THE RELATIONSHIP BETWEEN TEACHERS’ WARM DEMANDINGNESS AND
THE MATH ACHIEVEMENT SCORES OF AFRICAN AMERICAN MALES IN
MATHEMATICS

by

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THE RELATIONSHIP BETWEEN TEACHERS’ WARM DEMANDINGNESS AND THE MATH ACHIEVEMENT SCORES OF AFRICAN AMERICAN MALES IN MATHEMATICS

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DEDICATION

I dedicate this dissertation and doctorate degree process to my spiritual father, the late Bishop Eddie L. Long. For without the Word of God in the mouth of Bishop Long and his vision casting, I would have never thought that I could accomplish this goal of getting my doctorate degree. He taught me that God sometimes gives you a vision for your life that takes God to believe God. If it is beyond your ability, then you know it is God. Getting this doctoral degree was definitely beyond anything I could have ever thought I could accomplish. But God!
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ABSTRACT

ZENJA L. EVANS
THE RELATIONSHIP BETWEEN TEACHERS’ WARM DEMANDINGNESS AND THE MATH ACHIEVEMENT SCORES OF AFRICAN AMERICAN MALES IN MATHEMATICS
Under the direction of JEFFREY HALL, Ed. D.

The purpose of this study was to provide quantitative correlational data on the relationship between a warm demander teacher and the academic performance of African American male students in mathematics on the End of Course Test (EOCT). Research on a warm demander’s effect on academic performance of students has in general been qualitative. This research was designed to provide quantitative data to support the claims of the qualitative research.

Based on the review of literature, warmth is the term used in qualitative studies; however, student-teacher relationship is used in quantitative studies to identify the same concept. Therefore, this study used a Student-Teacher Relationship Scale (STRS) developed by Pianta (2008) to measure the warmth of a teacher. Per the STRS, subscale closeness measures the affection and warmth of the teacher. The word warmth is synonymous for closeness. The Survey of Individual Beliefs was used to evaluate the teachers’ demandingness in the classroom.

Four African American female mathematics teachers of 9th and 10th grade students participated in the study. Teacher completion of a survey on each student determined teacher warmth towards the student and the EOCT scores of 94 African
American males. The study utilized hierarchical model selection. Using warmth and demandingness, \(-2\) log likelihood was used to determine the best model for predicting math EOCT scores.

Warmth, statistically significant with a medium effect size of \(R^2 = 0.36\) in predicting EOCT score, accounted for 10% of the variance. Teacher effect accounted for 24.97% of the variance in EOCT score. Although, demandingness was statistically significant using the Kolmogorov-Smirnov test, demandingness was not normally distributed. Therefore, the results using demandingness did not have much strength in predicting EOCT score, but it indicated some significance in predicting EOCT scores.

Future research recommendations included increasing the sample size of teachers so conclusions can be drawn from the data. In addition to the inclusion of various teacher ethnicities, as well as of the male gender, identification of teachers as warm demanders can occur prior to inclusion in study, perhaps through a specified evaluation tool.
CHAPTER 1
INTRODUCTION TO THE STUDY

In 1997, African American students were documented as underperforming when compared to European American and Asian students (Ladson-Billings, 1997; Lee, 2006; Lubienski, 2002; National Center for Education Statistics, 2007, 2009; Tate, 1997). However, the underachievement of African Americans compared to their White counterparts has been a matter of concern since the 1950s (Ladson-Billings, 2006). Mandara (2006) stated that African American males are subject to school suspensions more often than the African American females are, and consequently experience lower grades and test scores. In addition, the Office of Civil Rights (2000) reported a disproportionate amount of African American males in special education, alternative schools, and remedial classes. Dyce (2013) argued that something must be done to stop the “inequalities, marginality, and oppression that is devouring Black male creativity, sense of academic and self-efficacy, masculinity, and ability to contribute socially, culturally, and politically to this multicultural nation” (p. 166). African American males must be held to high expectations, for they have the same ability and potential as females and other ethnicities (Howard, Douglas, & Warren, 2016).

Noguera (2003) suggested that a better understanding of how African American males experience school and interact with adults is necessary. Milner, McGee, Pabon, and Woodson (2013) contended that African American males must view the teachers as a
source of support and affirmation and experience a curriculum that is both challenging and relevant. African American males benefit greatly from having a strong student-teacher relationship while “establishing common ground rules, developing subject mastery and care, and reaching out as well as going beyond” (Howard et al., 2016, p. 4). In general, teachers have not deemed relationships with their male students as important; however, the relationship between the African American male student and his teacher is vital, especially with the vulnerabilities and hardships associated with urban life in America (Nelson, 2016). Reichert and Hawley (2010) discovered an important relational finding: “Boys experience their teachers before they experience the lesson they teach” (p. 11).

The African American male underachievement has partly been attributed to the lack of relational learning of schools (Raider-Roth, 2005; Reichert & Hawley, 2010). African American males have identified quality instruction and quality teacher-student relationship as pivotal in their ability to succeed in the classroom (Nelson, 2016). Based on the synthesis of research, Cooper (2002) stated that effective teachers of African American students

(1) are committed to the black community and provide a sense of family,
(2) promote positive racial identity,
(3) help students to succeed in school endeavors, despite the racist nature of both the institution and society in general, by using alternative instructional methods when necessary,
(4) take personal responsibility for their students learning,
(5) know their subject matter, and

(6) are demanding of students in all areas, including curriculum and discipline.

(p. 52)

According to qualitative studies, a teacher who is a warm demander can help increase the academic achievement of African American males. Ware (2006) explained that a warm demander is a teacher who sets clear boundaries for students, demands high performance from them, and at the same time provides support and encouragement to achieve academically in a very humanistic manner.

Statement of the Problem

The influence of the warm demander on the academic achievement of the African American male in secondary education has not been explored extensively from a quantitative research perspective. Kleinfeld (1972), who coined the phrase warm demander, conducted a quantitative study on urban Eskimo students to establish the different personality traits of teachers. However, since this study, the remaining studies on warm demanders have been qualitative case studies, and none conducted exclusively on African American males in a high school mathematics class.

Purpose of the Study

The purpose of this study was to quantitatively show the best indicator of African American male student performance on the math End of Course Test (EOCT). This quantitative correlational study utilized hierarchical model selection to determine the best model for predicting the academic achievement of African American males on the mathematics End of Course Test (EOCT). Data generated from two surveys completed
by teachers, one soliciting teacher perspectives regarding their warmth towards individual African American male students in their class, and the other soliciting the teachers’ expectations and demandingness in their high school mathematics classes.

Theoretical Framework

 Culturally responsive pedagogy (CRP) served as the theoretical framework of this study. African American students can lose their identity without culturally responsive pedagogy and teaching. Unfortunately, many attribute doing well in school to “acting White” (Ladson-Billings, 1994, p. 12). Therefore, many African American males have learned how not to learn (Ladson-Billings, 1994). Culturally and linguistically diverse (CLD) students avoid learning anything associated with European-American middle and high school culture because they believe the same effort will not render the same reward received by their counterparts (Stanton-Salazar & Spina, 2000). Chu (2011) identified three influential variables that significantly impact the education of students identified as CLD: “racial gap, social class, and cultural-ecological factors associated with involuntary minority status” (p. 201). African American students can be considered CLD students. As such, they need warm demanders attuned to the needs of CLD students.

The increase of African American students in the public sector paired with the decrease of African American teachers has serious implications (Cooper, 2002). The probability of an African American student being taught by a European American teacher continues to grow. The lack of academic success of African American students as it relates to standardized test scores, graduation rates, and college admission rates has been attributed to the inability of European American teachers to understand the viewpoints of
African American students (Cooper, 2002). However, Hilliard (1989) asserted that African American students can learn from European American teachers who are not culturally sensitive if the teacher has high performance expectations of students because the negative expectation tied to a systematic inequality of delivery makes it difficult for African American students to learn from European American teachers.

Similarly, McAllister and Irvine (2000) asserted that the cultural background of the teacher is not a key factor in the teacher’s ability to teach diverse students. African American teachers can also have low expectations of students based on race, socioeconomics, or personal biases (Cooper, 2002). Instead, it is the teacher’s ability to “construct knowledge of self, others and otherness” (McAllister & Irvine, 2000, p. 17).

Based on the research above, one of the ways to close the achievement gap of African American male students in the area of mathematics is for all teachers to attune to the students’ cultural differences with warmth and care while maintaining a high level of expectations from the student. The academic decline and gap between African American males and other ethnic groups in mathematics necessitate the need for all teachers, especially urban teachers of African Americans, to teach culturally responsive pedagogy.

Research Question

The following research question guided this study: What is the best model for predicting the math End Of Course Test (EOCT) scores of African American males using warmth, demandingness, and an interaction between warmth and demandingness as predictors?
Limitations/Delimitation

One limitation that posed a potential threat was the possibility that the teacher participants would select only students who scored well on the EOCT. To help minimize this action, the researcher asked teachers to complete the survey on all African American male students taught in the current academic year.

Another limitation was the objectivity of the teacher. Teachers possibly answered the survey questions subjectively as opposed to objectively.

The delimitation was teacher selection. Teacher selection was based on the criterion of teaching 9th or 10th grade math class with an EOCT. The researcher had no way of evaluating and designating the teacher as a warm demander before the teacher completed the survey.

Assumptions

The researcher assumed teachers completed the survey openly and honestly. The researcher also assumed the teachers answer the survey based on what was and not what they wanted or thought would be a favorable answer. Teacher honesty was a crucial component of this study. The teacher must be comfortable in admitting their warmth toward a student and demandingness in their classroom. Unfortunately, teacher perceptions of the warmth and demandingness present in the classroom are sometimes erroneous.

The researcher also assumed that a teacher’s warmth and demandingness affects student performance on the EOCT. However, if a student is academically advanced or deficient, then the teacher may not affect his or her achievement on the EOCT.
Significance of the Study

The decline in the academic achievement of African American males has caused many students to drop out of school and possibly move to a life of crime. This has been termed as a “pipeline” to prison (Lynch, 2015). The revitalization of African American males in their education could lead to their improved academic achievement and ultimately onto a different life path that culminates in them becoming a contributing member of society.

This study provides quantitative data to accompany existing qualitative studies related to the effect of warm demanders on the academic achievement of African American males. Several qualitative studies have been conducted on the effect of warm demanders on the academic achievement of students but few quantitative studies. There have been quantitative studies on warmth and demandingness completed separately. However, there have not been quantitative studies completed that combine warmth and demandingness of a teacher on the academic achievement of African American males.

Definitions of Key Terms

The intent of the following definitions is to assist the reader:

*Culturally responsive pedagogy* refers to the classroom praxis of teachers exhibiting sensitivity to the culture of their students and responding by altering their lessons to include students’ cultures (Irvine, 2002).

*End of Course Test (EOCT)* is a criterion test with norm-referenced assessment items. A criterion-referenced test is scored based on the number of answers correct,
which is expressed as percentage correct (Great Schools Partnership, 2014). The purpose of the EOCT is to “provide diagnostic information to help students identify strengths and areas of need in learning, therefore improving performance in all high school courses” (Georgia Department of Education, 2018, para. 3).

Response to Intervention (RtI) is the monitoring of a student’s achievement and response to high-quality instruction and implementation of an intervention in the case where the student is not achieving (Koellner, Colsman, & Risley, 2011).

Self-efficacy is “the conviction that one can successfully execute the behavior required to produce the outcomes” (Bandura, 1977, p. 79).

Title 1 “provides financial assistance to local educational agencies (LEAs) and schools with high numbers or high percentages of children from low-income families to help ensure that all children meet challenging state academic standards” (U.S. Department of Education, 2015, para. 1).

Warm demander is a teacher who sets clear boundaries for students and demands high performance from them while simultaneously providing support and encouragement to achieve academically in a very humanistic manner (Ware, 2006).

Summary

Since 1997, there has been a steady decline in the academic achievement of African American males. The purpose of this study was to identify the effect of warm demanders on the academic performance of African American males. This quantitative correlational study used hierarchical model selection to ascertain the best model of predicting the academic achievement of African American males on the mathematics
EOCT. This study fills a gap in the area of quantitative studies that sought to determine the impact of warmth and demandingness of a teacher on the academic achievement of African American males. The variables used in the models were warmth, demandingness and warmth*demandingness.

Chapter 2 offers a review of literature pertinent to this study. Chapter 3 provides a description and rationale for the methodology used to investigate the research question, as well as the criterion for participant selection, survey instruments, and data analysis techniques. Chapter 4 presents the survey results in the form of tables, figures, and narratives. Chapter 5 provides a discussion of the data results, addresses implications, and offers recommendations for future research.
CHAPTER 2
LITERATURE REVIEW

African American males tend to score less than their counterparts do on standardized tests. This situation has been attributed to factors such as desegregation, numerous suspensions of African American males, lack of culturally responsive teaching, and lack of relationship with teachers (Ladson-Billings, 1997; Lee, 2006; Mandara, 2006; Raider-Roth, 2005; Reichert & Hawley, 2010; Ware (2006). This study sought to determine the relationship between warm demanders and the academic achievement of African American males on the mathematics End of Course Test (EOCT).

This chapter begins with search strategy of relevant literature. Following this is an explanation of the theoretical lens that forms the basis of the need of warm demanders in math classes that teach predominately African American students. Next, the chapter provides the historical background of African Americans education in U.S. public schools, as well as a description of how public education has affected the achievement gap of African Americans with such policies as No Child Left Behind, zero tolerance, and testing. Also presented are a review and discussion of related literature regarding the characteristics and benefits of a warm demander, as opposed to other types of teachers, in urban schools. Finally, the chapter addresses the characteristics of an African American male and the ways a warm demander can improve his academic success in a mathematics classroom.
Search Strategy

The researcher used the following terms individually and conjunctively to search for articles and studies on the subject: *African American, male, teacher, motivation, intrinsic and extrinsic motivation, desegregation, warm demander, care, (math)ematics, math pedagogy, teaching math, curriculum, academic achievement, testing, engagement, assessment, culturally responsive teaching, culturally responsive pedagogy, prison, behavior, teenager behavior, discipline, student-teacher relationship, demandingness, expectation, and efficacy*. The researcher searched databases as well as the Mercer library catalog for books related to these terms. The databases were ERIC, Education Text (EBSCO), Dissertation and Thesis Full Text (ProQuest), MathSciNet, Psychology and Behavioral Sciences Collection, PsycINFO, and PsycARTICLES. The parameters included in the search were peer-reviewed, full text, studies, articles, and scholars’ writings related to the academic achievement of African American males in mathematics, with an emphasis on work done between the years 2004 and 2016. Review of articles and books that were applicable to the research yielded reference sections for other books and articles that proved useful in this research.

Theoretical Framework: Culturally Responsive Pedagogy

Culturally Responsive Pedagogy (CRP) refers to teachers being sensitive to the culture of their students and responding by altering their lessons to include students’ cultures (Irvine, 2002). The teacher must have the ability to connect the instructional content and the students’ cultural backgrounds (Irvine, 2002). Irvine (2002) identified the traits of teachers who exhibit CRP:
• the teacher having an attitude of respect toward varying cultures. The teacher must believe that every student can learn and have efficacy regardless of his culture;
• the teacher understanding the wealth of knowledge and experience that a student brings to the classroom based on their cultural background;
• the teacher being able to develop and implement rich and rigorous lessons where all students are able to learn (Irvine, 2002). Banks (2001) calls assimilationist ideology the ability of a good teacher to effectively teach any student regardless of their culture or social class; and
• the ability of the teacher to evaluate students fairly based on their cultural background. (p. 2)

Maximizing the learning experience of different cultures requires that culturally diverse students receive culturally responsive pedagogy (Irvine, 2002). To teach the African American male effectively, a teacher must include lessons that the African American male can identify with culturally. In addition, the cultural norms that the African American male brings to the classroom as a product of his household environment may create conflict in the classroom. The teacher must be able to distinguish between an act of disrespect and a cultural response not meant to be disrespectful. Furthermore, the African American male cannot be made to feel intellectually inferior or unintelligent with the dissemination of work that is not rigorous and challenging. The African American male thrives in an environment that challenges him to figure out complex problems. He feels a sense of accomplishment and pride in his
achievement and mastery of academically challenging work. Finally, the African American male needs to feel that the teacher cares about him as a person, as well as his success in the classroom. He responds favorably to a rigorous teaching style delivered in a caring and culturally responsive way. Warm demanders deliver rigorous lessons with the expectation that their students have the ability to achieve academically. In addition to giving challenging work, warm demanders are also willing to help students achieve. They will not allow the student to give up and not work to his highest potential (Ware, 2006).

Culturally Responsive Teaching

Culturally Responsive Teaching (CRT) drives the effectiveness of warm demanders as they teach predominately African American students. CRT is the understanding of how race, language, and ethnicity play a role in teaching and learning (Gay, 2000; Villegas & Lucas, 2002) and traditionally attributed to African American teachers because of their identification with the African American culture. The inability of European American teachers to relate to African American students is attributable to the lack of cultural synchronization, which refers to the lack of primary culture fits between teacher and student (Irvine, 1990).

Irvin (1999) termed the conflict that occurs between teachers and students because of differing cultural experiences as “cultural discontinuity” (p. 248). The lack of cultural synchronization is a contributing factor to the negative interaction between African American students and European American teachers. Based on voice pitch, tone, and speed, a teacher can misinterpret an African American student’s intentions (Irvine,
In addition to verbal differences, there are also nonverbal actions such as gestures, facial expressions and gaze subject to misinterpretation based on cultural norms (Irvine, 1990). Howard (2014) stated that Black males bring norms, values, and culture that are at odds with the school. Miscommunication, alienation, hostility, confrontation, and low self-esteem lead to conflict among the student, teacher, and school (Irvine, 1999). Based on prior research, the discontinuity between a student and teacher can lead to hostility and resentment, creating a perception of the African American male as disrespectful, whereas this may be a cultural norm for the student instead. A teacher must be willing to know a student before passing judgment on his actions or inactivity. A warm demander creates an environment of respect between herself and her students.

The components of culturally responsive teaching include ethics of caring, teachers’ beliefs, and instructional strategies and practices. Ware (2002) stated that caring for students can be demonstrated by “(1) giving time to students outside of the classroom; (2) listening to her students’ problems; and (3) encouraging problem students to grow academically” (p. 34). Walker (1996) found that an effective teacher is an involved teacher of the community who cares about the student like a family member. Walker (1996) further related that the teacher must be able to interact with the student relationally rather than just analytically. Howard, Douglas, and Warren (2016) shared this idea, for they believed teachers must acknowledge the cultural practices, language, point of view, and prior experiences that an African American male brings to the classroom. According to Ladson- Billing (1994), the primary focus of culturally relevant teaching is to promote academic achievement while assisting students in identifying with
their African American heritage. Specifically she noted, “Culturally relevant teaching is a pedagogy that empowers students intellectually, socially, emotionally and politically by using cultural references to impart knowledge, skills and attitudes” (Ladson-Billing, 1994, pp. 17-18).

Culturally relevant pedagogy includes cultural references in practices and curriculum (Ladson-Billings, 1994). Phuntsog (2001) referred to the intentional practice of building cultural knowledge and being reflective in practices as critical cultural consciousness, achievable when teachers engage in self-reflection of their personal beliefs, values, and behaviors (Gay, 2000). A teacher’s bias influences her teaching practices, as well as her response to students. Once a teacher is self-aware, she is better able to identify the cultural elements in a student’s behavior and modify teaching strategies accordingly (Gay, 2000). A key component of CRT is the inclusion of CRP in teaching. Based on research, the following conclusion can be drawn, although including culture in teaching practices is important, this must be in conjunction with skillful understanding and grasp of the subject content. The teacher must be able to teach the content effectively such that the students can understand and learn. An understanding of the history of African American history facilitates culturally relevant pedagogy of African American males.

Historical Background of African American Education

Irvine and Irvine (1983) stated that historically, the Black church stood at the forefront of African American education and nurtured African American students. Prior to desegregation, African American principals and teachers controlled African American
schools. They understood the unique circumstances of their students, and schools were free from European American control and domination. African American educators were dedicated to the achievement and development of African American students. In this regard, they served as warm demanders by enforcing high expectations of conduct and insisting on effort and achievement. A well-known warm demander was W.E.B. DuBois, who influenced the educational philosophies and practices of African American schools.

Hampton Idea

At Hampton University in 1906, Dr. W.E.B. DuBois delivered a speech that supported the idea of the integration of African Americans into European America through their attendance in liberal art schools and not just technical schools. DuBois believed that technical school led to employment, but an African American needed to be able to contribute to society both philosophically and culturally. He was trying to change the goal of Hampton, which was to limit African American males and females to industrial trades, and inspire them to reach for their highest potential instead. DuBois believed educating African American people in technical fields only perpetuated African American people being in subservient positions.

College-Bred Community

In 1910, DuBois stated that communities must create a culture of pursuing successful and progressive endeavors rather than destructive behavior that leads to death (DuBois, 1973). College-bred community does not mean that everyone must attend a college. However, there must be someone (even a small group) who can teach the culture and heritage of an individual. In 1910, there was a vast difference in the community that
existed between the North and the South in the United States. In the North, a man could get college training without attending college because his surroundings reflected college. However, in the South, the surroundings reflected teaching the African American male to be the perfect barbarian, perpetuated by the need for agriculture labor to work the rich soils. Southern European Americans would allow the higher education of African Americans if it were under the control and guide of European Americans. It was permissible for teachers at schools like Hampton and Tuskegee to educate African Americans, but they were not allowed to teach college curriculum.

To counteract this mentality, DuBois (1973) developed the idea of the Talented Tenth in which he argued that the most talented 10% of the Black community should be educated in the best liberal arts schools. Those 10% should then uplift the African American community. Conversely, Booker T. Washington (1901) believed African Americans should attend vocational school to support the ideals of hard work, thrift, and patience. The goal of both DuBois and Washington was to uplift and achieve the collective goals of the African American community (Hill, 2011). Although DuBois and Washington’s approaches to elevating the African American community were different, they both believed that education was the key to advancement of the African American community (Hill, 2011). However, desegregation proved to be detrimental to the educational attainment of African Americans.

Desegregation

DuBois (1973) and Hill (2011) agreed it was the school system’s purpose to provide workers who were able to do menial labor in factories in the Industrial Age. The
promotion of creativity and critical thinking was not the goal of the American education system for African Americans. Rather, the practice was to place African American students in schools and classes designed to train them to “be obedient and subservient, to submit to authority without question, to do menial jobs of manual labor for minimal wages, and to never interfere with the rights and privileges of Whites” (Hill, 2011, p. 3). However, southern schools broke away and began the teaching of African Americans within their own community by African American teachers and administrators. African American schools received limited resources in substandard buildings; however, African Americans received a high-quality education (Siddle Walker, 2001).

Unfortunately, the introduction of desegregation introduced a lower level of education for African Americans and relegated African American students to public schools that maintained the written and unwritten rules of race and class. Hill (2011) stated many believed African American students would achieve greater success if taught alongside European American, but in practice, this idea did not prove to be true. The integration of schools relegated African American students to the European American educational system, thus separating them from their heritage and community, as well as placing them with teachers who often exhibited hostility towards them and compared them to European American students (Patterson, Niles, Carlson, & Kelley, 2008).

After one year of desegregation, “African American boys’ autonomous achievement motivation change was significant for boys who transferred to a predominantly White school setting than those who remained in a segregated setting” (Veroff & Peele, 1969, p. 87). Veroff and Peele (1969) asserted that African American
males feel constrained by the high expectations placed on them in a desegregated environment as opposed to a segregated environment. Within a desegregated setting, their acceptance and sense of competence is connected to their athletic ability and not their academic achievement. In a social setting, male acceptance is based on ability, whereas female acceptance is based on looks. After desegregation, African American males no longer had a sense of self-efficacy or self-image except for in sports.

Furthermore, the research of Patterson et al. (2008) indicated that desegregation caused the “loss of structure, discipline, and relationship between black teachers and students” (p. 83). Prior to desegregation, high expectations and effective instruction existed in the student-teacher relationship. Teachers were able to encourage and push students into achieving academically because of the relationship they established with the student. Desegregation “sacrificed social and cultural capital” (Patterson et al., 2008, p. 92) and compromised the relationship that existed between teacher and student.

Irvine and Irvine (1983) noted that desegregation changed the pupil-teacher communication from a two-way to a three-way interaction. A pupil’s ability and class were the tenets of the two-way interaction, while three-way interaction included the pupil’s ability, social class, and race. Historically, the pupil-teacher interaction was the foundation of Black student achievement. The dedication connected to the overall success and advancement of the African American community was tied to the overall success of the African American student. The professional and personal identity of the African American was rooted in his community. Therefore, the interests of the African American community were at the forefront of the education of African Americans. The
principals and teachers were viewed as extensions of the African American community. However, desegregation relegated African American principals and teachers and African American students to European American control. The demotion, reassignment, or firing of African American teachers and administrators resulted in African American students receiving instruction from teachers who did not understand their cultural patterns, evinced unwillingness to be sympathetic in helping students achieve their academic goals, or worse, displayed prejudiced against them because of their race (Haney, 1978). Desegregation transformed the mindset of the African American student from the collective whole struggle to individual achievement aspirations (Irvine & Irvine, 1983) and forced the African American student to conform to a Eurocentric belief and culture. According to Irvine and Irvine (1983), “the ‘well adjusted’, ‘good’ black student is one who reflects the behavior and attitude of a Eurocentric world view, eschewing black behavioral modalities and cultural preferences” (p. 421).

Conversely, Kurlaender, Yun, and Borman’s (2005) research indicated a positive attitude of students toward diversity. Students felt better prepared to interact and participate in the democratic process with people of varying diversity. However, Kurlaender et al. (2005) discovered African American students were less likely to take advanced placement and honor classes in a more diversified school, a phenomenon possibly explained by Drury’s (1980) findings that the average self-esteem of African American students is lower in racially balanced schools than those enrolled in predominately African American schools. Interestingly, the self-esteem of an African
American student in a school predominated by European Americans is not as low as expected (Drury, 1980).

Prior research on desegregation has indicated a diversity of results, both positive and negative. Desegregation caused the removal of African American students from a comfortable school environment where their teachers encouraged them to excel academically. However, a more diverse school setting better prepared students to work and live in a diverse society. Although the self-esteem and the sense of community created in a predominately African American school were negatively affected, the recompense was the creation of a willingness in the minds of students, teachers, and administration to embrace diversity. Nevertheless, the diversity of African American males often leads to negative public school experiences in the 21st century.

Public School Experiences of African American Adolescent Males in the 21st Century

Teachers and administrators tend to overreact to African American males because of their “language, style of walking, glances, and dress” (Irvine, 1990, p. 27). The African American male’s communication style may appear confusing and baffling, especially to European American teachers (Irvine, 1990). The dress of African American students has caused many schools to adopt a dress code policy (Irvine, 1990). Kochman (1981) stated that African American students—more than other ethnicities—attribute their self-worth to their attire. Differences in social and cultural norms of African Americans and European Americans often result in negative interactions between African American males and school personnel, causing African American males to be misunderstood and subject to unfair perceptions and treatment. Kochman (1981) stated:
Blacks and Whites assume they are operating according to identical speech and cultural conventions and that these are the conventions the socially dominant White group has established as standard. This assumption—besides adding to the disruptive capacity of cultural differences—speaks to the general public failure to recognize that Black norms and conventions in these areas differ from those of Whites. (p. 8)

Taylor (1991) noted adolescent African American males typically are:

- more likely to be in the lowest academic track,
- more likely to be isolated (socially and academically) from their classmates,
- more likely than white males to be sent to the principal’s office or guidance counselor for challenging the teacher or other misconduct,
- more likely to be labeled deviant and described in more negative terms by their teachers and other school personnel, and
- more likely to be judged inaccurately by teachers with regards to their general (i.e. global) academic ability. (Taylor, 1991, pp. 149-150)

Irvine (1985) discovered that teacher expectations of African American males are lower than for other gender and race categories. The College Board (1985) research revealed the following truths about the education of African American students:

- African American male students are three times more likely to be placed in a class for the educable mentally retarded as European Americans.
- African American students are more likely enrolled in general or vocational educational tracks than European Americans.
• The demographics of students in college preparatory classes is 33 percent African American, 52 percent of Asians, and 40 percent European American.

• African American students are less likely to be enrolled in higher-level mathematical classes such as Algebra, Trigonometry and Calculus. African American classes tend to emphasize computation and recall of facts and rarely develop critical thinking skills through problem solving and abstract reasoning. (p. 1)

*Brown vs. Board of Education* furthered the cause of racial equality, but it perpetuated the ideology of an achievement gap (Hill, 2011).

**Achievement Gap**

Hill (2011) defined the achievement gap as “the failure and underachievement of students (typically those who are African American, Hispanic, and/or low-income) in comparison to the middle-class Whites of mainstream society” (p. 13). On standard measures of achievement, African American students continue to lag significantly behind their counterparts (Ladson-Billings, 1994). Standardized testing has illuminated the gap between African American males and other ethnicities (Uwah, McMahon, & Furlowe, 2008). The achievement gap may have always existed, but standardized testing has quantified the disparity, creating a national focus on closing the achievement gap between African Americans and other ethnicities. The National Center for Education Statistics (2009) revealed that African American males perform below grade level in the 4th, 8th, and 12th grade in key academic subjects, such as mathematics.
Testing is the “ability to generate quantitative and comparable results” (Ydesen, 2013, p. 717). Traditionally, teachers use testing to determine if a student learned a lesson or subject matter. However, testing has progressed to a more global method of evaluating the success or lack of success of teachers, schools, and school districts. Holding an individual or group responsible for the action of others can be termed as *accountability* (Ryan & Feller, 2009), which has become a method of generating quantitative data that hold teachers and schools districts responsible for student scores. Researchers and politicians emphasize test results as the primary component of a school’s performance (Ydesen, 2013). Research suggests that accountability has increased the achievement gains of Hispanics; however, it has not helped all groups (Hanushek & Raymond, 2005). Specifically, over the last 10 years, the gap has widened, particularly for African American males (Uwah et al., 2008).

The No Child Left Behind (NCLB) Act passed in 2000 was “to encourage schools to meet the needs of all children aiming at 100 percent proficiency by 2014” (Hill, 2011, p. 1). However, the intent of this act was not to raise the importance of African American students but the test scores of African American students. It is a matter of national and state policies to close the achievement gap between African American students and European American students. To accomplish this requires addressing numerous factors that contribute to the achievement gap. Uppermost are parental involvement, cultural discontinuity, and the effect of zero tolerance policies.
Parental Involvement

The Moynihan report of 1965 associated the underachievement of African American students with the crisis in the African American family (Hallinan, 2001). The report identified the factors linked to the crisis in the African American family as poverty, destructive behavior, and low educational achievement. Liberal traditionalists asserted that African American students were not performing on standardized tests because the tests were culturally biased. The cultures of African American and European Americans were different; therefore, African American students did not have the background to achieve highly on the standardized tests. Other researchers identified the following as reasons for the achievement gap of African American students: (a) the prevalence of female head of household in the African American home, (b) poverty in the African American home, and (c) the family size of the African American home (Hallinan, 2001; Jencks, 2001; Moynihan, 1965; Sewell & Hauser, 1975).

Sampson’s (2002) research compared the family structure of low- and high-performing African American students. Average-to-high achieving students possess a positive self-image and orientations towards high aspirations for the future. Sampson (2002) characterized these individuals as having “discipline, positive self-esteem, internal locus of control, high educational aspirations, orientation towards the future, and a sense of responsibility and cooperation” (p. 185). The participating students attended the same school and lived in the same low-income community. The average and high achievers had similar home lives, characterized as relatively quiet, orderly, and structured, which was conducive to homework and family conversations that centered on the educational
Another commonality between average-to-high achievers was the tendency to have chores at home, which developed a sense of responsibility and order in the students, and participation in extracurricular activities. Parents tended to be very involved in their children’s schoolwork and extracurricular activities, which Furstenberg, Cook, Eccles, and Elder (1999) found to promote student academic achievement because it develops leadership, self-control and cooperation. Clark (1983) wrote,

The interpersonal communication patterns in these homes [of high-achieving students] tended to be marked by frequent parent-child dialogue, strong parental encouragement in academic pursuits, clear and consistent limits set for the young, warm and nurturing interactions, and consistent monitoring of how they use their time. (p. 111)

A key to bridging the achievement gap of African American students is the improvement of the relationship between the parent and the student. Students from the same economic status attending the same school have the ability to achieve with the help of the parents.

Cultural Discontinuity

Cultural discontinuity, which contributes to the achievement gap, occurs when the school and teacher misunderstand, ignore, and discount the differences that exist between European American America and African American culture (Irvine & Irvine, 1983). The subjective opinion of teachers can be based on their impressions of the student’s “ability level, race, behavior and even appearance” (McAllister, 2002, p. 16). This cultural discontinuity causes African American students to be placed in low-achieving or special education classes and to be unfairly suspended or expelled (Irvine, 1999). Many times
students are placed in low-performing classes based on the subjective opinions of teachers (McAllister, 2002), which damages the academic self-efficacy of African American males, another factor attributable to the achievement gap. Uwah et al. (2008) defined academic self-efficacy as “an individual’s confidence in his or her ability to succeed in academic tasks and pursuits” (p. 298).

Research has suggested that African American males and White males have the same level of educational aspirations, yet African American males continue to perform at a lower level than White males. Ogbu (1978) posited that African American students were trained to act contrary to European American culture. He believed this was the African American students’ way of opposing their oppression and termed it oppositional culture. Ogbu and Fordham (1986) shared the view that African American students felt that doing well in school was acting white. Furthermore, Ogbu (1978) believed that African American students made no connection between doing well in school and the realization of economic and social rewards. Uwah and colleagues (2008) explained,

This incongruence between African American males’ educational aspirations and their ultimate educational attainment may be related to what Mickelson (1990) referred to as the dichotomy between abstract and concrete views of education. In other words, students’ aspirations may represent their hopes, but their eventual attainment may be affected by future concrete realities such as lack of resources, prejudice, and other social barriers. (p. 298)

Thill (2011) asserted the mistrust of the U.S. education system by African Americans is a major contributor to the achievement gap between African Americans and
European Americans. This may reflect a lack of a psychological sense of school belonging, which Uwah et al. (2008) explained as “the extent to which students perceive themselves to be welcomed, valued and respected members of the school community” (p 297). Anderman (2002) discovered a positive correlation between the sense of belonging and grade point average (GPA).

Zero Tolerance

During the 1980s, the term zero tolerance was adopted to address drugs in schools. The zero-tolerance initiative gained momentum in the 1990s after the rise of violence in schools (North Dakota Department of Public Instruction, 1995). Zero tolerance was not data-driven legislation. It was driven more by fear of super predators, defined as “radically impulsive, brutally remorseless youngsters, including ever more pre-teenage boys, who murder, assault, rape, rob, burglarize, deal deadly drugs, join gun-toting gangs and create serious communal disorders” (Becker, 2001).

Not only do these laws seem ineffective in reducing the number of violent crimes, they have also disproportionately affected African American males in the public school system and increased the number of suspensions and the dropout rate. Shah’s (2013) research suggested that the more a student is suspended, the more likely the student is to drop out of school, or at minimum, experience less academic success. The continual suspension cycle—another cause of the achievement gap that exist between African American males and other ethnic groups—has caused a continual downward spiral of the education achievement of African American males in mathematics. Irby (2014) wrote,
Young Black masculine bodies are disciplined through spectacles of harsh punishment and removal. By juxtaposing Black boys and White girls, my aim is to make visible the ways school discipline policies reproduce Whiteness and in doing so prop up the symbolic superiority of the White student body. (p. 786)

Mathematics Performance of African Americans

According to the National Center for Education Statistics (NCES) (2017), “The National Assessment of Educational Progress (NAEP) assesses student performance in mathematics at grades 4, 8, and 12 in both public and private schools across the nation” (p. 500). For 4th and 8th grades, the scores range from 0 to 500, and 12th grade scores range from 0 to 300. In 2015, the students’ average math scores were lower than in 2013 for 4th, 8th, and 12th graders. Although the difference is not measurable, the average scores on the NAEP have shown a decline from 2013 to 2015. In addition, the percentage of students performing at or above proficient level has decreased for all three-grade levels. Since 1990, the average mathematics score for African American students in 4th and 8th grade has been lower than that of European American students. However, the gap narrowed from 26 points in 2013 to 24 points in 2015 for fourth graders (NCES, 2017). This change was due to the decrease in European American student scores during these years. In 2015, the achievement gap between European American students and African American students in the eighth grade was 32 points.

Carr, Bowe, and Fhloinn (2013) recommended the administration of a core skills assessment to evaluate the students’ grasp of basic mathematical skills. Following this assessment, teachers should initiate a Response to Intervention (RtI) for low-performing
students to address their deficiencies in math knowledge and understanding. In the RtI process, teachers implement interventions based on student data, utilize high-quality research-based instruction, and subsequently monitor and adjust instruction based on the student’s response (Koellner, Colsman, & Risley, 2011). An important consideration of this process is teacher effect.

Teacher Effect

In a meta-analysis of 35 years of research of teacher effect, Jussim and Harber (2005) concluded teacher expectation directly associates with a student academic performance. Teacher behavior (Hamre & Pianta, 2005, 2007) and content and pedagogical knowledge (Cochran-Smith & Lytle, 1999; Shulman, 1987) influence this effect. In addition, teacher perception is a key factor (Jamil, Larsen, & Hamre, 2018), for it affects the daily experiences in the classroom, influences the likelihood of recommendation of a student for special services, and impacts student self-efficacy (Farkas, 2003; Smith & Shepard, 1988).

A teacher’s expectation influences students’ beliefs about themselves. Students adopt the teacher’s belief about them and begin to operate and perform based on this belief. The students then experience a phenomenon termed a self-fulfilling prophecy (Merton, 1948). Student may underperform based on a teacher’s belief about their academic ability. The Galatea Effect, a process of putting forth more effort in learning because of someone else’s belief about their academic ability, may affect a student perceived by the teacher to be extremely smart. Conversely, the Golem Effect has the same adverse effect on a student’s performance, for it causes a student to be discouraged
and underperform because of a low level expectation from his teacher (Babad, Inbar, & Rosenthal, 1982). Thus, teacher expectation influences a student’s self-efficacy (Bandura, 1977).

A student’s “self-efficacy is related to how hard a student will try, how long he or she will persist in a task, and ultimately, to students’ performance” (Brookhart, 1997, p. 173). Martin (2000) defined mathematics identities as a “student’s beliefs about their mathematics abilities, their beliefs about the instrumental importance of mathematics, their beliefs about the opportunities and constraints that affect their participation in mathematics, and their motivations to obtain mathematics knowledge” (p. viii). When assessing students in math, the teacher must first deal with the anxiety and the lack of self-efficacy that may exist in the students. Students’ self-efficacy directly affects their achievement scores regardless of what they may or may not know. All students must believe they can do math in order to truly excel and perform in the classroom and on assessments. Andrews and Brown (2015) found math anxiety affected the scores of students on standardized and classroom math tests. Much of this anxiety is due to the student’s lack of self-efficacy in the area of their mathematical knowledge.

Reis and Barwell (2012) showed that a student’s lack of achievement on assessments does not directly relate to what a student may know. The environment created by the teacher directly affects students’ academic success in mathematics because of its influence on the confidence of students, which subsequently affects their performance on assessments. Teachers must address and build students’ confidence in their ability to perform successfully in mathematics. DuBois (1903/1989) stated,
“Between me and the other world there is ever an unasked question . . . How does it feel to be a problem?” (pp. 1-2). When it comes to the academic performance of African American males in the mathematics classroom, Stinson (2013) asked, “How many well-meaning mathematics teachers—White, Black, or any ‘race’—perceive African American male (and female) students as a problem?” (p. 92). The mindset of educators that African American males are “troubling” or “thugs” creates a negative and hostile environment in which students are expected to learn (Stinson, 2013). Educational literature abounds with well-documented research on the teacher effect on student achievement (Harris & Sass, 2011; Kane & Staiger, 2008). Different types of teachers, of course, have different effects on students.

Sophisticate Teacher

A sophisticate teacher is a type of teacher who demands academic performance from students, but does not interact with students on a social level. This type of teacher causes confusion and apprehension in the student. A sophisticate teacher is very concerned with upholding academic standards but makes exceptions based on personal perception of student disadvantage, creating a hostile environment among the students. This type of teacher uses a greater amount of direct instruction with minimum inquiry-based learning to maintain teacher control (Kleinfeld, 1972).

Sentimentalist Teacher

In contrast, the sentimentalist teacher is very warm but does not hold students to high standards. Misguided empathy towards the students results in the failure to demand academic performance and excellence. Sentimentalists make everything easy, thus
students experience little academic growth. The students will talk freely with the teacher, but they do not perform academically. The work tends to be trivial types of assignments that do not push the students academically. This type of classroom environment is one of low learning and hostility. Students tend to push the teacher with their behavior to determine the limits of the teacher’s passiveness. Additionally, a sentimentalist teacher’s kindness creates a dependency on the generosity of others rather than their own capabilities. Students underestimate their capabilities and consequently experience low self-realization (Kleinfeld, 1972).

Traditionalist Teacher

Traditionalist teachers provide academic rigor but maintain appropriate distance while retaining a stiff demeanor, leading others to perceive them as cold and uncaring. Although traditionalists focus exclusively on academics, their limited subject-oriented demandingness creates a hostile learning environment. This type of teacher may be successful with rural students but not as successful with urban students. Task-oriented students respond best to a traditionalist type teacher, whereas social students respond better to an interpersonally warm teacher (Kleinfeld, 1972). Traditionalists have a need to control the behavior of African American students (Battey, 2012). In this type of classroom environment, students are not motivated to learn and excel academically.

Thus, teacher perception also influences student motivation to study and put forth an effort (Brookhart, 1997; Rodriguez, 2004). Unfortunately, in mathematics classes, females and minorities tend to be underestimated (Fisher et al., 1996; Steele, 1997; Swim & Strangor, 1998). African American students do not thrive in environments where they
feel disrespected and treated with cold harshness. They have a need to be treated with respect as human beings and the warmth of a caring teacher. Teachers need to possess the understanding of how to motivate a student to want to learn, study, participate, and seek help as needed (Brookhart, 1997). They need to be a warm demander.

Warm Demander

A warm demander, sometimes referred to as a supportive gadfly, is a teacher who provides warmth and relays high expectations. Teachers who are supportive gadflies create a safe and secure environment that encourages a strong work ethic (Dixson, 2003) and engagement that leads to high achievement. The teacher uses praise to affirm the students’ abilities, which encourages the students to go deeper in their mathematics (Battey, 2012). Such teachers bridge the achievement gap by relating mathematics to the students’ daily lives and culture. Acknowledgment of each student’s contribution to the mathematical conversation reinforces the students’ knowledge and understanding. The teacher creates a classroom of warmth through such nonverbal messages as smiling, touching, and maintaining close proximity. Gay (2002) maintained the most effective teacher is a warm demander.

Kleinfeld created the phrase warm demander in 1972 while researching effective teachers of Native American and Inuit children in an urban high school. Similar to the African American male, the village Native American and the Inuit have a low self-image that causes them to underestimate their abilities, hence causing them to underperform academically (Kleinfeld, 1972). A teacher must demand more from students than the students believe they are capable of giving. However, it is necessary to convey this
communication with warmth instead of coldness or severity, which students equate with low demand for academic performance. A warm demander is able to achieve nonverbal warmth through facial expression, close proximity, and appropriate touch and distance of the student (Kleinfeld, 1972). Teachers achieve close proximity by lowering themselves to the same postural level of the child or by squatting next to the child while teaching (Kleinfeld, 1972).

Vasquez (1989) defined a warm demander as a teacher who is successful at getting students of color to achieve without lowering their standards and expectations. Irvine and Fraser (1998) further expounded on the term by describing a warm demander as a tough-minded and structured teacher who maintains discipline in their classroom for students dismissed psychologically and physically by society. Determined to give their students a future, warm demanders identify with their students, and they not only believe their student can learn, they also demand that they must learn (Irvine & Fraser, 1998).

Ware (2006) elaborated that a warm demander is a teacher who maintains high expectations of African American students while conveying her personal belief in them. Ware (2006) combined the definitions of those prior and defined a warm demander to be an authority figure and disciplinarian similar to a pedagogically astute caregiver. Students perceive the correction delivered by a warm demander as a means for motivating and holding the student to a high standard of performance and behavior instead of mean spiritedness meant to hurt the students. A warm demander is an ordinary teacher who responds to African American students with care, discipline, high expectations, and skilled pedagogy (Ware, 2006).
Belief System

A warm demander’s belief system is a combination of three key philosophies: Perennialism, Essentialism, and Behaviorism. Perennialists believe that people are rational thinking beings whose minds need developing, whereas essentialists believe in the teaching of moral standards in the schools (Cohen, 1999). They also believe that students need to understand the value of working hard and having respect for authority.

Similarly, behaviorists believe people should be taught appropriate behavior with morals and a change in a person’s behavior must be seen and not just an internal, unobservable change. Pavlov, a well-known behavioral theorist, introduced classical conditioning. Pavlov contended that learning occurs when a stimulus is used to reinforce a desired behavior, such as when he conditioned a dog to salivate at the ringing of a bell. Initially, the bell did not make the dog salivate until the ringing of the bell was associated with meat (Slavin, 1995).

Slavin (1995) asserted that Pavlov’s theory of classical conditioning helps a teacher understand a student’s anxiety and fear of a subject and shows how a teacher can condition the student to behave in a desired manner. A warm demander uses classical conditioning to discipline students through consequences. Based on an essentialist philosophy, students are taught to achieve academically through hard work and discipline. These three philosophies meld together to provide a framework that enables a warm demander to influence the academic achievement in students who typically underperform in the U.S. 21st century public educational system.
Pedagogy

According to research, warm demanders bring a combination of care and rigor to the classroom. They insist upon academic achievement from their students while presenting the content in a culturally sensitive way. The warm demander teacher has a pedagogically astute and diverse method of teaching where students are able to learn. This intellectual grasp of the academic content enables the warm demander to present a lesson in a variety of ways that engage and relate to students. A warm demander’s confident pedagogical knowledge provides the comfort needed to conduct challenging discourse to include all the students.

Irvine and Fraser (1998) further identified a culturally responsible teacher as a person who uses cultural and personal experiences of students to create a link between the concept under discussion and prior knowledge. Consequently, a teacher who is “unable to understand the student’s home language, social interaction patterns, histories, and cultures” (Ladson-Billings, 1994, p. 146) is not able to truly educate the student.

Formal and informal instruction. A warm demander understands when and how to use formal and informal instruction. Formal instruction focuses on “meeting the developmental needs of students” (Ediger, 2013, p. 76). The teacher achieves this through ongoing observation of the student and implementing practice in the areas where the student is deficient. The teacher administers the learning objective and then evaluates whether the students have achieved the learning objective has been achieved.

Based on research, the informal approach to teaching is giving the students practical application problems in a relaxed learning environment. Students should
receive the opportunity to work in cooperative groups where they are able to work with others to solve problems. The teacher must observe the students to determine when each student is most engaged in the lesson. Some students work better with others, in workbooks, or from teacher devised learning experiences (Ediger, 2013). In conclusion, a warm demander is attuned to the individual needs of the students and offers various entry points for a student to learn a concept.

Constructivist teaching. A constructivist classroom is a socially structured interactive learning environment where the teacher encourages individualized learning from person to person. A constructivist teacher also uses alternative methods to teach and evaluate the student’s progress (Gunay & Yucel-Toy, 2015). A student is able to construct new knowledge based on prior knowledge using their individual learning process. In a constructivist class, there is no clear and concrete answer.

Warm demanders utilize a constructivist method of teaching. A constructivist teacher must have self-efficacy in their knowledge and ability to teach mathematics. Warm demanders possess high self-efficacy that allows them to lead a two-way dialogue of ideas and concepts between themselves and their students.

Based on research, each student’s learning style must be incorporated in the learning. The teacher should lead the students down a path of questioning and answering where the student discovers the answer rather than receiving the answers. The teacher must help the student develop an understanding of the problem, which means not providing answers but engaging students in being able to find and apply patterns in the case of mathematics (Battey, 2012). Students need opportunities to reflect on the
material and develop their own way of thinking and relating to the material (Ediger, 2013).

Compelling students to take ownership for their own learning is important in the individual achievement of the student. When reading in mathematics, students receive the chance to attach meaning to what has been read. In doing this, students must be able to distinguish between applicable information while eliminating the distracting information. This helps to build the student’s cognition (Ediger, 2013).

Research indicates that becoming a constructivist teacher requires work and training. Traditionally, teachers were perceived as the final expert on subject content in their classrooms, and their authority on a subject was considered absolute. Developing a constructivist classroom requires a transition in the minds of teachers and students so that both may engage in dialogue and mutual exploration of the subject matter. In this type classroom, the teacher challenges students to think and understand the subject more in-depth. Instead of passively receiving knowledge, students come to class prepared and ready to contribute to the conversation.

Cooperative learning. Cooperative learning is a strategy used regularly by culturally responsive teachers and warm demanders that gives students an entry point from which to learn. Research has shown that cooperative learning is an effective method of teaching students in a multicultural and economically diverse classroom (Slavin, 1995). Cooperative learning helps students build positive student relationships (Ladson-Billings, 1994). Cooperative learning groups provide venues for warm
demanders to model acceptable behavior and interaction in cooperative learning groups. In addition to support and guidance, males need reinforcement.

Questioning. In one research study, a teacher used high-level questioning to press students for understanding (Chen, Crockett, Namikawa, Zilimu, & Lee, 2012). This teacher paid close attention to the students’ mathematical ideas and questioned their answers further to advance student thinking (Chen et al., 2012). Another teacher pressed more for the students’ understanding of mathematical processes. The teacher asked low-level questions and pushed students to give the desired responses. Even though a student may have answered the question correctly, the teacher would continue to press with further questions to reinforce factual knowledge (Chen et al., 2012). Both teachers used questioning to advance the students’ thinking; however, one teacher wanted to assess the students’ factual knowledge and the other wanted to assess the students’ understanding in practical application. Both assessment techniques are beneficial for all students regardless of their heritage. However, a student’s verbal and cultural differences must be taken into consideration when questioning. Warm demanders modify the questioning language and consider cultural biases to meet the need of the learner.

Discipline. Another culturally responsive pedagogy practice is discipline. Teachers establish and teach classroom behavior expectations in the beginning of class and then hold students to the high expectation of behavior (Ware, 2002). Huebner (2012) advised including adolescents in the decision-making process, for they enjoy engaging in conversations regarding discipline decisions that govern behavior guidelines and consequences. A warm demander is able to bring balance between allowing the students
to develop their own classroom rules while still maintaining high behavior expectations of the students.

Another principle of discipline is establishing a safe and secure environment for all students. A warm demander believes that a student needs to be able to participate, ask questions, and learn without the fear and concern of ridicule from their peers (Ware, 2002). The establishment of this type of learning environment is extremely important to a culturally responsive teacher.

Some teachers have identified their teaching as a *spiritual calling* where they are teaching life and not just a subject matter (Irvine, 2003). Many times teachers find themselves giving “sermonettes about hard work, achievement, hope, appropriate behavior, and respect” (Irvine, 2003, p. 13). The same spiritually called teachers are compassionate disciplinarians (Irvine, 2003). These no-nonsense teachers are what Kleinfeld (1972) called *warm demanders*—competent teachers who are not resentful, afraid, or hostile toward students and respond to them with dedication and respectfulness (Kleinfeld, 1975).

High academic expectations. Regardless of the student’s socioeconomic status, warm demanders hold high academic expectations of their students. Foster (1994) stated that effective teachers do not allow culture and socioeconomic status to influence how they teach a demanding curriculum. Rather, an effective teacher continues to demand excellence from their students without compromise. They do not allow a student to underperform and will not accept anything less than the student’s best effort. Persistence becomes a main component of good teaching. This teacher is willing to do whatever is
necessary to convey to the student that they will not allow them to fail. Rosenthal (as cited in Cooper, 1985) developed a four-factor theory regarding teacher expectations:

1. Climate: Teachers should create a relationship with their students that are socioemotional. Teachers tend to create this type of relationship with their brighter students but this type of relationship should be created with all students especially African Americans.

2. Feedback: Teachers should set and communicate expectations to students. Teachers should consistently give academic feedback to students about their performance.

3. Input: Students should be given opportunity to work through more challenging and difficult material.

4. Output: Students should be given more opportunity to respond and ask questions. To create this opportunity, students may have to be given more clues and longer response times, with more repeats, redirects, and rephrases.

Classroom environment. The physical environment of the classroom and disposition of the teacher are critical to the willingness of students to learn (Ware, 2006). Teachers must create a caring classroom environment where everyone feels included and safe (Chu, 2011). A warm demander is able to maintain an orderly and positive working environment where all students are encouraged to learn and social interaction is encouraged, but in a structured manner where learning is the goal of the discourse.

A warm demander conjunctively provides warmth and care while maintaining an insistence on high academic achievement (Gay, 2002). A warm demander has the ability
to command order while maintaining a nonthreatening learning environment in the classroom. The warm demander uses verbal and nonverbal clues to maintain order in the classroom that do not disrespect or belittle the students. The teacher can use joking and teasing as a way to build a rapport with the student (Battey 2012); however, “ridicule, rudeness, and belittling should not exist in the classroom/school environment” (Ediger, 2013, p. 76). Even a hint of ridicule can cause a student to retreat into silence (Kleinfeld, 1972). The use of slang can be an effective method of building a personal relationship with the student (Battey, 2012). Harassment, however, is not an effective tool in promoting student growth, development, and progress (Ediger, 2013). In conclusion, because of the care established at the beginning of the class, the students understand the teacher reprimand is from a root of care and a desire for the student to be academically successful.

Teacher-student relationship. The dedication of a warm demander derives from caring for the students. Caring is a connection between the student and the teacher where students believe the teacher is there to help them and is willing to assist them through the difficulties they may have grasping the lesson (Ware, 2002). In its fundamental state, caring is a relationship between two human beings where there is a connection or encounter (Noddings, 2005). In a caring relationship, the two parties care how one another hears, sees, or feels (Noddings, 2005).

Unfortunately, many teachers have not been successful at convincing their students that they care. Students often complain that their teachers “don’t care” (Comer, 1988). In addition, students have reported they are less likely to confide in their teachers
because of their lack of trust in the teachers (Noddings, 2005). Students feel “alienated from their school work, separated from adults who try to teach them, and adrift in a world perceived as baffling and hostile” (Noddings, 2005, p. 2).

Ladson-Billings (1994) stated teachers should view students as their extended family. To this effect, the caring teacher creates an inviting, clean, and safe classroom environment by posting student work, keeping the classroom clean, and adding such decorative touches as plants, rugs and additional lighting. This creates an environment in the classroom that emulates a homelike atmosphere (Ware, 2002). A warm demander is a teacher has the unique ability to relate to the students in such a way that their students feel safe sharing their confidences.

Another aspect of caring is adapting the curriculum to meet the student’s need (Ware, 2002). A teacher can show care by including coursework that is relatable and has interest to the student (Ware, 2002). According to John Dewey (1963), a teacher establishes care for their students by connecting to the students’ interests and experiences. Warm demanders are teachers who successfully make this connection with students.

According to research, teaching is caring, parenting, believing, demanding the best, a calling, and discipline. An 18-month ethnographic study indicated that the most influential factor on student achievement in a diverse culture is care (Institute for Education in Transformation, 1992). Martin (1995) stated that schools must be turned into homes where the three Cs are just as important as the three Rs. The three Cs are care, concern, and connection.
Caring can take on many forms in the eyes of students. Ware (2002) described care as “(1) giving time to students outside of the classroom; (2) listening to her student’s problems; and (3) encouraging problem students to grow academically” (p. 34). Additionally, students identified caring teachers as those who respected and trusted them, acknowledged them as individuals, and laughed with them (Irvine, 2003). They set boundaries in an organized manner, believed their students could learn, and refused to allow them to do anything less than their best. Warm demanders are able to balance care with disciplined structure that pushes the students to achieve.

To teach mathematics curriculum effectively, teachers must have “a good grasp of mathematical facts, concepts, and generalizations to explain ideas accurately and meaningfully” (Ediger, 2013, p. 75). Warm demanders possess self-efficacy in their ability to teach and their students’ ability to learn (Irvine, 2003). With their security and confidence in their knowledge of the subject matter come flexibility and a willingness to allow students to construct their own learning, as demonstrated in the following case study.

Traditional versus Nontraditional Style of Teaching

Boaler and Staples (2014) conducted a five-year longitudinal study of Stanford Mathematics Teaching and Learning. The study included 700 students in three schools with diverse backgrounds. One of the schools, located in an urban area, served a culturally and linguistically diverse student population of low-income socioeconomic status and limited financial resources. The other two schools were rural, with one comprised mostly of Latino and European American students, and the other school with a
majority student population of European Americans. In the urban school, students were placed in the same level math class in the ninth grade, whereas students in the other two schools were placed in math class based on their ability. The urban school supported the practice of mixed-ability teaching and student equal opportunity for advancement. At the beginning of the study, the urban school demonstrated low academic achievement and interest by students in mathematics.

During the study, the urban school changed to a nontraditional teaching style, while the other two schools continued traditional style teaching. The change in the urban school included infrequent lecturing to accompany the predominant mode of posing longer and conceptual questions for heterogeneous groupings. Approximately three-fourths of the time in class, teachers circulated the room, showing student methods, helping students, and asking questions about their work. Unlike the nontraditional urban school, the questioning techniques of teachers in the traditional classrooms of the other schools were 62% procedural, 17% conceptual, 15% probing, and 6% other (Boaler & Staples, 2014).

Students completed a mathematics test at the beginning and at the end of the study in the three school study sites. At the end of Year 1, although a gap remained between European Americans and African Americans, as well as between Asian, African American, and Latino students, there were no longer statistically significant differences between the achievement of White and Latino students, nor the Filipino students and Latino and African American students for those exposed to the nontraditional method of teaching. In addition, survey responses of students at the urban school revealed a
significantly more positive experience in mathematics. The nontraditional method of teaching showed a difference by reducing the achievement gap among ethnicities, increasing African American achievement overall, and producing a positive attitude towards mathematics (Boaler & Staples, 2014).

Evaluating the reasons for the urban school’s success is important in deriving applicable information from the data. The teachers at the urban school collaboratively planned, which engaged the teachers in the exchanging of instructional ideas. A shared commitment among the teachers to provide equity of education for all students prompted the teachers to develop a coherent curriculum and establish teaching practices that improved the performance of all students in mathematics. Additionally, the foundational class of Algebra, traditionally scheduled for a half year, now encompassed a period of an entire year. This gave students a strong depth of knowledge in a foundational course of mathematics and helped students to progress further in subsequent math classes with a greater degree of success (Boaler & Staples, 2014).

The teachers developed “group worthy” (Louie & Nasir, 2014, p. 195) tasks that challenged the students cognitively with multiple mathematical representations and gave students varied entry points to understanding the content. The teachers valued multiple ways of solving problems. The teacher celebrated diversity and valued “multiple ability treatment” (Boaler & Staples, 2014, p. 24), which is the idea that success and failure on a task is achievable through varied abilities and criteria.

When teachers asked students about the ways they could be successful in their mathematics class, the responses were “asking good questions, rephrasing problems,
explaining well, being logical, justifying work, considering answers, and using manipulatives” (Boaler & Staples, 2014, p. 24). In the traditional school, students recorded a more narrowly viewed method of success in their math classroom. They noted such things as concentrate and pay attention as ways to be successful in class. Giving students varied ways to be successful caused the students to be confident in their ability to do math. The improvement in their self-efficacy resulted in better performance on standardized tests.

According to research, group work played an important role in student achievement. The teacher assigned roles to each group member during group work, which gave each student a sense of importance and contribution to the success of the group. By praising students in front of the whole class for verbal or mathematical contributions, the teachers intellectually assigned competence to every group member, even the low-level students. Teachers challenged students to be interdependent and responsible for their classmates’ learning. Students learned to work together as well as function as a contributing member of a group who took responsibility for their classmates’ learning.

In the urban school, teachers consistently expected students to perform at high levels. Students received challenging cognitive problems and tasks to complete. Teachers required students to justify all of their answers, which promoted stimulating discussions and increased the students’ understanding of mathematical concepts. Regardless of the initial student level, students progressed academically to a higher level presented by the more challenging work. Students reiterated the message that mathematical ability was
not through innate ability but through hard work—a message repeated by their teachers as they assured students they could achieve through dedicated work effort. Therefore, the students were willing to put in the hard work necessary to achieve. Through the practice of persistence, students were able to learn the mathematical concepts and ultimately achieve.

Similarly, warm demanders insist on the perseverance and hard work necessary to higher academic achievement. Their philosophical and pedagogical beliefs and care make warm demanders effective instructors of African American males.

Effective Mathematics Instruction of African American Males

Howard’s (2002) investigation of elementary and secondary school students showed the three characteristics of effective teachers as creating a sense of family and community, establishing a caring environment, and providing verbal affirmations. Effective teachers of African American students see their role as more than teaching content standards but as caring, like a mother who challenges students to believe in themselves and demands the best of them (Irvine, 1999). Howard et al. (2016) advised teaching African American students as “whole people, in need of social, emotional, physiological, and intellectual support” (p. 4). As a direct outcome of a teacher’s care and support, students achieve at high levels despite racism and do not fall to the status quo (Ware, 2002).

In her book, Teaching Boys Who Struggle in School: Strategies That Turn Underachievers into Successful Learners, Cleveland (2011) described what she called the six Pathways to reengage struggling, underachieving male students: “Support, Guide,
Reinforce, Adjust, Ignite, and Empower” (p. 60). Effective instruction of these interconnected concepts for African American males requires addressing a variety of factors. The following sections address some of these factors.

Communication

The teacher needs to engage in authentic communication acknowledging students’ successes and strengths (Cleveland, 2011). In the beginning of class, males need to engage in tasks where they can receive positive feedback to help build their confidence and self-efficacy, as well as cause them to make academic connections and reflect on their work. Instructions should be fair and concise and delivered in steps. Detailed and specific information should include who, what, when, where, why, and how. The manner in which a teacher instructs and corrects a student is critical to student success, for Ediger (2013) found that “a pleasant voice with appropriate stress, pitch, and voice” (p. 75) affects student achievement.

Because males do not respond well to judgmental statements, teachers should keep communication informational when giving a directive or corrective instruction. For example, when referring to the student’s behavior, the teacher must address the specific behavior and not any attributes about the student (Cleveland, 2011). This includes identifying positive consequences and restates negative behaviors in a positive manner. For African American males who misbehave chronically, Maag (2015) recommended creating classroom behavior plans collaboratively with the student, based on positive reinforcement.
In addition, the teacher must acknowledge the student’s growth and progress in their behavior, which aligns with the theory called Behavioral Opportunities for Social Skills (BOSS) (Ross & Sliger, 2015). A major component of the BOSS theory is for the teacher to focus energy on the reinforcement of positive student behavior and avoid punishment. According to Maag (2001), after a teacher gives a verbal reprimand to the student, the goal of the teacher should be to find that student exhibiting correct behavior and give verbal acknowledgement of that good behavior. In addition, although a student may not be traditionally well behaved, it is important that a teacher recognize when the student makes improvement in their behavior.

Optimal Learning Environment

Howard (2002) found the environment created by the teacher directly affects a student’s academic success in mathematics. Black students have shown higher academic achievement with teachers who are interpersonally oriented (St. John, 1971). African American males must have “safe venues where their voices, victories, and vulnerabilities can be shared, heard, affirmed, and then utilized toward the creation of systems and sensibilities that are attuned to Black male perspectives and experience in context” (Howard et al., 2016, p. 6).

In class, the male needs to be in a comfortable learning environment where he does not feel the need to self-protect (Cleveland, 2011); therefore, a male student must believe that the teacher is not going to embarrass or humiliate him in class. If concerns and issues are not addressed privately between the teacher and the student, the African
American male will typically cease engaging in productive school behavior and lose the motivation to perform academically.

Culturally responsive teachers intertwine values and character development in their curriculum and use the classroom environment to encourage mutual respect and trust. Warm demanders teach curriculum in a way that is engaging and active. Lessons are prepared to encourage high performance and involvement of the students. In this type of classroom, the teacher is able to identify students who need help, as well as identify students who are passive and not engaged. Specifically, male students thrive in a physically active classroom (Cleveland, 2011). They value increased social interaction in a focused, positive, and interactive learning environment. In a cross-cultural environment, establishing a social relationship is important (Kleinfeld, 1972).

According to research, the classroom needs to be enjoyable but not filled with distractions. A warm demander’s insistence on discipline and proper behavior creates an orderly environment where students are able to learn in an active classroom. An African American student can be successful in a classroom where there is structure and order, but not hostility (Gay, 2000; Ware, 2006). African American students have a much greater respect for teachers they refer to as strict, caring, and in charge (Delpit, 1993). Warm demanders advocate for African American students and see themselves as surrogate parents (Battey, 2012). Kleinfeld (1972) stated that students of color tend to respond best with teachers who relate to them both culturally and academically.
Modeling

The teacher must help reinforce African American males’ communication skills, for they need explicit instruction and modeling on how to communicate and collaborate effectively (Cleveland, 2011; Ross & Sliger, 2015). Similarly, teachers must “utilize basic learning principles to model and reinforce social skills training in a step-by-step process” (Ross & Sliger, 2015, p. 77). A warm demander regularly teaches and models expected behavior and acceptable communication interaction with their peers, which involves “the ability to speak to, listen to, and ‘read’ other people” (Cleveland, 2011, p. 136). The modeling and practice will help build the self-efficacy of the African American male in his ability to communicate, collaborate, and behave accordingly.

African American Male Mathematics Self-Efficacy

A major theme threading through psychological research on African American males is “the construct of the self, whether defined as general self-esteem, self-perceived ability, racial self-esteem, personal identity, or any number of other related concepts” (Graham, 1994, p. 104). African American males are motivated based on their self-efficacy and self-image as well as their competence to complete a task successfully.

On social comparison achievement motivation, when compared to Whites, African Americans are less motivated based on their perceived ability to complete a task efficiently. The motivator for African American males is their sense of self-efficacy, self-image, and competence to complete a task (Graham, 1994). If an African American male believes he is incapable of completing a task, he is less likely to attempt the task.
Thus, it is essential that teachers relay their belief in their students’ ability to achieve academically, regardless of their learning disability or cultural background (Ladson-Billings, 1994). Noble and Morton’s (2013) study revealed that the higher the expectation of the teacher, the more the African American male student achieved. The African American male develops self-efficacy over time with continual affirmation and help from a warm demander to achieve academically.

Maintaining a positive working environment is a key component of teaching math (Ediger, 2013). Students must receive verbal and nonverbal positive encouragement from the teacher in acknowledgment of their contributions (Battey, 2012). The teacher must be careful not to attach labels to students based on differing ability levels (Ediger, 2013). Regardless of the student’s ability, students should receive praise for improved performance (Ediger, 2013). Indeed, any attempt by the student must be acknowledged without any form of criticism (Kleinfeld, 1972). This builds their intrinsic worth and self-efficacy in being able to achieve in mathematics (Ediger, 2013). Like athletics, warm demanders have the ability to build an African American male’s self-efficacy through continual positive feedback and persistent assistance in achieving academically. Through academic success and discipline, a warm demander is able to contradict any negatively perceived ability of their students by driving their students to achieve (Ware, 2002). In addition, the high expectations of the warm demander cause the student to persevere through difficult lessons.

Another factor that influences African American male self-efficacy and subsequent achievement is the presence of other positive African American male role
models. A survey completed by African American males between the ages of 13 and 15 years indicated a lack of understanding of how to be a “good man” (O’Neil, Challenger, Renzulli, Crapser, & Webster, 2013). Role models visually show the African American male how to navigate the journey from being a boy to becoming a man. Cleveland (2011) echoed the same sentiment about males needing positive role models, delineating the connection to the African American males need for self-efficacy. If a student is not confident in his actions and success as a male, he is more likely to perform at a lower level of academic achievement.

Based on previous studies, warm demanders who are African American males are role models for African American male students. They not only show care and have high expectations, but they also become a visual demonstration of an effective African American male. Unfortunately, the shortage of African American males in the classroom has left some African American male students void of a good role model.

Learning Tasks

Male students thrive in a physically active classroom (Cleveland, 2011). Hale (2001) stated African American students thrive in a classroom environment where there is oral communication, kinesthetic activity, and effective orientation. Many teachers’ main method of instruction is analytical and not relational (Irvine, 1990). Ignoring relational instruction methods does not capitalize on the strengths of African American students and other students who have a different learning modality. Consequently, the teacher must provide opportunities for African American males to experience
competency, acceptance, and increased academic performance in the classroom. They work best in a focused, positive, and interactive learning environment.

Battey’s (2012) research shows that African American students need a relational and cultural component in a math classroom. Cultural content helps the student identify and relate to the subject matter. A student more readily engages in a lesson when they are able to identify with some aspect of the lesson. In addition, the African American male translates the use of culturally relatable content to care on the part of the teacher. This shows the student that the teacher values them as a person and not as just another student in the classroom. Cooperative learning builds upon the cultural value of African American students that encourages collaboration as opposed to competition (Ware, 2002) and appeals to the African American male’s value of social interaction. Furthermore, cooperative allows for active exchange of ideas and knowledge, which engages students in the learning process.

In the beginning of class, males need to receive tasks where they can experience growth. This helps build their confidence and self-efficacy. Scaffolding lessons is critical in building conceptual understanding where the student is able to make a connection between their everyday lives and the mathematical world (Battey, 2012). The learning tasks should include real-world scenarios to reinforce the male students’ communication skill both socially and academically. Practical discussion and illustrations of the subject matter is instrumental in enabling the student to connect the math content to a broader application (Ediger, 2013). Questions and comments help the student understand the purpose of the learning and attach meaning to the mathematical
lesson (Ediger, 2013). Drawing on prior knowledge helps the student connect and understand the concept. Increasing practice time will help student’s progress in their understanding of mathematics. In addition, male students need frequent feedback that leads to connection and reflection (Cleveland, 2011), as well as the realization of immediate success.

Summary of Effective Mathematics Instruction

The male student needs to be inspired to learn in a non-threatening learning environment (Cleveland, 2011). A goal to address underachieving males is to replace negative attitudes about learning with productive perspectives. The next goal is to reconnect him with learning as a capable, valued, and respected leader. This is in alignment with an African American male’s need to be valued and respected.

Common themes exist in different studies between motivating an African American male and a teenager. Both need continual acknowledgement of their efforts and improvements. Research has shown that acknowledging the positive rather than the negative behavior improves student behavior. In addition, they need to be involved in the decision-making process. Their involvement gives them a sense of leadership, value, and belonging. They need to be valued as individuals with opinions and views taken seriously by the adult. Modeling and practice builds the self-efficacy of the African American male teenager. They need acceptable social behavior modeled for them because they are visual learners. Classroom instruction and activities should include opportunities for modeling and practice of desired behavior and social skills. The
African American male is motivated and involved in their learning when they have self-efficacy and receive positive feedback.

According to research, the presence of warm demanders in the classroom can help reduce the gap through discipline, care, and refusal to accept underachievement. Warm demanders believe their students can achieve and are willing to do what is necessary to help their students achieve. The need for warm demanders has not declined, but desegregation may have diminished their presence. Warm demanders bring discipline to the classroom while acknowledging and respecting the cultural background of their students.

Empirical Studies of Warm Demanders/Student-Teacher Relationship

As mention previously, Judith Kleinfeld (1972) coined the term *warm demander* in her quantitative research. Since her original research, there have been eight qualitative studies completed regarding warm demanders, but no quantitative studies conducted. Therefore, in addition to these qualitative studies, this review addresses quantitative studies of a similar concept—the student-teacher relationship.

Qualitative Studies of Warm Demanders

The qualitative studies completed on warm demanders addressed the student population of elementary and middle schools. In one study, 25 elementary students comprised of 85% Latinos and 15% African American. The other study involved 32 fifth to seventh grade African American boys. Another study targeted 10 minority students between the ages of 14 to 18 years.
In regards to participant teacher populations, the studies included a variety of teacher profiles: veteran teachers, beginning teachers, elementary teachers, middle school teachers, high school teachers, European American teachers, and African American teachers. Bonner (2014) completed a grounded theory study that included people who were a part of the community.

Teacher point of view. Of the two ethnographic case studies, one targeted a female European American teaching veteran of 22 years and the other focused on one African American and one European American high school teacher. Boucher and Helfenbein’s (2015) research suggested the need for teachers to move from sole authorities in the classroom to shared power with students and relationships based on common goals. The building of a working relationship establishes solidity where teachers and students work in a collaborative, rather than a combative environment.

The research of Ford and Sassi (2014) offered a methodology in which to create a relationship between teacher and students. Teachers must establish authority in the classroom. However, the research suggests two different ways in which to establish authority between African American students and their European American or African American teacher.

In conclusion, the European American teacher, the development of interpersonal relationships where the teacher is able to communicate culturally and responsibly works best. This requires critique of the curriculum to ensure culturally responsive teaching. Teachers must also link their care for the students to advocating for justice on behalf on the students.
On the other hand, the African American teacher can establish authority with the African American student by relating to them based on their shared culture, history, and frame of reference. Although Boucher and Helfenbein (2015) recommended a collaborative relationship between student and teacher, and Ford and Sassi (2014) suggested teachers establish an authoritative relationship with the students, all of the researchers emphasized the necessity of teacher establishment of caring and culturally relatable relationships with students. Ford and Sassi’s (2014) research, limited to the relationship establishment of the African American student with either a European American or an African American teacher did not examine how an African American teacher would relate to European American or other ethnic students. Similarly, the study did not examine how a European American teacher would establish a relationship with European American or other ethnic students (Ford & Sassi, 2014).

Ware (2006) conducted a comparative study between two generations of African American middle school teachers, whereas Ford and Sassi (2014) conducted a comparative study between an African American and European American teacher. The intent of both studies was to establish a culturally responsive teaching pedagogy for African American students. Ware (2006) documented the unique style, extended across generations, in which African American teachers have established relationships with their students. Although each teacher was from different generations, both showed very similar teaching styles and beliefs as they related to culturally responsive pedagogy (Ware, 2006). Both Ware’s (2006) and Ford and Sassi’s (2014) studies revealed that a
warm demander pedagogy who is culturally responsive is the most effective way for African American teachers to relate to African American students.

The findings of the Ullucci (2009) case study of six European American elementary teachers and the Boucher and Helfenbein (2015) ethnographic study of one European American female teacher suggest that building relationships with the students should be the focus when addressing classroom management. Similarly, both studies highlight the conducting of further research with European American and other ethnic students to determine how teachers establish classroom discipline while maintaining high academic expectations. Battey’s (2013) case study indicated that teachers should not address behavior in a classroom. Instead, teaches need to focus on acknowledging student accomplishments and identifying with student culture. This again aids the teacher in building a relationship with the student.

Student point of view. The remaining studies give the perspective from the student’s point of view. Pitt’s (2013) in-depth qualitative study focused on 10 minority students between the ages of 14 to 18 years old. Results indicated student motivation derived from teacher-set goals, self-motivation, and relationship with the teacher. Bonner’s (2014) grounded study identified relationship and trust as key factors in teaching mathematics. Both studies revealed that students appreciated learning how they contribute to society culturally, as well as understanding how they culturally relate to the mathematics curriculum (Bonner, 2014; Pitt, 2013).

Berry, Thunder, and McClain (2011) conducted a phenomenological study on 32 successful fifth to seventh grade African American males in a mathematics class and
discovered the students attributed their success in mathematics to a balance between high expectations, scaffolding, and teacher support. Teachers in the other studies (Bonner, 2014; Pitt, 2013; Ullucci (2009) indicated that relationship and culturally responsive teaching were critical in classroom behavior and student success. However, from the perspective of successful mathematics African American male students, the academic challenge and the continuing help were critical to their success (Berry et al., 2011). In conclusion, creating a learning environment where work was rigorous but accessible through continual support and help was pivotal to the student establishment of positive mathematics identity.

Conclusions drawn from warm demander qualitative research. Based on the qualitative studies completed on warm demanders, different opinions exist regarding what factors contribute to student success in a mathematics class. From the teacher’s perspective, building relationships and culturally responsive teaching are critical to the academic success of African American students. However, although students view relationship as important, they also view challenging pedagogy as a major contributing factor, along with adequate support and help. Through help, the student is able to be successful and therefore build their self-efficacy in mathematics, which leads to a positive image of them as it relates to mathematics.

Quantitative Studies of Student-Teacher Relationship

Of the 16 quantitative studies completed on student-teacher relationships, one was a correlational study that included students and teachers. Of the other 15 studies, two focused on the teachers’ perspectives, and 13 pinpointed the students’ perspective. The
10 math teachers, 20 English teachers, 109 middle school teachers, 147 high school teachers, and 14 unidentified teachers observed in the studies constituted a variety of background profiles. On the other hand, the student participants were not as diverse. Although the culture of the students varied, the grade levels involved were primarily elementary, with the exception of one study of middle schoolers. The ethnicity of the students included African American, Chinese, Indonesian, and students from Singapore. One study involved English Language Learners (ELL) students. Eleven of the studies were correlational, two were hierarchical linear, and one was cross sectional, and one was a multivariate analysis of variance (MANOVA) study.

In the Meece, Herman, and McCombs (2003) study, data analysis showed a significant relationship among measures of achievement goals, self-efficacy, and strategy use for teachers who used Assessment of Learner Center Practices (ALCP) and a positive correlation between student self-reported self-efficacy and active learning strategies. Meece et al. (2003) suggested that males focused more on performance goals than did females, and middle schoolers focused more on mastery than did secondary students. Although the study targeted the instructional practices of teachers, the results were correlated based on student response to the instructional practice. A limitation of this study was the inability to draw inferences regarding cause and effect (Meece et al., 2003).

The Boak and Conklin (1975) study suggested that, regardless of the subject matter, a teacher has the ability to understand and respect her students as individuals. However, teacher selection and separation procedures resulted in a lack of generalizability of the results, thus posing a limitation of this study. In addition, the
interpretation of the data was subject to the trainers and raters. The research completed from a teacher’s point of view is understated. The studies completed do not provide evaluative data on a teacher’s perspective on the student-teacher relationship (Boak & Conklin, 1975).

Correlational studies conducted on students indicated a strong correlation between teacher warmth and student achievement. Murray and Greenberg (2001) found students who exhibit a positive attitude toward school also have a good relationship with their teacher. Maulana, Opdenakker, Brok, and Bosker (2012) further discovered a direct correlation between students’ motivation to learn mathematics with a teacher’s interpersonal relationship with the student. The warmth of a teacher also correlated positively with a student’s reading achievement (Ly, Zhou, Chu, & Chen, 2012). Cham, Hughes, Jan, West and Im (2014) showed that teacher expectations was significantly correlated with school belonging and teacher-rated warmth. In addition, peer aspirations significantly, positively correlated with student grades, behavior, and engagement (Cham et al., 2014). Although achievement related positively with the warmth of the teacher, Voelki (1995) indicated that a teacher’s warmth was positively related to student achievement. However, the correlation was nonexistent with the elimination of student participation. Warmth is crucial, but a student must be involved in the class in order to realize true achievement. Finn and Rock (1997) added to the body of research by showing that academic resilience is a major component of student engagement. Although, resilience was not statistically significant, females demonstrated slightly higher resilience rate (Finn & Rock, 1997).
Goh and Fraser (2000) discovered an improvement in student achievement when a teacher is helpful, friendly, and understanding of behaviors. A teacher’s leadership in the classroom proved to be important in student achievement. The teacher’s leadership eliminated uncertain behaviors and placed a focus on creating a learning environment (Goh & Fraser, 2000). Skinner and Belmont (1993) discovered a correlational relationship between a child’s classroom experience and the teacher involvement in the class. A teacher’s ability to provide classroom structure and autonomy support was important to the motivation of the students, and a mutual working relationship between the student and teacher was important in the student’s behavioral and emotional engagement in the class (Skinner & Belmont, 1993). Similarly, Lopez (2012) indicated that a teacher’s warmth was crucial in reducing the academic achievement gap of at-risk students.

When Birch and Ladd (1997) compared male and female student response to student-teacher relationships, teachers reported a stronger closeness to females and a more conflictual relationship with males. Students who reported closeness with their teacher also reported liking school (Birch & Ladd, 1997). Hughes, Wu, Kwok, Villarreal, and Johnson (2011) found that males and African American students experience a greater degree of conflict with teachers than females, European Americans, and Latinos do. However, Latino students experience more teacher conflict, and African American students show less conflict and less dependence on teacher-student relationships (Garner & Mahatmya, 2015). In contrast, Hughes et al.’s (2011) research indicated that males and non-African American students experience less warmth than
females. African American students, as well as other racial/ethnic students, tend to regulate their emotions in an effort to reduce the opportunity for teacher-student conflict (Garner & Mahatmya, 2015). Jerome, Hamre, and Pianta (2008) discovered teacher-student conflict was greater for African American males in kindergarten, and the gap in student closeness to teachers increased as students transitioned from elementary to middle school. The research also indicated that students who spent more hours in daycare showed lower academic achievement and posed greater behavioral challenges in the classroom (Jerome et al., 2008). Murray and Zvoch (2011) found that both teachers and students reported their student-teacher closeness as based on their emotional, behavioral, and school-related adjustment.

Conclusions drawn from quantitative research of teacher-student relationship. Although teacher warmth and classroom management positively correlate to student achievement, research has shown that students must be engaged in the class. Teacher warmth improves not only math achievement, but also reading. However, the teacher must maintain a learning classroom environment where the students are engaged in the lesson.

Summary

Numerous factors may influence the academic achievement of the African American male in mathematics. One of the factors may be desegregation, which brought about a lack of identification and connection to a community that was historically instrumental in the advancement of education for the African American. In addition, the school system instituted a zero-tolerance policy that caused many African American
males to find themselves in the penal system rather than the educational system. An exorbitant amount of testing is another factor in the decline of African American male academic performance.

DuBois (1935) summed up the matter by stating that African American students do not need segregated or desegregated schools—they need an education. Educators cannot assume that what works for European American middle class students will work for African American students (Delpit, 1993). Qualitative research has shown that a warm demander teacher has positive effects on the academic performance of African American students. Chapter 3 provides a detailed outline and rationale of the quantitative correlational research methodology chosen for this study, as well as the population and instrumentation selected to evaluate the possible models that affect the academic performance of African American males on the mathematics EOCT as it relates to warmth and demandingness as predictors.
CHAPTER 3

METHODOLOGY AND PROCEDURES

From a quantitative research perspective, researchers have not explored the influence of the warm demander on the academic achievement of the African American male in secondary education adequately. The purpose of this study was to provide quantitative correlational data on the relationship between warm demander teachers and the academic performance of African American male students in mathematics. Using hierarchical model selection, the best set of predictors of End of Course Test (EOCT) scores for African American males in mathematics were determined. Based on the review of literature, warmth is the term used in qualitative studies; however, student-teacher relationship is used in quantitative studies to identify the same idea. Therefore, this study used a Student-Teacher Relationship Scale (STRS) to measure the warmth of a teacher. Per the STRS, subscale closeness measures the affection and warmth of the teacher (Pianta, 2001). The term warmth is used as a synonym of closeness.

Demandingness was determined using the Individual Belief survey. The teachers evaluated themselves by answering the questions in the survey. Teacher warmth and teacher demandingness were used in the models to determine which model best predicts the EOCT score of African American males in mathematics.

This chapter reiterates the research question and delineates the variables, participants and setting, research design and variables, data collection instrumentation
and procedures instrumentation, statistical analysis, ethical considerations, and role of the researcher in this investigation.

**Research Question Reiterated**

The following research question guided this study: What is the best model for predicting the math End Of Course Test (EOCT) scores of African American males using warmth, demandingness, and an interaction between warmth and demandingness as predictors?

**Research Participants and Setting**

The participants were four African American females who taught 9th and 10th grade students in coordinate algebra and analytic geometry with an EOCT class. Although all the participants were the same gender and ethnicity, this was not a requirement to be a participant in the study. These teachers reported the EOCT scores of 94 African American male students.

The study was situated in a suburban district at Golden Gate High School (pseudonym). At the time of the study, the school district student population was approximately 16,869 (Georgia Department of Education, 2017). Golden Gate High School was a Title 1 school where 72% of the students receive free-or-reduced lunch (Georgia Department of Education, 2017). With a student-teacher ratio of 20:1, Golden Gate High School served 1,205 students in the 2017-2018 academic school year. The student population consisted of 82% African Americans, 7% Caucasians, 8% Hispanic, and 2% multi-racial. The school had a four-year graduation rate of 83.3% and College
and Career Ready Performance Index (CCRPI) score of 69.3 out of a possible 100 with a four-star out of a possible five-star climate rating.

Research Design/Measures and Covariates

Using a quantitative correlational research design, hierarchical model selection was used to determine the best set of predictors of African American male student’s EOCT scores. Student-teacher warmth was a continuous student-level predictor variable, teacher demandingness was a cluster teacher-level predictor variable, and the EOCT scores were the outcome variables. Based on three predictor variables with a medium effect, the minimum sample size was 77 students (Field, 2013). The actual sample size was 94 students.

The student-teacher warmth and teacher demandingness were determined based on the participating teachers’ responses to two different survey instruments. In one survey, the teacher answered questions regarding their relationship with each of their African American male students using the Student-Teacher Relationship Scale (STRS). The teachers’ demandingness was determined using the Individual Belief Survey.

Instrumentation

The instruments used to generate data were the Student-Teacher Relationship Scale (STRS), the Survey of Individual Beliefs, and student EOCT scores. The teacher participants completed the STRS and the survey online through Survey Monkey. The following sections describe these instruments.
Student-Teacher Relationship Scale (STRS)

The STRS is a self-reporting instrument developed in 1991 to evaluate the nature of the student-teacher relationship quantitatively. The development of the tool was prompted by a “(a) teachers’ own emotional and social experiences with children in their classrooms, (b) applications of attachment theory in school settings, and (c) the contribution of relationship with adults to students’ academic and social competence” (Pianta, 2001, p. 1). “Normed on more than 1,500 students and 275 teachers” (Pianta, 2001, p. 1) and used in large-scale national studies, the STRS measures teacher perception of his or her conflict, closeness, and dependency with a student. Conflict is the manner in which a teacher perceives their relationship to be negative with a student. Closeness measures the degree in which a teacher experiences “affection, warmth, and open communication” (Pianta, 2001, p. 2) with a student. Dependency measures the depth in which a student becomes dependent on a teacher.

A pilot group of 24 teachers and 72 students participated in evaluating the initial scale of 16 Likert-type items and 3 open-ended questions. The first study analyzed five dimensions of a student-teacher relationship: “conflict/anger, closeness, open communication, dependency, and troubled feelings” (Pianta, 2001, p. 3). The pilot group of teachers and administrators offered suggestions, leading to a revised version of 31 Likert-type items and three dimensions: conflict, closeness, and dependency.

This study utilized only the closeness component of this instrument, consisting of 11 questions, which generates a subscale raw score ranging from 11 to 55, with 11 representing a low sense of closeness between the student and teacher. The STRS
manual reports the Cronbach alpha to be .91 (Pianta, 2001). The total variance of 48.8% is due to three factors: conflict contributes 29.8%; closeness contributes 12.9%; and dependency contributes 6.2% to the variance (Pianta, 2001).

Closeness “measures the degree to which a teacher experiences affection, warmth, and open communication with a particular student” (Pianta, 2001, p. 2). Warmth reflects the teacher’s knowledge of whether a student feels comfortable using them as a resource (Pianta, 1992). A high warmth score indicates that the student-teacher relationship is characterized by a warm and effective relationship (Pianta, 2001). The test-retest correlation reliability of warmth is .88 (Pianta, 2001). The STRS instrument has a total validity of 48.8% (Pianta, 2001). Closeness accounts for 12.9% of the total variance (Pianta, 2001). The STRS has a “strong evidence for concurrent and predictive validity” (Pianta, 2001, p. 27). The average score for older students that are five years of age or older ($M = 43.56$, $SD = 7.81$) for subscale closeness. The STRS uses a five-point Likert scale: 1 (definitely does not apply), 2 (does not really apply), 3 (neutral, not sure), 4 (applies somewhat), and 5 (definitely applies).

Survey of Individual Beliefs

The Survey of Individual Beliefs served to evaluate the teachers’ individual beliefs of students in their classroom. Containing 20 “questions categorized as indicators establishing a climate of high expectations for success from the bank of the Effective Schools Profiler 9 (ESPS, 1988)” (Sweatt, 2000, p. 49), the survey rates whether a teacher establishes a climate of high expectations for his or her students (Sweatt, 2000). The Cronbach alpha is .91 (Sweatt, 2000). The survey uses a five-point Likert
scale of 1 (strongly disagree), 2 (disagree), 3 (undecided), 4 (agree), and 5 (strongly agree). The inverted questions Likert scale is 1 (strongly agree), 2 (agree), 3 (undecided), 4 (disagree), and 5 (strongly disagree).

End of Course Test (EOCT) Score

The outcome variable in this study was the student’s academic achievement on the Georgia Milestones EOCT score in Coordinate Algebra and Analytic Geometry. The EOCT score is based on the individual student achievement on the test. In 2011-2012, the diagnostic test was established as an accountability assessment for the CCRPI. Students in coordinate algebra, analytic geometry, U.S. history, biology, physical science, economics/business/enterprise, ninth grade literature and composition, and American literature and composition course take the EOCT at the end of a semester as the final exam in these courses and a final assessment of a student’s proficiency in the course content. Students may complete a paper and pencil or an online version of the test.

The purpose of the EOCT is to “provide diagnostic information to help students identify strengths and areas of need in learning, therefore improving performance in all high school courses” (Georgia Department of Education, 2018, para. 3). The norm-referenced assessment items of the criterion-referenced test compare and rank test takers statistically based on age and grade level (Great Schools Partnership, 2014). The instrument informs stakeholders as to whether the state of Georgia is meeting federal accountability requirements.

The evidence of validity for the Georgia Milestone is how well the instrument assesses the Georgia standards and how well the instrument reports the results to the
stakeholders—students, parents, and educators. Therefore, the process used to develop the test speaks more to the validity of the instrument. Twenty-five standards related to validity govern how the test is developed. Two separate committees of educators review the test to ensure compliance with the Georgia curriculum and standards as well as account for possible biases and sensitivity. The test questions are field-tested. An analysis is done on the individual questions based on answered correctly or incorrectly. A group analysis results in the removal of any question that may be culturally biased to a given group of test takers. After review, questions are accepted as is, revised, or removed from the test. After analysis and revision, the test is field tested again. After the test questions are determined, the test forms are developed. Creators of the test forms consider content and statistical data into consideration when creating the test forms and ensure the tests equally assess students as in relation to content and difficulty. The final stage is the scoring of test and distribution to stakeholders. The creators of the test must adhere to strict test creation guidelines. Test generators must supply a detailed report of the actions taken during each phase of the test creation to the Georgia Board of Education. The Cronbach alpha median reliability for Coordinate Algebra is .90 and Analytic Geometry is .91 (Georgia Department of Education, 2018).

Data Collection Procedures

Following approval from the Mercer University Internal Review Board (see Appendix A), the researcher requested permission of the principal to conduct the study with teachers at Golden Gate High School. After receiving approval from the principal, the researcher emailed teachers of coordinate algebra or analytic geometry, requesting a
request their participation in the study. The request to participate included the importance, significance, and scope of the study, as well as the estimated time investment required (see Appendix F).

Upon participant consent, the researcher prompted participants to create their teacher identification number by using the last two digits of their house address and their two-digit birthday. Participants then combined all their classes and numbered them sequentially starting with one. The researcher reviewed each of the survey instruments with participants and allowed time for participants to ask questions and receive answers. In anticipation that some participants might have questions about the relevance of a question, the researcher advised participants to answer as best as possible as it related to their relationship with a student (Pianta, 2001).

The researcher then showed participants how to access the Student-Teacher Relationship Scale (STRS) and Survey of Individual Belief on the computer. Participants completed the survey on the computer using Survey Monkey. Per the STRS manual, the researcher read the following script to the teachers:

This is a measure of your relationship with your [African American Male students]. First fill in your name, gender, your race/ethnicity, and age.

Then read the instructions. Each of the items describes some aspect of your relationship with [each child]. You should read each item carefully and decide the extent to which that statement applies to your relationship with [the student]. Next, to each statement is a 5-point scale for recording the degree to which you believe this statement applies to your relationship with the child. After reading
the item, record this information by [choosing] the number that best applies to that statement as a description of your relationship with the child. Please answer every item and answer as honestly as you can. You can have as much time as you need to complete the form. Do you have any questions? (Pianta, 2001, p. 8)

After the completion of the individual STRS, each teacher reported the students’ EOCT scores. The researcher reiterated the importance of inputting the teacher identification number in every entry, for teacher identifications served as pseudonyms used in data analysis. In the case of students, pseudonyms consisted of the teacher number plus a two-digit number in numerical order. The researcher asked the participating teachers to keep a list of the student names associated with each pseudonym in case there were outliers necessary to explore anonymously. The researcher did not know the identity of the teacher or student.

Statistical Analysis

The researcher checked conditions to ensure that the use of hierarchical model selection was appropriate. This involved examining data for outliers, normality, linearity, homoscedasticity, autocorrelation, independence, and multicollinearity. Failure to do this may result in lack of trustworthiness of results (Osborne & Waters, 2002)

First, the researcher reviewed the boxplot and histograms of the data for outliers, which are data that are extremely different from the other data. If outliers exist in the dataset, it will cause the analysis of the data to be biased. Therefore, extreme cases were removed from the dataset (Field, 2013).
Next, the researcher checked conditions for normality, which refers to the normal distribution of data. According to Field (2009), data can be considered normally distributed if three criteria are met: the sample size is greater than 30, the Kolmogorov-Smirnov test score is not statistically significant \((p > .05)\), and the distribution of the data in a histogram is normally distributed. The actual sample size of 94 satisfied the first criteria. The researcher visually examined histograms for predictor variables and ran tests of normality per teacher and predictor variables.

The researcher then reviewed the scatterplot of standardized residuals versus EOCT scores to check for linearity and homoscedasticity. Data should be independent and not correlated. Visually, if there is no systematic association between the residuals and the predicted values in the model, then the data is assumed to be homoscedastic and linear (Field, 2013).

To determine if the data were auto correlated, the researcher used the Durbin-Watson statistic test. According to Field (2013), if the Durbin-Watson statistic is less than 1 or greater than 3 then the data may be correlated. However, if the Durbin-Watson statistic is close to 2, then it is assumed that the data is uncorrelated and independent (Field, 2013).

Multicollinearity indicates an interchangeability of the predictor variables (Field, 2013). In general, perfect multicollinearity does not exist in real-life data (Field, 2013). However, if the variable inflation factor (VIF) for each predictor variable is close to 1, then multicollinearity is assumed to be acceptable (Field, 2013). If the VIF is substantially greater than 1, then there is cause for concern (Field, 2013).
Using linear mixed modeling, the models were compared to determine which model best predicted the EOCT scores. The predictor variables used in the models were teacher-student warmth and teacher demandingness score. The researcher used -2 log likelihood as a criterion for model selection. Field (2013) explained, “the larger values of the log-likelihood statistic indicate poorly fitting statistical model” (p. 763). The -2 log-likelihood calculates the deviance, which has a $\chi^2$ distribution (Field, 2013) that tests the fit of the models compared to the baseline model. The models were compared through a systematic process of using the -2 log likelihood (-2LL) values and the number of parameters to calculate the $\chi^2$ distribution value. “$\chi^2 = (-2LL \text{ (baseline)} – (-2LL \text{ (new)})$ and the $df = k_{\text{new}} – k_{\text{baseline}}$” (Field, 2013, p. 764). Upon initial evaluation of $\chi^2$, the difference should be greater than 3.48. The variable $k$ represents the number of parameters. Using $\chi^2$ and $df$ a $p$-value is generated. The significance of the $p$-value determines whether it is worth going to a higher -2 log likelihood or an increased number of parameter model. If the $p$-value is not significant then it is not worth going to a bigger model (Field, 2013). Table 1 shows the variables and the interactions between the variables that were evaluated.
Table 1

Predictor Models

<table>
<thead>
<tr>
<th>Model #</th>
<th>Model Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Warmth</td>
</tr>
<tr>
<td>2</td>
<td>Demandingness</td>
</tr>
<tr>
<td>3</td>
<td>Teacher (Random)</td>
</tr>
<tr>
<td>4</td>
<td>Teacher (Fixed)</td>
</tr>
<tr>
<td>5</td>
<td>Warmth and Demandingness</td>
</tr>
<tr>
<td>6</td>
<td>Warmth and Teacher (Fixed)</td>
</tr>
<tr>
<td>7</td>
<td>Warmth and Teacher; Random Slope and intercept</td>
</tr>
<tr>
<td>8</td>
<td>Warmth and Teacher; Random Slope</td>
</tr>
<tr>
<td>9</td>
<td>Warmth and Teacher; Random Intercept</td>
</tr>
<tr>
<td>10</td>
<td>Warmth; Demandingness (fixed); Warmth * Demandingness</td>
</tr>
<tr>
<td>11</td>
<td>Warmth; Teacher (Fixed); Warmth * Teacher</td>
</tr>
</tbody>
</table>

Ethical Considerations

To ensure compliance with governmental ethics and regulations as it relates to doing research on human subjects, the researcher recertified through Collaborative Institutional Training Initiative (CITI). To further ensure ethical compliance, she participated in the Mercer University Institutional Review Board (IRB) process. After receiving Mercer approval, the researcher sought district approval from the desired study site. The researcher requested help from an associate who was a teacher in the district, and she subsequently spoke with her principal in regards to conducting the research at her school. Based on prior district approval, the principal granted approval for conducting the research at her school.

Following this, the researcher sought her associate’s assistance again in the form of recruitment of study participants. The researcher ensured these participants fully
understood the scope of the research, maintained student anonymity, and signed a consent form only after learning they could withdraw from the study at any time. In compensation, the research supplied each participant lunch and a gift card from a local retailer. Although an associate of one of the participants in the study, the researcher did not know any of the other participants in the study. She is unfamiliar with the school, principal, or school district of this study.

Assent from parents and consent from students was not necessary for IRB approval because the researcher did not know, or need to know, the identity of the students. The teacher participants in the study used a numeric pseudonym comprised of a teacher identification number and a two-digit number in numerical order to identify each student. This promoted anonymity and reduced the possibility of bias.

Role of the Researcher

At the time of the study, the researcher was a general education mathematics teacher with eleven consecutive years of experience teaching analytic geometry exclusively. Prior to her teaching career, the researcher was the manufacturing engineer for an automotive company. As an engineer for over 10 years, she was usually the only African American female or person under the age of 50 operating in a professional role in the executive meetings. Her transition to a teacher was fueled by her desire to increase African American and female presence in the executive boardroom.

The researcher believes all students have the ability to learn if they will put forth effort. Unfortunately, she has found many African American male students are very intelligent but uninterested or unmotivated to be an active participant in their learning.
As a result, they tend to fail classes. However, the researcher has observed that African American males tend to be more motivated during certain type of lessons as opposed to others. As an educator, the researcher is committed to the advancement of student learning, especially mathematics and passionate about finding a key to motivating African American males to achieve academically. She feels there is a loss of intellectual assets due to the lack of motivation and achievement of the African American male student in the classroom. Thus, she sought to research effective methods of motivating African American males to achieve academically.

As a number person, the researcher chose to conduct quantitative research to determine if the quantitative data supports the indications of the qualitative research. Numerous qualitative studies address the effect of a warm demander teacher on the academic performance of students, but Kleinfeld conducted the last quantitative research on warm demander teachers in 1972. Although Kleinfeld’s research population consisted of Native American and Inuit students who share some characteristics of African American male students, other dissimilarities, such cultural and 21st century societal influences, led the researcher to design a study that would address personal interests and a gap in the research literature.

Summary

Teachers were the participants in the study. Teachers completed a two-part survey instrument that indicated their student-teacher warmth and teacher demandingness. Participants also reported the End of Course Test (EOCT) score for their 94 students. The research utilized a correlational design of hierarchical model selection.
Using a top-down approach, a hierarchical model selection analysis evaluated which model best predicted the EOCT score of African American males in mathematics. Chapter 4 presents the results displayed in figures, tables, and narrative.
CHAPTER 4
RESULTS OF THE STUDY

This study examined how teacher demandingness and teacher warmth affected student achievement in mathematics on the Georgia Milestones End of Course Test (EOCT). Using a quantitative correlational research design, the researcher used hierarchical model selection to choose the best-fitting model. The -2 log likelihood was used to compare and assess the fit of the models. Four African American female teachers at a single suburban high school completed two surveys that evaluated the teachers’ warmth towards each student and their demandingness in the classroom.

Descriptive Statistics Results

A positive association exists between warmth and student EOCT score. Unfortunately, the result for demandingness is underpowered due to the small sample size. The overall EOCT score mean was 70.20 (9.93). Table 2 shows the mean and standard deviation for EOCT score, warmth, and demandingness for each teacher.

Table 2
Descriptive Statistics by Teacher

<table>
<thead>
<tr>
<th>Teacher</th>
<th>EOCT Score</th>
<th>Warmth</th>
<th>Demandingness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Davis</td>
<td>76.48</td>
<td>9.27</td>
<td>34.09</td>
</tr>
<tr>
<td>Jones</td>
<td>65.52</td>
<td>9.64</td>
<td>38.43</td>
</tr>
<tr>
<td>Thomas</td>
<td>70.13</td>
<td>10.25</td>
<td>37.88</td>
</tr>
<tr>
<td>Williams</td>
<td>68.50</td>
<td>7.89</td>
<td>24.15</td>
</tr>
<tr>
<td>Total Sample</td>
<td>70.20</td>
<td>9.93</td>
<td>33.28</td>
</tr>
</tbody>
</table>
Figure 1 shows the demandingness for each teacher. Figures 2 and 3 show the distribution of warmth and EOCT scores for each teacher.

**Figure 1.** Bar chart of mean demandingness score for each teacher.

**Figure 2.** Boxplot of warmth for each teacher.
Assumption Results

After visually reviewing the boxplot and the histogram, one outlier was observed. An EOCT grade score can range from 0 to 100; however, a grade score of 1 is an EOCT score that is extremely different from the other data. Therefore, the data associated with the EOCT grade score of 1 was deleted from the dataset before analysis. The other data are used in the analysis.

*Figures 4 and 6* show normal distribution of warmth and EOCT scores. The sample size for warmth and EOCT score is greater than 30. Demandingness is not normally distributed and has a sample size less than 30; therefore, demandingness fails the normal distribution test (see *Figure 5*). However demandingness is significant ($p = .000$) using the Kolmogorov-Smirnov test. Although demandingness is not normally distributed, it was shown to be significant. Therefore, the results using demandingness
does not have strength in predicting EOCT score, but it does indicate significance in the predicting of EOCT scores. Tables 3 and 4 display tests of normality by variable and tests of normality by teacher respectively.

**Figure 4.** Histogram of teacher warmth scores for all students.

**Figure 5.** Histogram of teacher demandingness.
Figure 6. Histogram of EOCT scores for all students.

Table 3

Tests of Normality by Variable

<table>
<thead>
<tr>
<th></th>
<th>Kolmogorov-Smirnov&lt;sup&gt;a&lt;/sup&gt;</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>df</td>
<td>p</td>
<td>Statistic</td>
<td>df</td>
<td>p</td>
</tr>
<tr>
<td>Warmth</td>
<td>.07</td>
<td>94</td>
<td>.200&lt;sup&gt;*&lt;/sup&gt;</td>
<td>.98</td>
<td>94</td>
<td>.067</td>
</tr>
<tr>
<td>Demandingness</td>
<td>.31</td>
<td>94</td>
<td>.000</td>
<td>.75</td>
<td>94</td>
<td>.000</td>
</tr>
<tr>
<td>EOCT Score</td>
<td>.09</td>
<td>49</td>
<td>.090</td>
<td>.99</td>
<td>94</td>
<td>.439</td>
</tr>
</tbody>
</table>

<sup>Note.</sup> <sup>*</sup> This a lower bound of the true significance. <sup>a</sup> Lilliefors significance correction
Table 4

Tests of Normality by Teacher

<table>
<thead>
<tr>
<th></th>
<th>Kolmogorov-Smirnov&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>df</td>
</tr>
<tr>
<td>Warmth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Davis</td>
<td>.15</td>
<td>23</td>
</tr>
<tr>
<td>Jones</td>
<td>.15</td>
<td>21</td>
</tr>
<tr>
<td>Thomas</td>
<td>.09</td>
<td>24</td>
</tr>
<tr>
<td>Williams</td>
<td>.16</td>
<td>26</td>
</tr>
<tr>
<td>EOCT Score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Davis</td>
<td>.12</td>
<td>23</td>
</tr>
<tr>
<td>Jones</td>
<td>.11</td>
<td>21</td>
</tr>
<tr>
<td>Thomas</td>
<td>.11</td>
<td>24</td>
</tr>
<tr>
<td>Williams</td>
<td>.14</td>
<td>26</td>
</tr>
</tbody>
</table>

Note. *This a lower bound of the true significance. *Lilliefors significance correction

The scatterplot in Figure 7 is a plot of residuals versus EOCT scores. Because the scatterplot shows no systematic relationship between the model predictions and the errors, it is assumed to have linearity and homoscedasticity (Field, 2013). The Durbin-Watson statistic test assessed the assumption of independent errors and autocorrelation. The Durbin-Watson statistic test is 2.13. Because the test is close to 2, there is an assumption that the data is independent and uncorrelated.
Figure 7. Scatter plot of standardized residuals and EOCT scores.

As shown in Table 5, the variable inflation factor for each predictor variable was close to 1; therefore, multicollinearity was not a problem. Williams served as the baseline to compare the other teachers.

Table 5

Multicollinearity Check

<table>
<thead>
<tr>
<th>Variable</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Tolerance</td>
</tr>
<tr>
<td>Constant</td>
<td>-</td>
</tr>
<tr>
<td>Warmth</td>
<td>.71</td>
</tr>
<tr>
<td>Teacher</td>
<td></td>
</tr>
<tr>
<td>Davis</td>
<td>.61</td>
</tr>
<tr>
<td>Jones</td>
<td>.55</td>
</tr>
<tr>
<td>Thomas</td>
<td>.54</td>
</tr>
<tr>
<td>Williams</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. Dependent variable: EOCT score. *Reference category
Model Selection

Eleven models were generated to explore which variables were meaningful in predicting EOCT scores. The linear mixed model procedure in the Statistical Package for Social Science (SPSS) was used, and the -2 log likelihood was used to assess the fit of the model and compare models. Table 6 shows a summary of the models, including the -2 log likelihood value and the number of parameters. Model 1, Model 2, and Model 3 had the fewest parameters but produced higher -2 log likelihood. Each of these models used one predictor variable (warmth, demandingness, and Teacher (random), respectively). Teacher is the only predictor variable in Model 4, but it is a fixed effect and not a random effect as in Model 3. Model 11 had the lowest -2 log likelihood. However, to achieve the -2 log likelihood required the use of nine parameters. Model 6 produced a slightly higher -2 log likelihood but with six parameters. Model 6 was approximately four points higher, but it required three less parameters.

After running 11 models, Model 6 and Model 9 were chosen as the best-fitting models to predict EOCT scores. Model 6 and Model 9 produced the lowest -2 log likelihood with the fewest parameters. In Model 6, the teacher is a fixed effect, and in Model 9 the teacher is a random effect. Therefore, Model 6 results can be attributed to these specific teachers in this study and cannot be generalized to the population of teacher. However, the teacher variable Model 9 can be generalized to a larger population because it was used as a random factor.
### Table 6

**Model Description and Outcome**

<table>
<thead>
<tr>
<th>Model #</th>
<th>Model Description</th>
<th>-2 Log Likelihood Result</th>
<th>Number of Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Warmth</td>
<td>688.92</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Demandingness</td>
<td>692.24</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Teacher (Random)</td>
<td>691.19</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Teacher (Fixed)</td>
<td>681.24</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Warmth and Demandingness</td>
<td>673.77</td>
<td>4</td>
</tr>
<tr>
<td>6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Warmth and Teacher (Fixed)</td>
<td>666.75</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>Warmth and Teacher Random Slope and Intercept</td>
<td>677.71</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>Warmth and Teacher Random Slope</td>
<td>680.84</td>
<td>4</td>
</tr>
<tr>
<td>9&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Warmth and Teacher Random Intercept</td>
<td>677.67</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>Warmth</td>
<td>673.74</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Demandingness (fixed)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Warmth * Demandingness</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>Warmth</td>
<td>662.76</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Teacher (Fixed)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Warmth * Teacher</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<sup>Note.</sup> <sup>a</sup> Best model. Dependent variable = EOCT score.

**Model Results**

The purpose of this study was to determine the best-fitting model to predict African American males’ performance on the Math EOCT. The candidate models included teacher warmth, teacher demandingness, and the interaction between these variables. The following research question guided this study: What is the best model for predicting the math End Of Course Test (EOCT) scores of African American males using
warmth, demandingness, and an interaction between warmth and demandingness as predictors?

When using fixed effects, Model 6 was shown to be the best-fitting model to predict African American males’ performance on the mathematics EOCT. Model 6 was composed of warmth and fixed teacher effect. As shown in Table 8, warmth is statistically significant \((p = .000)\) and has a positive association with EOCT score with a coefficient of 0.38. For every one-unit increase in warmth, there is on average a .38 increase in EOCT score. The predicted EOCT score can be defined as \(Y_i = b_0 + b_1X_{1i} + b_2X_{2i} + b_3X_{3i} + b_4X_{4i} + \epsilon\) where \(Y_i = \) the predicted EOCT score, \(b_0 = \) intercept, \(b_1 = \) warmth score coefficient, \(b_2 = \) Davis coefficient, \(b_3 = \) Jones coefficient, \(b_4 = \) Thomas coefficient, \(X_i = \) the warmth a teacher has towards the student and \(\epsilon = \) error. The equation for Model 6 is \(Y = 59.42 + .38*X_{1i} + 4.24*X_{2i} + -8.34*X_{3i} + -3.53*X_{4i} + \epsilon\). The formula works such that a teachers’ warmth score towards a student can be placed in formula for the respective teacher and the other teachers’ warmth will be set to zero. The formula will calculate the predicted EOCT score for the student. In general, a student’s EOCT score in Davis’s class will increase by 4.24 points. According to the model, if a student has Jones’ as a teacher their predicted EOCT score will be lowered on average by 8.34 points. Similarly, students who are in Thomas class EOCT score will be lowered on average by 3.53 points.
Table 7

Model 6 Predictor of Mathematics EOCT Scores

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>β</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>59.42***</td>
<td>0.20</td>
<td>[53.65, 65.19]</td>
</tr>
<tr>
<td>Warmth</td>
<td>0.38***</td>
<td>0.34***</td>
<td>[0.18, 0.57]</td>
</tr>
<tr>
<td>Davis</td>
<td>4.24</td>
<td>0.35</td>
<td>[-1.03, 9.52]</td>
</tr>
<tr>
<td>Jones</td>
<td>-8.34**</td>
<td>-0.69**</td>
<td>[-14.08, -2.60]</td>
</tr>
<tr>
<td>Thomas</td>
<td>-3.53</td>
<td>-0.29</td>
<td>[-9.07, 2.00]</td>
</tr>
<tr>
<td>Williams</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$F$</td>
<td>8.55***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. N = 510. CI = confidence interval.
*p < .05, **p < .01, ***p < .001.

Although Model 9 has slightly higher -2 log likelihood than Model 6, Model 9 is useful because it can be generalized to a broader population beyond this sample.

Model 9 was run with warmth as a fixed effect and teacher as a random effect. As shown in Table 8, warmth was statistically significant ($p = .000$) in predicting EOCT score. As shown in Table 8, warmth is statistically significant ($p = .000$) and has a positive association with EOCT score with a coefficient of 0.36. For every one-unit increase in warmth, there is on average a .36 increase in EOCT score. The predicted EOCT score can be defined as $Y_i = b_0 + b_1X_{1i} + \epsilon$, where $Y_i$ = the predicted EOCT score, $b_0$ = intercept, $b_1$ = warmth score coefficient, $X_{1i}$ = the warmth a teacher has towards the student and $\epsilon$ = error. The equation for Model 9 is $Y = 58.11 + .36X_{1i} + \epsilon$. Unlike Model 6, the equation for Model 9 can be used for any teacher. The warmth score of
teacher towards a student can be input into the formula and the formula will predict the EOCT score for the student. Using data in Table 8, the parameter estimate of 24.97 is the percent of variance accounted for in the model by teacher warmth as a random effect. The teacher effect is 24.97% of what one would need to make a perfect prediction of EOCT scores.

Table 8

Model 9 Estimates of Fixed Effects and Covariance Parameters for Predictors of EOCT Scores

<table>
<thead>
<tr>
<th>Parameter</th>
<th>B</th>
<th>β</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>58.11***</td>
<td>0.05 (0.22)</td>
<td>[49.24, 66.99]</td>
</tr>
<tr>
<td>Warmth</td>
<td>0.38***</td>
<td>0.32***</td>
<td>[0.17, 0.55]</td>
</tr>
<tr>
<td>Random Parameters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>74.43***</td>
<td>0.50*** (0.08)</td>
<td>[55.48, 99.86]</td>
</tr>
<tr>
<td>Intercept (Teacher)</td>
<td>24.77</td>
<td>.17 (0.16)</td>
<td>[3.95, 155.54]</td>
</tr>
<tr>
<td>-2*restricted log likelihood</td>
<td>677.67</td>
<td>208.22</td>
<td></td>
</tr>
</tbody>
</table>

Note. N = 94. Standard errors are in parentheses. Restricted maximum likelihood estimation was used.
* p < .05, **p < .01, ***p < .001.

In Figure 8, the lines represent the predicted EOCT score by warmth for each teacher. For each teacher, as warmth increased, on average EOCT score increased. The $R^2$ value for Jones’s class indicates that 44.4% of the variation in EOCT scores for students is explained by warmth. The strongest correlation existed in Jones’s class between the student EOCT score and the teacher warmth. On the other hand, Davis’s
class EOCT scores show that 5.6% of the variation in EOCT scores is due to warmth. Davis’s students’ EOCT scores showed the weakest relationship between EOCT scores and teacher warmth. Jones’s class had a steeper slope than the other teachers. For Jones, as warmth increased, the predicted EOCT score increased more than for other teachers. The other teachers had similar slopes and y-intercepts.

For Model 9, the variance between the EOCT scores within each class was 74.43 percent. The variance of EOCT scores between teachers was 24.77 percent. Based on the intraclass and interclass correlation coefficient, the variance of EOCT scores varied more within each class as opposed to between teachers.
Summary

The purpose of this study was to determine the best-fitting model predictor of African American male students’ performance on the math EOCT. Using linear model selection, -2 log likelihood was used to compare the different models to determine the best-fitting model. Teacher warmth and teacher warmth with fixed teacher effect were determined to be the best-fitting model predictor of African American male student performance on the math EOCT.
CHAPTER 5
DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

The purpose of this study was to utilize quantitative data to determine the relationship between a warm demander teacher and the mathematics performance of African American males. According to Ware (2006), a warm demander is a tolerant teacher who supports and encourages students while simultaneously establishing specific limits and high behavior and academic expectations. Qualitative studies indicate an African American male student performs better with a teacher who shows care while demanding high academic performance (Battey, 2013, Berry, Thunder, & McClain, 2011; Bonner, 2014; Bouch & Helfinbein, 2015; Ford & Sassi, 2012; Pitt, 2013; Ullucci, 2009; Ware, 2006). While maintaining expectations of high academic performance, the teacher is accessible to the student to help support and guide the student as necessary. Research shows that an African American male performs higher when in an environment where they receive the opportunity to establish their own rules of behavior while having clear rituals and routines (Howard, Douglas, & Warren, 2016; Huebner, 2012). They work better in an orderly classroom where they know what to expect.

This quantitative correlational study utilized hierarchical model selection to determine the best model for predicting the academic achievement of African American males on the mathematics End of Course Test (EOCT). Four high school mathematics teachers completed two surveys. On one survey, each teacher answered self-evaluative
questions that generated a teacher demandingness score. The other survey allowed teachers to answer questions regarding their relationship with each African American male student in their classroom. The teachers included the EOCT scores for each of their African American male students. This survey generated a warmth score that indicated the relationship between the teacher and the student.

Nine model variations were evaluated using -2 log likelihood. Two models were determined to be the best indication of the performance of African American males on the mathematics EOCT. The model with warmth and fixed teacher was the best model. However, the model with warmth and a random teacher effect was the best model to generalize to a larger population.

Discussion

According to qualitative research, teacher effect positively affects the academic performance of a student (Berry, Thunder, & McClain, 2011; Pitt, 2013). This quantitative study supports a positive association between teacher effect and student performance. In this study, warmth and teacher effect were both shown to be significant in indicating the performance of an African American male on the mathematics End of Course (EOCT) score. Warmth was statistically significant, and the slope of the regression line was positive for all four teachers. The data revealed the higher the warmth between the teacher and student, the higher the EOCT score was. Previous quantitative studies used the term student-teacher relationship to indicate the warmth of a teacher. However, the researcher was unable to find other quantitative studies to compare effect sizes. Previous studies dealt with elementary students, other ethnicities,
or the feelings students experienced based on the warmth of the teacher, but not the academic performance of the student. The effect sizes of previous studies related to student-relationship is shown in Appendix G. Based on comparing the effect sizes of other research studies, the effect size of .36 and .38 is a medium affect.

Warmth, variable in both of the selected models, was a statistically significant predictor of academic achievement of African American males. Per Figure 8, in Jones’s class, the linear relationship between EOCT score and warmth explains 44% of the variability in the EOCT scores. Jones’s warmth had the strongest correlation to EOCT score (.67). In addition, Jones’s warmth is statistically significant \( (p = .000) \) at the \( p < .05 \) level, and it decreases student EOCT scores by 8.34. The weakest correlation exists between EOCT score and teacher warmth in Davis’s classroom, where \( r = .24 \). Although Davis’s warmth increases EOCT score by the greatest factor of 4.24, the warmth is not statistically significant. Although three of the four teachers’ warmth is not statistically significant, warmth itself is shown to be statistically significant \( (p = .000) \). As seen in Table 8, for every increase in warmth, the EOCT score will increase by .38. The performance of Davis’s students on average surpassed that of the students of the other participating teachers. Warmth was statistically significant. However, teacher effect was shown to be significant as well.

According to prior research, warmth and demandingness must be present in the classroom for an African American male student to perform well academically. African American males respond positively academically to teachers who teach a curriculum rigorously coupled with care and discipline (Foster, 1994). Irvine and Fraser (1998)
echoed the idea of providing a rigorous curriculum while believing in the student’s ability and insisting on the best from the student. This study provides support that warmth is important in the academic achievement of African American males. Further research is necessary to draw conclusions about demandingness in this study.

Recommendations for Future Research

Drawing conclusions about demandingness from the data in this study would be limited and weak due to the small sample size and inclusion of only four teachers of female gender and African American descent. Therefore, future research is necessary on the effect of demandingness of teachers of other ethnicities and male gender on the academic performance of African American males. In addition to the inclusion of various teacher ethnicities as well as the male gender, identification of teachers as warm demanders can occur prior to inclusion in study, perhaps through a specified evaluation tool the teacher can be identified as a warm demander.

Another consideration revealed by this study is the indication that demandingness was not affectively evaluated due to its low sample size, for it limited the ability to draw conclusions and implications from the data. Therefore, research that includes at least 30 teachers is necessary to evaluate the effect of demandingness on EOCT scores. It would also be useful if the teachers and students completed the survey on teacher demandingness. Comparing the teachers’ self-evaluations and the students’ evaluations of the teachers’ demandingness would render a deeper and richer understanding of how demandingness affects EOCT scores from the teacher and student perspectives. Student evaluation of their teachers’ warmth would provide valuable information.
Furthermore, this study addressed the underperformance of African American males only. Future research to determine the relationship of warm demanders on African American females might prove beneficial when considering the underperformance of African Americans—males and females—in academic achievement compared to other ethnicities.

Finally, the researcher believes it is important to report the suggestions of previous researchers of warm demanders because of the importance of their effect on student achievement. These recommendations targeted more in-depth investigations of how relationships affect the learning process of students. For example, Battey (2013) suggested further research of how much students attribute their academic achievement on their positive or negative interactions with teachers and if African American students perceive their interactions with teachers to be more negative. Ford and Sassi (2012) recommended an examination of the interaction between African American teachers and European American students. Pitt (2013) believed broader and more in-depth knowledge of educators, practitioners, parents, students, and researchers is necessary to understand how to close the achievement gap of minority students. Ullucci (2009), whose research focused on the effects of teachers building a sense of community among their students and how the building of community eliminates the need to use punitive punishment as a classroom management strategy, expressed a desire to see more research done on “how” the teacher builds this sense of community in their classroom.
Implications for Practice

Research continues to indicate that the biggest influence on a student’s academic performance is the teacher. The warmth of a teacher is a direct predictor of student academic performance. A teacher must show she cares about a student; otherwise, a student is not likely to perform to potential. Classroom environment affects student perception of teacher empathy and belief in student ability.

Demandingness is also significant in predicting academic performance. If a teacher does not challenge a student or expect the student to do well, the student will live up to the teacher’s expectations. A teacher must have a rigorous classroom where high academic performance is a daily expectation of every student.

To improve the academic achievement of African American males, it is necessary to create a professional learning curriculum and accompanying professional learning opportunities to inform teachers of the importance of providing a warm and supportive classroom. Once teachers understand this need, they need to receive training with specific instruction and modeling of how to create a warm and supportive classroom. Furthermore, teachers need to deepen their subject matter knowledge to allow for a deeper and enriching classroom discussion that encourages critical thinking. This will facilitate the creation of a constructivist-learning environment that supports and inspires critical thinking and innovation.

Summary of the Study

Warmth was statistically significant with a medium effect size of $R^2 = 0.36$ in predicting EOCT score and accounted for 10% of the variance. Teacher effect accounted
for 24.97% of the variance in EOCT score. Although, demandingness is statistically significant using the Kolmogorov-Smirnov test, demandingness was not normally distributed. Therefore, the results using demandingness does not have much strength in predicting EOCT score, but it does indicate some significance in predicting of EOCT scores.

Qualitative research has indicated that a warm demander would have a positive effect on the academic performance of African American males. This quantitative research supported a positive correlation between warmth and the EOCT score for African American males in mathematics. The warmth of a teacher is statistically significant. Although, demandingness is statistically significant, a larger sample size is necessary to draw conclusive information from the data. As indicated in prior research, the teacher effect is important in the self-efficacy of a student, and an African American male is driven by his self-efficacy. Thus, a teacher’s belief about the student directly affects the student’s belief about himself. If an African American male does not believe he can achieve, he will fall prey to a self-prophecy of defeat and underperformance. In addition to helping students access the knowledge, a teacher must combine care and unyielding demand for students to perform at their highest potential.
REFERENCES


Farkas, G. (2003). Racial disparities and discrimination in education: What do we know, how do we know it, and what do we need to know? Teachers College Record, 105(6), 1119-1146.


APPENDICES
Wednesday, March 21, 2018

Ms. Zenja Evans
Mercer University
Tift College of Education - Atlanta
3001 Mercer University Dr
Atlanta, GA 30341

RE: Warm Demander effect on EOC Test score of African American males in mathematics (H1803066)

Dear Ms. Evans:

On behalf of Mercer University’s Institutional Review Board for Human Subjects Research, your application submitted on 13-Feb-2018 for the above referenced protocol was reviewed in accordance with Federal Regulations 13 CFR 50.6000 and 50 CFR 46.1020 (for expedited review) and was approved under category(ies) 07 per IRB 60364.

Your application was approved for one year of study on 21-Mar-2018. The protocol expires on 20-Mar-2019. If the study continues beyond one year, it must be re-evaluated by the IRB Committee.

Item(s) Approved:
New Student Application for research study using a quantitative correlational research design, hierarchical linear modeling will be used to determine the best set of predictors of African American male student’s EOC scores.

NOTE: You MUST report to the committee when the protocol is initiated. Report to the Committee immediately any changes in the protocol or consent form and ALL accidents, injuries, and serious or unexpected adverse events that occur to your subjects as a result of this study.

We at the IRB and the Office of Research Compliance are dedicated to providing the best service to our research community. As one of our investigators, we value your feedback and ask that you please take a moment to complete our Satisfaction Survey and help us to improve the quality of our service.

It has been a pleasure working with you and we wish you much success with your project! If you need any further assistance, please feel free to contact our office.

Respectfully,

Ava Candelas-Richardson, Ph.D., CIP, CIM.
Associate Director of Human Research Protection Programs (HRRP)
Member
Institutional Review Board

“Mercer University has adopted and agrees to conduct its clinical research studies in accordance with the International Conference on Harmonization’s (ICH) Guidelines for Good Clinical Practice.”
APPENDIX B

SURVEY OF INDIVIDUAL BELIEFS
The Survey of Individual Beliefs is a 20-question survey that evaluates a teachers’ attitude regarding the education of a student in their class. Answer choices to the questions are strongly agree, agree, undecided, disagree or strongly disagree. The survey asks teachers about their belief regarding every student’s ability to learn and master a subject matter in their class. Teacher is asked whether they believe there is a normal curve distribution of achievement based on ability and therefore do not feel responsible for assuring that all students master basic skills. In addition, whether they believe 90-100% of the students will master essential skills. The survey also asks whether a teacher believes outside influences affect a student’s academic performance more than their classroom instruction. The survey asks about the teachers’ classroom management and encouragement style. This includes questions regarding whether the teacher has high expectations of all students regardless of prior academic performance or socio-economic status. Additionally, whether they believe some children (other than the mentally handicapped) simply cannot achieve up to the learning levels of their more successful classmates. Based on this belief, do they have high standards and expectations of all students? This high standard and expectation is evident in how they question and engage all students of differing learning ability. Do they spend more or less time with a student based on their perception of the student’s ability? Do they believe at-risk students should be removed from regular classrooms and placed in homogeneous groups so their needs can be better addressed? (Effective Schools Profiler, 1998)
APPENDIX C

WARM DEMANDER QUALITATIVE EMPIRICAL STUDIES
<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Units &amp; Settings</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battey (2013)</td>
<td>Qualitative Design</td>
<td>One teacher with 25 elementary students who are 85% Latino and 15% African American</td>
<td>Relational interaction was an important part of quality instruction.</td>
</tr>
<tr>
<td>Berry, Thunder, &amp; McClain (2011)</td>
<td>Phenomenological Study</td>
<td>32 - 5th to 7th grade African American boys who are successful in mathematics</td>
<td>A balance between teacher high expectations and support in mathematics help students experience success. Creating a challenging mathematics classroom without negating the challenge is instrumental in promoting positive mathematics identities for boys.</td>
</tr>
<tr>
<td>Bonner (2014)</td>
<td>Grounded Theory</td>
<td>Random population from neighborhood events such as church, school events, and after school programs. Also through discussions with community experts and elders who have some connection to the schools.</td>
<td>Regardless of the cultural setting, relationship and trust are central to culturally responsible mathematics teaching (CRMT).</td>
</tr>
<tr>
<td>Boucher &amp; Helfenbein (2015)</td>
<td>Ethnographic Case Study</td>
<td>One Caucasian 22 year old female</td>
<td>The practice of teaching is as complicated as the theory of teaching and both must be examined to move teachers from disempowerment to solidarity with students. African American teachers establish their authority in a classroom by the shared culture, history and frame of reference. A Caucasian teacher establishes authority by prioritizing interpersonal relationships, communicate in culturally congruent ways, link care with justice, develop critical race consciousness, rally with students, and critique curriculum. Students believe that the major contribution to their academic success and racial identity development was setting goals, having self-motivation, having good relationships, awareness and learning about their race and their contribution to society. Teachers were able to manage discipline in the classroom by first focusing on building relationships, communication and a sense of belonging. They did not rely on punitive discipline policies to manage their classroom. Classroom management was less about rewards and punishment but about norms. Build on the definition of a warm demander, document the cultural transmission of a unique African American teaching style across generations and emergence of warm demander pedagogy.</td>
</tr>
<tr>
<td>Pitt (2013)</td>
<td>Qualitative (in-depth, personal interviews, focus groups, and surveys)</td>
<td>10 minority students (14-18 year olds) and 8 administrators</td>
<td></td>
</tr>
<tr>
<td>Ullucci (2009)</td>
<td>Case Study</td>
<td>6 white teachers (5 females, 1 male) (elementary school)</td>
<td></td>
</tr>
<tr>
<td>Ware (2006)</td>
<td>Comparative Case Study</td>
<td>2 different generation African American Teachers (middle school)</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX D

TEACHER-STUDENT RELATIONSHIP QUANTITATIVE EMPIRICAL STUDIES
Table E1

<table>
<thead>
<tr>
<th>Study</th>
<th>Units &amp; Settings</th>
<th>Design</th>
<th>Treatment (IV)</th>
<th>Outcomes (DV)</th>
<th>Control Variables</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birch &amp; Ladd (1997)</td>
<td>206 mixed gender kindergarteners</td>
<td>Correlation, dependency, conflict</td>
<td>Confictual relationship with boys</td>
<td>Gender and relational environment</td>
<td>Teachers reported having significantly more closeness relationships with females, significantly more conflictual relationships with boys; children with a higher conflict mean with teacher liked school less than students with lower mean levels of conflict; Classrooms with higher mean level of dependency showed students like school more than did children in classrooms characterized by a lower mean level of teacher-rated dependency. Children with more teacher-reported closeness in their teacher-child relationships liked school more than did children with less close relationships with their teachers. In addition, children with more conflictual or dependent teacher-child relationships liked school less than did children with less teacher-child conflict or dependency; neither closeness nor conflict made significant contributions; children in classrooms with higher mean levels of teacher-child conflict were less self-directed (according to teachers) than were children in less conflictual relational environments. Higher teacher-child closeness, lower dependency, and lower conflict were related to greater self-directedness on the part of students. Degree of closeness in the teacher-child relationship also appeared to be an important variable to consider when examining children's early school adjustment, given that it emerged as a significant correlate of children's academic performance, school attitude, and engagement.</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Units &amp; Settings</td>
<td>Design</td>
<td>Treatment (IV)</td>
<td>Outcomes (DV)</td>
<td>Control Variables</td>
<td>Findings</td>
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</tr>
<tr>
<td>Boak &amp; Conklin, 1975</td>
<td>10 math teachers</td>
<td>Multivariate</td>
<td>Teacher interpersonal skills</td>
<td>Student achievement</td>
<td>Not Applicable</td>
<td>Teacher ability to understand and respect students as persons was not a function of subject matter. Although, mathematics teachers were all in the low group prior to training but the group trained fell into the high group for the testing of the main hypotheses.</td>
</tr>
<tr>
<td></td>
<td>20 English</td>
<td>hierarchical</td>
<td></td>
<td></td>
<td></td>
<td>Teacher educational expectations was significantly positively correlated with school belonging and teacher-rated warmth, peer aspirations was significantly correlated with teacher-reported grades and youth-rated conduct problems, peer aspirations was also significantly correlated with teacher-rated behavior.</td>
</tr>
<tr>
<td></td>
<td>teachers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>School openness is most strongly associated with the reaction to teacher subscale at both the elementary and secondary levels. Openness is most strongly associated with reactions to teachers, satisfaction is least related to commitment to classwork. The relationship between openness and reactions to teachers is always about twice as big as the relationship between openness and general satisfaction. The relationship of openness with commitment to classwork never reaches a standard level of significance.</td>
</tr>
<tr>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td>Latino children scored lowest on emotion regulation, were less close to their teachers, and experienced more teacher-child conflict and dependence. In contrast, Black children had closer, less conflict-laden, and less dependent teacher–child relationships than children of other racial/ethnic backgrounds.</td>
</tr>
<tr>
<td>Study</td>
<td>Units &amp; Settings</td>
<td>Design</td>
<td>Treatment (IV)</td>
<td>Outcomes (DV)</td>
<td>Control Variables</td>
<td>Findings</td>
</tr>
<tr>
<td>------------------------------</td>
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<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Gehlbach, Brinkworth, Harris (2011)</td>
<td>119 students and 30 teachers</td>
<td>Correlation</td>
<td>Teacher-student relationship Change in teacher-student relationship</td>
<td>Student Achievement based on grade in class</td>
<td>Student gender and mother’s educational level</td>
<td>No significant association between changes in teacher-student relationships and student grades at the end of the year.</td>
</tr>
<tr>
<td>Goh, Fraser, 2000</td>
<td>1, 512 math elem. males and females from Singapore</td>
<td>Canonical Correlation</td>
<td>Teacher leadership, helping/friendly, understanding behaviors</td>
<td>Student achievement and attitude</td>
<td>Not Applicable</td>
<td>Better achievement and student attitudes were found in classes with more of an emphasis on a teacher's Leadership, Helping/Friendly, and Understanding behaviors, and less so with uncertain behavior.</td>
</tr>
<tr>
<td>Hughes, Wu, Kwok, Villarreal, Johnson (2011)</td>
<td>690 (52.8% males) 2nd and 3rd grade students over a 3 year period</td>
<td>Correlation</td>
<td>Children’s perception of warmth and conflict</td>
<td>Reading and math achievement</td>
<td>Not Applicable</td>
<td>Child-reported conflict was stable across the 3 years, whereas warmth declined. Boys and African American students reported greater conflict than did females and Caucasian and Hispanic students. Females and African American students reported higher warmth than boys and nonAfrican American students. Modest stability of teacher-perceived conflict and closeness through 6th grade, with relatively greater stability in perceptions of conflict. Levels of conflict at kindergarten higher for males, Blacks, had greater mean hours of childcare, had lower academic achievement scores, and greater externalizing behavior. Black children and those with less sensitive mothers were at greater risk for increased conflict with teachers over time. Levels of teacher-reported closeness were lower for males, lower quality home environments, and lower academic achievement scores. Gap in closeness ratings between males and females increased in the middle elem. years.</td>
</tr>
<tr>
<td>Jerome, Hamre, Pianta, 2008</td>
<td>878 students from kindergarten to 6th grade</td>
<td>Correlation</td>
<td>Conflict and closeness</td>
<td>Conflict and closeness</td>
<td>Not Applicable</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Units &amp; Settings</td>
<td>Design</td>
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</tr>
<tr>
<td>Kavenagh, Freeman, Ainley</td>
<td>9 teachers and 70 boys</td>
<td>Cluster Analyses</td>
<td>Teachers' perception of their relationships with students</td>
<td>Attitude toward English teacher, student’s perception of English teacher’s attitude towards them, student perceptions of English teacher’s helpfulness, student perceptions of English teacher’s positive feedback</td>
<td>Not Applicable</td>
<td>Boys perception indicated their teacher-student relationship as moderate and teachers indicated strong. The boys considered teachers less likely to understand or care about their feelings. Boys thought teachers were less likely to care about them, make themselves available or help them. On the other hand, teacher data indicated relationships that boys perceived as strong but teachers considered moderate were characterized as being less satisfying and more frustrating.</td>
</tr>
<tr>
<td>Lopez (2012)</td>
<td>995 students that are in grades 3, 4, 5; 62% of students are ELL</td>
<td>2 level hierarchical linear modeling</td>
<td>Teacher warmth and instructional support</td>
<td>Reading achievement</td>
<td>Student eligibility for free lunch, ethnicity, gender, and dual language immersion</td>
<td>Increasing teachers’ emotional warmth and instructional support are essential to in addressing educational disparities among students at risk for school failure. Findings of the present study reflect the relationship between teacher behaviors and reading achievement in generally positive, well-organized classrooms Results indicated warmth was positively associated with Chinese American children’s reading achievement, conflict was negatively associated with females (but not males’) math achievement, overall TCRQ was positively associated with males’ (but not females’) reading achievement</td>
</tr>
<tr>
<td>Ly, Zhou, Chu, Chen (2012)</td>
<td>207 Chinese students in the 1st and 2nd grade</td>
<td>Correlation</td>
<td>Teacher-student warmth and conflict</td>
<td>Reading and math Achievement</td>
<td>Not Applicable</td>
<td></td>
</tr>
</tbody>
</table>
Table E1 (Continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Units &amp; Settings</th>
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<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maulana, Opdenakker, Brok, Bosker (2012)</td>
<td>506 mixed gender Indonesia 7th and 9th graders</td>
<td>Correlation</td>
<td>Teacher Influence and proximity</td>
<td>Student motivation to learn math (intrinsic and extrinsic)</td>
<td>Not Applicable</td>
<td>Teacher influence and proximity was positively correlated with the student’s motivation to learn mathematics, the teacher influence was significantly related to all student motivational scales except extrinsic motivation, while teacher proximity was only related to the identified and intrinsic motivation scales. Analyses revealed significant relations among measures of achievement goals, self-efficacy, and strategy use. Significant relations were found among students’ achievement goals and measures of adaptive learning. Specifically, mastery and performance goals were positively correlated with students’ self-reports of academic efficacy and active learning strategies. Gender effect only (F = 5.365, df=3, 4787, p&lt;.001) School-level by gender interaction effect for student achievement only (F = 5.53, df=3, 4486, p&lt;.001). Both gender (F = 10.98, df=4, 4777, p&lt;.001) and school level (F = 15.25, df=4, 4777, p&lt;.001), but no interaction effect.</td>
</tr>
<tr>
<td>Meece, Herman, McCombs (2003)</td>
<td>109 middle high/ 147 high school teachers</td>
<td>Hierarchical linear modeling/ Correlation</td>
<td>Achievement goals, self-efficacy, and strategy use</td>
<td>Students’ achievement goals and adaptive learning</td>
<td>Not Applicable</td>
<td></td>
</tr>
</tbody>
</table>
Table E1 (Continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Units &amp; Settings</th>
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<th>Control Variables</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Murray &amp; Zvoch (2011)</td>
<td>193 African American students from 19 elementary classrooms</td>
<td>Multiple Regression Analysis</td>
<td>Student-Teacher Closeness, trust, and Conflict</td>
<td>Student emotional behavior and school-related adjustment</td>
<td>Not Applicable</td>
<td>African American youth who fell above the clinical cut point on the externalizing scale of the Child Behavior Checklist (n = 64) reported lower trust in relationships with teachers than did similarly matched students who did not have clinically significant externalizing symptomology. In addition, teachers rated students in the externalizing subgroup as lower in relational closeness and greater in relational conflict. Both student and teacher perceptions of teacher–student relationship quality were associated with student and teacher rated emotional, behavioral, and school-related adjustment.</td>
</tr>
<tr>
<td>Northup (2011)</td>
<td>103 self-report student climate surveys and 12 teachers</td>
<td>Hierarchical multiple regression</td>
<td>Teacher Instrumental help, relationship satisfaction and conflict within the teacher-student relationship</td>
<td>Academic Engagement</td>
<td>Not Applicable</td>
<td>Measures of satisfaction, instrumental help and lack of conflict were significantly correlated to a measure of academic engagement.</td>
</tr>
<tr>
<td>Phillippo (2013)</td>
<td>531 students and 45 teachers</td>
<td>Correlation</td>
<td>Teacher’s role (various forms of social and emotional supports to students)</td>
<td>Student academic press</td>
<td>Student-reported background and school performance characteristics</td>
<td>A positive relationship exist between teachers’ sense of efficacy about providing student support and their reported role breadth. In addition, teacher role breadth was positively related to student perceptions of teacher support and academic press</td>
</tr>
</tbody>
</table>
Table E1 (Continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Units &amp; Settings</th>
<th>Design</th>
<th>Treatment (IV)</th>
<th>Outcomes (DV)</th>
<th>Control Variables</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skinner &amp; Belmont (1993)</td>
<td>144 children, equally divided by sex and grade (Grades 3,4, and 5), and their 14 female teachers from a rural-suburban school district in upstate New York 144</td>
<td>Correlation</td>
<td>Autonomy, support and structure</td>
<td>Children’s motivation</td>
<td>Not Applicable</td>
<td>Correlational and path analyses revealed that teacher involvement was central to children's experiences in the classroom and that teacher provision of both autonomy support and optimal structure predicted children's motivation across the school year. Teachers' interactions with students predicted students' behavioral and emotional engagement in the classroom, both directly and through their effects on student's perceptions of their interactions with teachers. No relationship exists among teacher expectations for students, teacher attitudes toward the TAAS and student achievement. Although warmth was significantly related to academic achievement and to participation, the relationship between warmth and achievement was nonexistent after the effect of participation was eliminated.</td>
</tr>
<tr>
<td>Sweatt (2000)</td>
<td>22 teachers</td>
<td>Correlation</td>
<td>Teacher Expectations and Teacher Attitude toward the TAAS</td>
<td>Student Achievement</td>
<td>Not Applicable</td>
<td></td>
</tr>
<tr>
<td>Voelkl (1995)</td>
<td>13, 121 students in 8th grade in public school</td>
<td>Correlation</td>
<td>School warmth</td>
<td>Test achievement and student participation</td>
<td>Not Applicable</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX E

INFORMED CONSENT
Warm Demander Affect on EOCT Score of African American Males in Mathematics

Informed Consent

You are being asked to participate in a research study. Before you give your consent to volunteer, it is important that you read the following information and ask as many questions as necessary to be sure you understand what you will be asked to do.

Investigators
Zenja Lanore Evans, Ph.D. in Curriculum and Instruction, Mercer University, Tift College
3001 Mercer University Drive, Atlanta, GA 30341

Purpose of the Research
This research study is designed to determine the best model for predicting math End of Course Test (EOCT) scores of African American males using warmth, demandingness, warmth*demandingness as predictors? The data from this research will be used in my dissertation to complete my doctoral degree program.

Procedures
If you volunteer to participate in this study, you will be asked to complete two surveys. The first survey is an 11-item questionnaire to be completed on each African American male in your EOCT class. The second survey is one 20-item survey to be completed on your individual belief about your students. Your participation will take approximately 2 hours after school.

Confidentiality and Data Storage
During data collection phase, participants will be identified using a randomly generated number. Participant’s name and identify will not be disclosed in the dissertation. The data will be input in a statistic database called SPSS. The researcher and dissertation committee will have access to the data for the purpose of writing the dissertation. After completion of the study, the survey data will be stored at Mercer University for 3 years.

Participation and Withdrawal
Your participation in this research study is voluntary. As a participant, you may refuse to participate at any time. To withdraw from the study please contact Zenja Evans via email at zledoc@gmail.com or via phone at 404-245-2183.

Questions about the Research
If you have any questions about the research, please speak with Dr. Jeffrey Hall, Dissertation Committee Chair at 678-547-6520.

In Case of Injury
It is unlikely that participation in this project will result in harm to subjects. If an injury to a subject does occur, all expenses associated with care will be the responsibility of the participant and his/her insurance.

This project has been reviewed and approved by Mercer University’s IRB. If you believe there is any infringement upon your rights as a research subject, you may contact the IRB Chair, at (478) 301-4101.

You have been given the opportunity to ask questions and these have been answered to your satisfaction. Your signature below indicates your voluntary agreement to participate in this research study.

________________________________________  ______________________________________
Research Participant Name (Print)                  Name of Person Obtaining Consent (Print)

________________________________________  ______________________________________
Research Participant Signature                  Person Obtaining Consent Signature

________________________________________  ______________________________________
Date                                              Date
APPENDIX F

STRS PERMISSION
June 29, 2017

Dr. Robert Pianta
P.O. Box 400260
Charlottesville, VA 22904

Dear Dr. Pianta,

I am a doctoral student from Mercer University writing my dissertation tentatively titled “Warm Demander affect on EOCT score of African American males in mathematics” under the direction of my dissertation committee chaired by Dr. Jeffrey Hall.

I would like your permission to reproduce, to use and print your Student-Teacher Relationship Survey (STRS) under the following conditions:

- I will use this survey only for my research study and will not sell or use it with any compensated or curriculum development activities.
- I will include the copyright statement on all copies of the instrument.
- Upon request, I will send my research study and one copy of reports, articles, and the like that make use of this survey data promptly.

If these are acceptable terms and conditions, please indicate so by signing one copy of this letter and returning it to me either through postal mail or e-mail:

Mailing Address: Zenja Evans
6362 Ariael Dr.
Lithonia, GA 30038
Email Address: zledec@gmail.com

Sincerely,
Zenja Evans, Doctoral Candidate

Expected date of completion 5/2018

Signature Date
APPENDIX G

TEACHER-STUDENT RELATIONSHIP EFFECT SIZE COMPARISON CHART
Table G1

<table>
<thead>
<tr>
<th>Study</th>
<th>Participants (N)</th>
<th>Warmth measure</th>
<th>Outcome Measure</th>
<th>Raw Correlation</th>
<th>Partial Correlation (95% CI)</th>
<th>If Partial, what other factors are controlled for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birch &amp; Ladd (1997)</td>
<td>206 kindergarten children</td>
<td>STRS</td>
<td>Teacher – Child Relationship and Cooperative Participation</td>
<td>.52****</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cham, Hughes, West &amp; Im (2014)</td>
<td>569 students</td>
<td>Adolescent motivation for educational attainment</td>
<td>Teacher warmth</td>
<td>Year 9 - .23 Year 10 - .26**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evans (2018) (Random effects model)</td>
<td>94 high school students</td>
<td>Warmth using STRS</td>
<td>EOCT scores</td>
<td>.36 (.17 - .55)</td>
<td></td>
<td>Teacher (random effect)</td>
</tr>
<tr>
<td>Evans (2018) (Fixed effects)</td>
<td>94 high school students</td>
<td>Warmth using STRS</td>
<td>EOCT scores</td>
<td>.38 (.15 - .49)</td>
<td></td>
<td>Teacher Fixed effect</td>
</tr>
<tr>
<td>Gehlbach, Brinkworth, &amp; Harris (2011)</td>
<td>119 middle school students and 30 teachers</td>
<td>TSR positivity, TSR negativity</td>
<td>Student achievement and motivation</td>
<td></td>
<td>Variance between students Effort – .29 (0.04) Self-efficacy - .33 (0.05)</td>
<td></td>
</tr>
<tr>
<td>Hall (2014)</td>
<td>152 high school students</td>
<td>Randolph warmth scale</td>
<td>SAT scores in Math</td>
<td>.27</td>
<td>.17</td>
<td>Free and reduced lunch, Classroom (random effect)</td>
</tr>
<tr>
<td>Hughes, Wu, Kwok, Villarreal, &amp; Johnson</td>
<td>690 academically at risk elementary students</td>
<td>TSRQ</td>
<td>Warmth, behavioral engagement in Math</td>
<td>.33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table G1 (continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Participants (N)</th>
<th>Warmth measure</th>
<th>Outcome Measure</th>
<th>Raw Correlation</th>
<th>Partial Correlation (95% CI)</th>
<th>If partial, what other factors are controlled for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lopez (2012)</td>
<td>995 students and 46 urban classrooms</td>
<td>Classroom Assessment Scoring System STRS (Teacher)</td>
<td>Emotional warmth and prior achievement Closeness and Academic competence</td>
<td>.58***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murray &amp; Zvoch (2011)</td>
<td>193 At risk African American students</td>
<td></td>
<td>Closeness and Academic competence</td>
<td>.63***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timmermans, Boer, &amp; Werf (2015)</td>
<td>5316 6th grade Dutch students</td>
<td>School Leavers Test</td>
<td>Result on math test association with student-teacher relationship</td>
<td>.19**</td>
<td>Fixed Part</td>
<td></td>
</tr>
</tbody>
</table>

*Note. *p < .05, **p < .01, ***p < .001, ****p < .0001*