning styles of African American children: A review of the literature and interventions. *Journal of Black Psychology*, 16(1), 47-65.
- Yoon, I. H. (2012). The paradoxical nature of whiteness-at-work in the daily life of schools and teacher communities. *Race, Ethnicity & Education*, 15(5), 587-613.

APPENDIX A

INTERVIEW QUESTIONS

1. What are your earliest recollections of your experiences with mathematics as an African American/Black male?
2. What were the messages you received from school, home or community about your ability as a student of mathematics?
3. What specific steps did you take to rise above the narrative about your abilities as a competent student of mathematics?
4. Are there any factors/experiences that you can identify which helped you to sustain your interest in mathematics?
5. What specific steps do YOU remember taking to ensure your personal success in mathematics? Did you take these steps with the encouragement of anyone or were they inspired by your own inner drive for success?
6. If you had to teach mathematics to a young African American male now, how would it compare to how you were taught?

APPENDIX B

QUALTRICS SCREENING QUESTIONS

1. Contact information and Email
2. Gender
3. Level of actuary
4. Where did you attend High School?
5. Are you a graduate of a US University?
6. Where were you born?
7. Do you self-identify as an African American?

APPENDIX C

FOLLOW-UP QUESTIONS

1. What was the role of sports in your life?
2. Do you feel that code switching was/is a necessary skill you had to develop in order to be successful?
3. What specific steps do you remember taking to deal with failure? Or what personal characteristics helped you with the challenges of passing the professional exams.
4. Are you an atheist, agnostic or believer in God?
5. Do you consider this statement to be true or false? Algebra is the gateway to success in mathematics.
6. Which of the following characteristics do you think were most influential in your success? Please rank your responses. If there is another characteristic not mentioned, please identify and rank it as well.
7. Curiosity Persistence Early mathematical ability Natural ability Hard work Family Fear of the future OR something else. What is that something else?

APPENDIX D

QUALTRICS SCREENING SURVEY RESPONSES TO GENDER AND ACTUARIAL DESIGNATION/LEVEL

Table D-1

		Please indicate your gender.			Which level of actuary are you?		
		Male	Female	Total	Associate	Fellow	Total
Please indicate your gender.	Male	19	0	19	7	6	13
	Female	0	3	3	1	0	1
	Total	19	3	22	8	6	14
Which level of actuary are you?	Associate	7	1	8	8	0	8
	Fellow	6	0	6	0	6	6
	Total	13	1	14	8	6	14

NOTE: There was no response from 8 participants

APPENDIX E

RECRUITMENT LETTER AND INFORMED CONSENT

Dear IABA member,

My name is Mary Figuero and I am pursuing a doctoral degree in Curriculum and Instruction at Texas & M University. As a former Mathematics teacher who taught for 20 years, I am interested in the experiences of African American males who have experienced success in Mathematics. My study is entitled, Exponential Genius: How African American male actuaries develop mathematical expertise and I am writing to request your voluntary participation. This letter will explain the purpose of the Exponential Genius research, detail your involvement and review key federal protections of which all research participants should be aware.

The purpose of this study is to:

1. Identify common life experiences of successful African American male mathematicians.
2. Identify the strategies used by African American males to become successful mathematicians.

Your potential involvement will include:

1. Complete the consent form;
2. An hour long interview with a half hour follow up session

Your Federal Rights include:

1. Participation in this study is completely voluntary. You may withdraw participation at any point during the study with no penalty. Your participation and/or withdrawal from the study will not negatively impact your relationship with your organization. During the interview, you may decline to answer any of the interview questions or stop the interview at any time without penalty.
2. Information shared during interviews is confidential (not made public in a manner that will allow you to be identified). All data collected will be anonymous (your name will not be linked to data). Quotations from the interviews may be used in reports but will not include your name or identifiers linked with quotes.
3. With your written permission, the interview will be audio recorded and transcribed into text for analysis. The audio files will not have your name written

on them nor stated during the interview. These audio files will be converted to text files, stored on a secured Texas A & M server and the original audio files deleted after the defense of my dissertation.

4. There are no known or anticipated risks to participants in this study, but you are asked to refrain from disclosing what you share during your interviews with others because it reduces your confidentiality and anonymity.
5. For questions about your rights as a research participant, to provide input regarding research, or if you have questions, complaints, or concerns about the research, you may call the Texas A&M University Human Research Protection Program office by phone at 1-979-458-4067, toll free at 1-855-795-8636, or by email at irb@tamu.edu.

If you would like to participate in the interview, have any questions regarding this study, or would like additional information to assist you in reaching a decision about participation, please contact me at (832) 253-5136 or email at acharles8877@gmail.com.

I look forward to speaking with you and thank you in advance for your assistance with this project.

Yours sincerely,

Mary Figuero, PhD Candidate

I have received and read the informational correspondence about the, *Exponential Genius: How African American male actuaries develop mathematical expertise* study conducted by Mary Figuero from Texas A & M University.

I have had the opportunity to ask any questions related to this study, to receive satisfactory answers to my questions and any additional details I may request.

I am aware that I have the option of allowing my interview to be audio recorded to ensure an accurate recording of my responses.

I am aware that excerpts from the interview may be included in any dissertation and/or publication emanating from this research with the understanding that quotations will be anonymous.

I have been informed that I may withdraw my consent at any time without penalty.

I was informed that if I have any questions about my rights as a research participant, to provide input regarding research, or if I have questions, complaints, or concerns about the research, that I may call the Texas A & M University Human Research Protection Program office by phone at 1-979-458-4067, or toll free at 1-855-795-8636, or by email at irb@tamu.edu.

I will retain a copy of my signed consent form for my records.

With full knowledge of all foregoing, I agree, of my own will, to participate in this study.

I agree to participate in this study.

YES NO

I agree to have my interview audio recorded.

YES NO

I agree to the use of anonymous quotations in any thesis and/or publication that comes from this research.

YES NO

Participants Name: _____ (Please print)

Participants Signature: _____

Date: _____

APPENDIX F

AUTOETHNOGRAPHY

Four years ago, the researcher was a mathematics teacher at an urban public school. During that time, the academic achievement of the African American male was always the subject of concern at staff meetings and data analysis meetings. I regret to say, but I do not believe this concern was inspired by a genuine concern for what failure meant to these young men, but concern for our personal and professional reputations as teachers. It is with great consternation that I must admit that I cannot identify with any measure of confidence, one school wide intervention, which proved helpful to the young African American males who seemed to be the topic of every data disaggregation meeting. Rather it appeared that most of the interventions seemed only to intensify the general notion that the African American male was a problem.

In addition to this concern for the African American male student, there was also a very personal interest in how these men became successful in mathematics because my now ex-husband was having challenges with passing the first actuarial exam. My ex-husband who was a certified mathematics teacher did not seem able to pass the first professional examination even though he was always very successful when he completed practice exams or enrolled in classes. I could not understand why this man who demonstrated such ability in all of the assessments given by the best actuarial preparation agencies could never manage to get over the exam hurdle. Students who he would work with and help would be successful and he would himself be unsuccessful. I

saw what his failures did to his confidence in himself and in his hopes for a brighter future. He was in many ways a living conundrum, which needed to be understood for his personal good and for men like himself. His experiences also seemed to mirror in part what I was finding in the classroom. I noticed that there were male African American students who attended my tutorials (but were assigned to other teachers) who seemed very capable yet would be unsuccessful in the State assessment. I also began to wonder why so many of my male students were consistently more successful than their peers. Year after year the questions and the quest for solutions would haunt me until I eventually decided on an alternative route and that route took me to this investigation.

I resigned from my job as a mathematics teacher 4 years ago when the newly appointed female African American Principal of the middle school where I taught finally voiced her refusal to my persistent request to have only male students assigned to me. Previously, she was an Assistant Principal at the school so we knew each other well and I felt reasonably sure that she would respond in the affirmative to my request. I will always remember with some consternation, the reason for her decision and it was ultimately her reasoning, which “fired me” up to resign. I was struck by the incoherent logic between her opening thoughts and the rationale she offered for her decision.

She began by acknowledging that there could be no doubt that I was doing something right since the boys I served, consistently demonstrated higher passing rates than the African American boys in other classes. She joked about the basketball and soccer games that I faithfully attended for years and my rambunctious support of the students over the teachers at teacher/student basketball games. After we recalled some

amusing experiences, I felt reasonably comfortable that she was going to say that for those reasons she was willing to give it a try. Instead she pronounced that she could not because it would be unfair to the White sub group because she needed to make sure that their performance did not further downgrade the school's rating. She explained that their passing rate had fallen in consecutive years and that it was being monitored by District Personnel. While my initial reaction was to at first criticize her logic, I remembered almost simultaneously that I heard a similar comment voiced at least twice during the data analysis meetings, which followed district wide assessments.

On one of our more memorable data disaggregation meetings, the scores of the White students oddly enough became the focus of the discussion. It was an unusual turn because we were all used to the focus being on the African American male's performance. The shift in focus was inspired by an initial comment, which seemed innocent, practical and a very valid perspective. I was looking forward as always to an open and serious discussion of the comment which now in hindsight must have seemed incendiary to the white teachers on staff.

A young female African American teacher made the comment that too many of her "boys" were assigned *In School Suspension (ISS)*, and that they could not be expected to be successful if the trend continued. Everyone in the room understood that she was talking about her African American male students. We also all understood that "zero tolerance" adhered to, most stringently by the White teachers or the more inexperienced teachers was at the root of the high incidence of ISS and Out of School suspensions for African American male students. The young teacher's comments

immediately brought to mind the teachers who we all knew were strict observers and enforcers of Zero Policy. Under Zero Policy tolerance, harsh punishment is meted out to students, without regard to the circumstances. The consequences are usually expulsion or suspension.

It was not uncommon to hear teachers joke that they would “not get angry but get even”. Others would smugly comment about “the power of the pen to get rid of problems”. These were the teachers who were firm believers that the slightest infraction needed to be curbed or else anarchy was the sure result and that instruction would not (under their watch) be a casualty of the undisciplined child who cared nothing for their (his) education. I was hoping for a lively discussion aimed at revamping the criteria for In School Suspension (ISS) but that did not happen. Instead the conversation took an unusual turn, and an older White female teacher interjected that she felt our focus on the African American student was “hindering the academic success of the White Student” she then began to engage in a bit of data analysis of her own. She was prepared and it was a thoughtful diversion. This was the first time that I heard anyone express concern for the White students who were doing very well and I was frankly shocked that she was expressing concern for the 4 White students who failed the most recent District assessment. In her data analysis monologue, I remember thinking to myself that she neglected to mention that of the remaining White students in the school they were all in the Gifted and Talented program and that they were all faring quite well. She also did not mention that over the years the numbers of White students in the school was declining steadily so that with smaller numbers of White students the failure of one or

two students hurt the average passing rate for the group more than it would for a group with larger numbers. How could she be more concerned with 4 White students when ten times that many African American students were failing? In my mind at the time, the African American students were either invisible to her or not worthy of concern. It was ultimately this argument, i.e. that the school had to be sure to cater to the very small white population which ultimately inspired my Principal to refuse my request to be the instructor of record for only male students. Her argument infuriated me, not because I felt that there was no need to pay attention to all demographic groups, but because she seemed willing to minimize the attention that the larger group needed to appease the minority, which was by far the most successful demographic group in the school.

I have been a Texas certified educator for 13 years. During that time, I prepared students for 3 iterations of the state assessment in mathematics: Texas Assessment of Academic Skills (TAAS), Texas Assessment of Knowledge and Skills (TAKS) and most recently The State of Texas Assessment of Academic Readiness (STAAR). During those years, the trend in the performance of African American males in mathematics remained much like it now is.

Before coming to Texas, I was a teacher at a Private Denominational school in Hartford, Connecticut. My first teaching experience in Texas was at an Urban Intermediate School. I spent my first days at the school in a state of confusion. Having come from a Private school, Texas education seemed unnecessarily rigid and predictable. For the first time in my professional experience, lesson plans were expected to be homogenous across grade level, department and district and students did not have recess.

I was accustomed to a certain amount of autonomy in my previous teaching positions, and I struggled. After some time, I realized that all schools in the District adhered to some form of micromanagement though to lesser or greater extents. My school was luckily for me, one of those schools where micro management was pervasive at every level, even so far as the work of the custodians. After four years in this environment and after much opposition from my Principal, I negotiated something of a surprise transfer to a less austere Middle School in the District, from which I eventually resigned.

It is insufficient to loosely offer a critique of the unnecessary stringencies of the school's administrative practices without an example and a brief history of this, my first teaching appointment in Texas. An example is also important because it helps to contextualize how my current philosophy of education and interest in the African American male mathematics student has evolved.

The female Principal at this my first teaching position in Texas was a female African American woman. I might insert here that for both schools where I was employed as a mathematics teacher, both of the Administrators had been African American females. Where were the male administrators?

I arrived for the interview an hour late. I arrived from New York the day before the interview and had a day to rent a car and drive to the location. On the day of the interview I printed the directions and prepared for a two-hour trip to a completely unknown territory. On my way there, I took several wrong turns and not having any GPS in the car I could not find my way to the school. I had to stop several times and ask for

help. I also did not own a cell phone at that time so I could not call to explain my delay. Eventually, 2 hours later, I made it to the school and met with the Principal.

When I arrived, I promptly attempted to explain the reason for my delay. Her response was uncharacteristically kind. It had been a hard day for her as well because the spouse of one of her Assistant Principals' died the night before and that I actually arrived at the best possible time. The interview went well and it ended with her stating that she met with 12 other applicants for the position and that none of them met with her approval and that I was the one that she had been waiting for. I was hired on the spot. She made a call in my presence to District Personnel, asking if I could come over to the office first thing in the morning. Believing in fate, I happily accepted the position. In about a week, my family and I moved and looked forward to what I believed to be a God appointed position.

Within the first week at the school, there were a number of practices that I could not understand. Yet for every strange and unnecessary Administrative directive, I simply complied, because frankly the transition to a new state is a stressful process filled with grave uncertainty: securing a job was a welcomed release from the unpredictability of my situation so I simply accepted all of the burdensome and unexplained demands.

Weekly staff meetings began at 7am. The agenda was almost always the same. The meeting was held to share with staff, things, which to my mind could have been communicated via email. I rarely questioned the merits of the activity because in addition to being thankful for the job, the school was "high performing"-they must have been doing something right.

As the years went on, the “majoring in minors” as I called it behind closed doors, continued and each year the school’s academic rating declined. It was frankly very difficult to teach when there were so many other duties that robbed us of the time and opportunity to plan for effective instruction. After the third year, I began to be more vocal and less accepting of the pointless busyness. One example of this unnecessary busyness, which comes to mind is, the annual meeting whose sole purpose was to have teachers bubble in the personal information for students who were taking the IOWA test of Basic Skills. This was an intermediate school and students should have been able to bubble in their information or the district should have done this so that teachers would not have had to spend their time doing clerical work. With each new senseless activity, I became more and more frustrated because there was less and less of me available to plan for instruction.

A few months before I left the school, the Principal walked into my room to complete an observation. Before she left, she walked over to one of my bulletin boards, tore it down and asked for tape to “do it right.” I was in shock and the students reacted. The benefit of hindsight, has now allowed me to realize that my objections which were now no longer silent, were finally being recognized and chickens were coming home to roost: She was upset with the questions I had been asking. The day after the observation, I received a copy of my appraisal and immediately responded by requesting a conference.

We began the meeting with feigned courtesies because we were both upset. When the incident which prompted, the meeting was eventually brought to the fore, i.e. the tearing down of the chart in the class and her written and verbal comment that a

classroom should be visibly appealing, I responded with uncharacteristic venom, which to this day shocks me and those that know me. I had frankly grown very weary of all the efforts to demand more from teachers. I felt that most of the activities were created to impress District personnel and that the school was a place that did not take education seriously. I felt that it was all a bit hypocritical. All of the activities appeared to be aimed at giving the impression that the school was a highly functional and organized system, which was really predicated on the view that appearances matter. It was this frustration that gave birth to my response, which was, “I am sorry but I am here to decorate minds and not walls.” I felt that so much of what characterized my day as a teacher had less and less to do with the student and more and more to do with the externalities prompted by the accountability requirements associated with No Child Left Behind and of course, the Principal’s need to be seen as efficient.

The entire philosophy of accountability, at the root of No Child Left Behind bothered me and continues to bother me. It bothers me because at its foundation, the underlying assumption is that pedagogy, is improved by micromanaging teachers and that student achievement is only influenced by instruction. Students need so much more in order to be academically successful, especially students who are considered at risk of success.

It is this focus on accountability, which often inspires a myriad of programs, activities and interventions, which I think has derailed the essential objectives of education. Accountability has mandated that teachers keep records of communication with parents. Accountability has demanded that teachers, analyze data in terms of race

rather than objective and the list of things aimed at improving performance have had a counter impact because it has stretched teachers to the extremes. It has also not served many students well because students are not inanimate objects. We cannot teach content while ignoring the fundamental humanity of the students we teach. Very little of what is done under NCLB allows us to cater instruction to meet the social and psychological needs of children. Students cannot be expected to learn if the challenges and issues relevant to their lives are ignored.

After that experience, I was able to pull off something of a coup d'état. The principal did everything to prevent me from negotiating a transfer, but eventually I was hired by a Principal who was impressed with the performance of my students and decided to hire me in spite of the negative assessments I knew her to be offering to Principals interested in hiring me. Finally, after about three years of failed attempts to transfer I was accepted to a middle school, which was 8 minutes from my house. At the time of my hire, my reputation as a mathematics teacher could not be questioned because of the District's scrupulous attention to each teacher's successes and failures with students.

The middle school I transferred to, at the time was called the Country Club of Middle Schools in the District and it was from this school that I eventually retired. The school was on the border of two Districts and had in earlier years the highest enrollment of White students in the District. The Principal was a White male who had been the Principal for over 20 years. There was no hidden agenda on his part when he hired me. He needed me to help with the passing rate of "troubled groups". I knew even back then

that the African American male represented that troubled group. I began my career at that school fully aware that I was hired to solve a problem-the problem of the African American male student.

My now ex-husband was at the time also a mathematics teacher at a high school. He had enjoyed amazing success with the African American boys and I would listen to his stories of his interactions with the students. He would say that he was not a particularly good teacher but that he got good results because he invested in building strong relationships with his students. While I had known this from my years in the Intermediate School, I made an intentional effort to infuse that philosophy into my daily plan at my new school. I therefore became known as the teacher with the odd accent who went to every basketball game and every track meet. Very soon, boys from other classes wanted to come to my class and the boys in my class continued to show amazing academic growth.

A fond memory comes to mind, which has shaped my philosophy of education and my deeply held convictions about the male African American learner. One year, I had a particularly rowdy seventh period class. In that class, I worked especially hard to nurture and encourage my African American male students many of whom were student athletes. Then, in January as often happens in schools serving racially diverse and economically impoverished populations, a new student was added to my 7th period roster. The student was an African American male who was almost non communicative. He was a large boy and his grizzly like temperament kept him isolated. He did not seem impressed by the camaraderie and rough housing that sometimes characterized

instruction. He remained aloof and expressionless. In spite of my efforts to motivate him he would not budge from his sour demeanor. Then one day, when I insisted that he complete an assignment he got up and shouted that he was not going to do and insisted that I better get off his (expletive) back. It was then that the group of both boys and girls in the class turned full throttle on him and told him that he could not speak to me like that. They demanded that he apologize. The situation went on for a tense 4 or 5 minutes until he eventually relented and with that he was immediately accepted into the fold and the lesson continued as though nothing happened. The next day, this gruff young man came to class, said nothing and completed all assignments as best as he could. In hindsight, zero tolerance would have insisted that I issue a referral and have the student dismissed from class and then the cycle of rejection and missed academic opportunities would have continued for another Black boy. That experience was one that I will forever remember, as a moment when the power of the village overcame. The student eventually did not pass his mathematics test. He was far too behind from years I expect of similar situations that did not end quite the same and where he was immediately dismissed from the class to sit for days without any academic interventions. Zero tolerance is truthfully a dishonorable practice. I also learned from that experience, that students need to have meaningful connections with their teachers and that often teachers are the best line of defense for students facing challenging life circumstances.

Yet another experience comes to mind and this one quite possibly represents my best and most cherished memory of teaching which has shaped my educational philosophy and pedagogy. While this study is dedicated to the male African American

student of mathematics, this story is about a Hispanic female student. And while the story does not conform to the focus of this study it can be applicable because it is about a student who everyone believed would fail much like the overriding stereotype of the African American male student of mathematics. Additionally, I tell the story here because the experience became a hallmark strategy, I employed to encourage excellence in mathematics for all students.

Within two years of teaching at the new school, I began to use the first 10 minutes of class to begin with a motivational story or quotation. In those days, a mathematics class lasted 90 minutes and I could comfortably invest in a brief story telling session without fear that I might not have enough time to cover the content.

The story that I will now briefly recount soon became my favorite and every school year it was the story that I would first tell students. The story became my favorite for the response it inspired months later in this particular female student and because it always seemed to resonate with the students. The story, which I will here recount, has even been retold in the teacher preparation classes I taught and the reactions were always significant.

All teachers should be performers. A teacher who is unable to make instruction interesting and illustrations come to life in the students' mind is often ineffective. While strong academic content is most definitely a requirement, strong academic content should be housed in a lively, vivacious, somewhat shameless, carefree character. I am not innately that person but I learned that it was important to be a good story teller because I knew that it was having an effect on my students and the harder I worked at

engaging them, the more attentive they became and the more adept I became. After a while the students would rush to class to be on time to hear the story and then when they were all ready and attentive, in my most dramatic persona I would begin the story of the day.

This, my favorite story begins with a tragedy as some lives begin. A young bird falls from his nest and gets lost in the forest. He is unable to fly and thus makes his way through the forest by way of hops and leaps. Eventually, the young bird comes to the edge of a farm. There he joins a brood of chickens, dutifully following their mother. The young bird is soon adopted by the family of chickens and comes to regard the mother hen, as his mother.

The young bird lives the life of a chicken. He keeps his head down and picks at whatever bits of corn he can get and learns well the ways of the chicken. He clucks like they do, walks like they do and partakes of all the daily chicken activities. Even though he looks a little odd, his mother is pleased with his development and continues to nurture and instruct him in the ways of "*chickenhood*".

Then one day, the young chicken looks up and notices a bird, flying with great grace and majesty. He gets so preoccupied with this creature that he forgets for a moment that he needed to keep his head down to gather as much corn as he could. Shortly thereafter, his mother abrades him for his lack of attention to what should concern him. He then asks his mother to look up and asks, "Mother, what kind of bird is that?" To which she replies, "That, my son is an eagle." The young bird continues to look up and mutters to himself, "I sure wish I could do that!". To which his mother

sternly replies, “No son, you could never do that. You are just a chicken. Put your head down and gather what you can.”

Yet every day the young bird would cast his eyes heavenward, to view the object of his admiration. Then one day he separates from his brothers and sisters and climbing up onto the tallest chicken coop that he could find began to flap his strange wings. He leaps from the coop only to go a slight distance and then to crash into the ground. He completes this ritual every day and finds that his odd looking wings only seemed to be getting in the way and he was not quite sure what to do with them- his brothers and sisters did not look like he did so he had no example of what he should do with them. All he knew was that he was odd. Today, as I write about that story I find even deeper significance in the so-called odd-looking wings of the young bird. Might our African American male students experience their difference as an oddity and not really manifestations of the strengths peculiar to them?

The young bird continues looking at the eagle in the sky and the older he gets the less he fits in with the other chickens because his wings are now monstrosities that he has no control over. He continues his ritual of climbing to the highest point he could get to and then taking a leap of faith, attempts to reach the object of his dreams. Finally, one day, he dares to climb to the top of the farmer’s house because he notices that each day he seems to be going a little higher and going a little further.

Then as he leaps off of the farmer’s roof, he instinctively begins to flap those odd wings of his and the more he flaps the higher he goes. He continues to go higher and higher and soon begins to soar above the farm. He can no longer see his family but

instead meets that fascinating bird, and as he approaches the bird, he realizes that the bird looks like he looks. He stares at this creature he has idolized for months and in that moment realizes for the first time that he is not so different from his role model. It was then that the once lost bird learns that he was always an eagle but lived the life of a chicken. And here again, as I write, I wonder if the story held such appeal for me and my students because it validates the need and benefits of having inspirational characters in the lives of children; characters who are able to push, pull and encourage us to believe that we can reach for and achieve remarkable goals.

Each time I end the story there is a hush in the room. Once or twice I remember students clapping. The ensuing discussion has always been provocative. Then, as a result of that transformative moment, I would throughout the year, say to my students' variations of the following: "Are you a chicken or an eagle?" "Why are you behaving like a chicken?" "Stretch those wings" and at odd times, students themselves would come up with derivatives of those thoughts and it would inspire us all to press on.

Teresa (pseudonym) was the student I remember who had the most meaningful and memorable reaction to this story.

Teresa never passed mathematics and was targeted for after school tutorials and a series of interventions. Students are often mandated to attend tutorials based on their previous performance on state tests and their current performance on District assessments but most, having been discouraged from years of failing and failed interventions are reluctant to attend. It is hard to convince a child who has failed a test

for 5 years that attending tutorials will make a difference. Yet, Teresa attended tutorials every week and often would ask for help when the other students left the room.

In March of each year when results from the first administration of the test are released students are called out of the room and the teacher privately shares with the student their results. This was not unique to my school. Students are informed so that if their schedules need to be adjusted in preparation for the second Administration of the test, they are aware of the reason for the change. By eighth grade, students understand and are familiar with this process.

Teresa was called out of the class like all students. She was clearly nervous. Her eyes remained averted. When I told her that she passed, there was no expression on her face. She seemed not to hear me. I congratulated her and sent her back to the room, because I had to inform each student before the period ended. When all of the students in the class were told, I returned and after a few minutes, I saw that Teresa had her head down and the students all said that she was crying and of course they all assumed that she had failed. Breaking with protocol, I went to her and asked her why she was crying. Sound practice and issues of confidentiality advise us that we are not to publicly reveal a student's results. However, in this particular case, I felt that I had to reveal to everyone that Teresa did pass her test. Everyone could learn a lesson from her success-it was what educators call a teachable moment. I also desperately wanted to defend her so I told the entire class that she passed the test. Yet, even as I told the class she remained, it seemed, despondent. I continued to cajole and encourage her for a few minutes. Eventually after a few minutes she looked up and with tears in her eyes, half asked, half stated, "Ms.

Charles, am I an eagle?” To which I slowly replied, “Yes, honey you are an eagle.” The story does not end there. No more than two years later, Teresa came to our school to participate in a pep rally. She was one of the cheerleaders. She found me and came to tell me that she was doing very well in Math and was now in Algebra 2, which is not a required class. My heart lit up when she told me this and all I could manage was to remind her that she was in fact an eagle. Hopefully, her success can be a source of motivation for her family members and others in her community. And if her success was predicated on the lost bird’s ability to reach to heights not imagined, can we not similarly focus on the success of African American male actuaries to inspire other African American students of mathematics?

Over the years, my students would often remind me that they were eagles but the experience with Teresa was the first and by far my most poignant memory based on her history of failure.

Years later when I encountered past students they would remind me of the story or I would remind others who appeared to have become disengaged with ambitions of going to college. The academic literature has confirmed that my efforts to provide a counter narrative, is in fact helpful in turning their academic trajectory around.

A few years later, I no longer had the luxury of telling motivational stories because the master schedule was changed and instead of teaching 3 classes per day with each class lasting 90 minutes, I now taught 7 classes a day with each class lasting a little over 45 minutes. I did not enjoy the change. Before I knew it, I was so focused on instruction that I forgot that I was not just teaching mathematics, but I was teaching

mathematics to *children*. In hindsight, this shift to teaching a core subject rather than teaching kids a core subject was the beginning of the end of my love affair with teaching. It signaled the end of my love affair with teaching, because it was straining the loving connections I believed necessary for effective and impactful instruction. I now firmly believe that the focus on performance has not helped teachers to become better instructors but has instead forced us into a mold that seeks self-preservation rather than the noble and lofty ideals of education.

The demands of No Child Left Behind required so much from me as a teacher that I unintentionally went into what most teachers call *survival mode*. My instruction ceased to be innovative and inspiring. I was simply trying to cover the material in preparation for the next test. In addition to the pressures of the test, there was the obvious concern for my reputation. For years, I was the teacher with the highest passing rate and by virtue of that ranking, I was the teacher charged with preparing students for the second and third administrations of the test. As the years went by it became exhausting and I could feel myself losing my very personal connection with students. I soon became that teacher who had no patience with the student who was off task and I was too exhausted to attend any after school games. I also became that teacher who began to find merit in was the Zero Tolerance mandate, which I previously hated so much. In hindsight, there is no surprise that the performance of my students began to diminish. It was this realization that inspired me to make the request that I teach only the boys. I wanted to recapture and reconnect with my male students and with my beliefs about how children particularly African American boys should be taught. When my

Principal said no, I knew that the situation as it existed would not allow me to reconnect with the methods, which for many years had served students well. Once again, as I prepare this narrative, I wonder how many teachers who once being committed to students and effective pedagogy have become burned out and inefficient by unnecessary and burdensome tasks that have little to do with instruction. Within 4 days of my Principal's refusal to allow me to reconnect with my first love, I turned in my resignation. I had received my acceptance from the Department of Teaching Learning and Culture yet was not sure if it was the best decision. Maybe it was providential that my Principal refused my request because had she responded in the affirmative, it is unlikely that I would have followed through and actually began this venture. And just like that, I decided to dare to soar like the lost bird of my story.

When I began this adventure of pursuing a Ph.D. I was employed by the university to be a methods teacher to elementary mathematics teachers. The other part of the position required that I perform the duties of Field Supervisor to beginning mathematics teachers. As I prepared the syllabus for my classes, I decided to include activities, which I believed would inspire student teachers to give the students in their care, the confidence needed to believe that they could be successful in mathematics. Thus, many of the activities I created were born from a sincere desire to debunk the myth that only some students are good at math because of innate abilities or propensities.

Like Darling-Hammond (2010), I have concluded that while NCLB may have had noble aspirations, it has produced results counter to its intentions. The accountability

demands often push teachers to becoming unfeeling automations that focus on product and largely ignore the needs of the client- the client being the student.

There have been many questions and frustrations about educational enterprise, which have been addressed in my coursework at Texas A&M. Yet, there remain many unanswered questions and perplexities. It seems as though there remain as many questions as there now are answers. My experiences as a mathematics teacher of African American male students, my coursework at Texas A&M and my experiences as the wife of an African American male who has struggled with success in mathematics has given birth to what I expect to be my lifelong commitment to cultivating successful African American male mathematicians.

While my interest is primarily with the African American male student of mathematics, it would seem to be counterintuitive to focus on actuaries, who on the surface appear to be very different from my target interest, i.e. the male *student* of mathematics. However, often times the best way to understand a phenomenon is to look at the ideal rather than models, which fall short of the ideal. It would seem that current educational research endeavor has followed a logic, which prefers to focus on the apparent weaknesses of African American males in mathematics rather than the strengths, which exist. I am arguing therefore that we should use representations of the desired outcome as the model for young African American males in schools. Only when we understand the exemplary model can we hope to create a plan for African American males in schools. The young eagle did not become successful, while focused on the

chickens he lived with, he realized his potential only as he focused on his ideal. It is that logic which ultimately drives this approach.