FACTORS RELATED TO NINTH-GRADE AFRICAN AMERICAN FEMALE STUDENT MOTIVATION TOWARD MATH ACHIEVEMENT: A CASE STUDY

by

ROXANNE T. A. COMEGYS

A Dissertation Submitted to the Faculty of Tift College of Education at Mercer University in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

Atlanta, GA

2018
FACTORS RELATED TO NINTH-GRADE AFRICAN AMERICAN FEMALE
STUDENT MOTIVATION TOWARD MATH ACHIEVEMENT: A CASE STUDY

by

ROXANNE T. A. COMEGYS

Approved:

Margie Wiggins Jones, Ed.D
Dissertation Committee Chair

Bruce Sliger, Ed.D
Dissertation Committee Member

Jeffrey Hall, Ed.D
Dissertation Committee Member

Jane West, Ed.D.
Director of Doctoral Studies, Tift College of Education

Lucy Bush, Ed.D.
Chair, Teacher Education, Atlanta

Keith E. Howard, Ph.D.
Interim Dean of Graduate Studies
DEDICATION

This dissertation is dedicated to my students, my great grandmother who wasn’t allowed to go to school, and the participants of this study.

It is in loving memory of those special people who transitioned to be with God during my time in this program. First to Amanda and Grandpa David, may you enjoy your eternal peace. To my students, Morgan, Cherish, and Rod, you will always be my kids. I will always be proud to have been a part of who you were.
ACKNOWLEDGMENTS

The pursuit of such an undertaking as wiring this dissertation was made possible by God’s grace. I am grateful. This is to acknowledge those people who God has placed strategically along my journey in completing this research study. First, thank you to my family who exercised understanding and patience while always providing supportive commentary. I would like to thank my church family for your prayers.

This dissertation was initiated underneath the guidance of Dr. Peter Ross. Thank you for your time. I would also like to acknowledge my current dissertation chair, Dr. Margie Jones, and my committee members, Dr. Sliger and Dr. Hall. Thank you for your help, encouragement, and most of all, your invaluable knowledge. I would also like to acknowledge Dr. Cheryl Jamison, who gave me personal guidance and willfully shared advice aiding me to persevere pass struggles.

Next, I would like to acknowledge my students from whom this study was inspired. Their willingness to push pass their personal circumstances and try what they feel is impossible, inspires me to continue to work harder for them. I would like to acknowledge the students who showed me a different way to approach teaching which pushed me toward concentrating move on motivating them toward academic success.

I am thankful for the professors at Mercer University for providing words of encouragement and offering extra support. Special thanks goes to the teachers and administrators that I have worked with throughout my program. Your continued support
enabled me to persevere through challenges. It is because of all of you that I never felt as though I was matriculating through this program alone.

Lastly, I would like to acknowledge the seven young ladies who agreed to participate in this study. This study would not exist without their dedication to wanting others to learn about who they are and how they learn. They courageously answered questions honestly with an attempt to remain authentic to who they are.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDICATION</td>
<td>iv</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>v</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>x</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xi</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>xii</td>
</tr>
<tr>
<td>CHAPTER</td>
<td></td>
</tr>
<tr>
<td>1. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Context of the Study</td>
<td>3</td>
</tr>
<tr>
<td>Purpose of the Study</td>
<td>6</td>
</tr>
<tr>
<td>Research Questions</td>
<td>7</td>
</tr>
<tr>
<td>Theoretical Framework: Achievement Goal Theory</td>
<td>8</td>
</tr>
<tr>
<td>Limitations</td>
<td>10</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>12</td>
</tr>
<tr>
<td>Summary</td>
<td>13</td>
</tr>
<tr>
<td>2. REVIEW OF LITERATURE</td>
<td>15</td>
</tr>
<tr>
<td>Conceptualization of Achievement Goal Theory</td>
<td>18</td>
</tr>
<tr>
<td>Theoretical Framework</td>
<td>20</td>
</tr>
<tr>
<td>Achievement Goal Theory</td>
<td>22</td>
</tr>
<tr>
<td>Theoretical Inconsistencies and Criticisms</td>
<td>23</td>
</tr>
<tr>
<td>Achievement Goals, Gender, and Race</td>
<td>26</td>
</tr>
<tr>
<td>Performance goals</td>
<td>29</td>
</tr>
<tr>
<td>Mastery goals</td>
<td>35</td>
</tr>
<tr>
<td>Motivation in Math and African American Female Students</td>
<td>54</td>
</tr>
<tr>
<td>Summary</td>
<td>60</td>
</tr>
</tbody>
</table>

vii
### TABLE OF CONTENTS (continued)

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3. METHODOLOGY</strong></td>
<td>63</td>
</tr>
<tr>
<td>Rationale for Research</td>
<td>67</td>
</tr>
<tr>
<td>Study Purpose and Research Questions</td>
<td>69</td>
</tr>
<tr>
<td>Research Design</td>
<td>70</td>
</tr>
<tr>
<td>Participants, Setting, and Sample Study</td>
<td>75</td>
</tr>
<tr>
<td>Data Collection and Instrumentation</td>
<td>78</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>79</td>
</tr>
<tr>
<td>Subjectivity Statement</td>
<td>80</td>
</tr>
<tr>
<td>Internal Validity</td>
<td>82</td>
</tr>
<tr>
<td>Dependability and Credibility</td>
<td>82</td>
</tr>
<tr>
<td>Ethical Safeguards</td>
<td>83</td>
</tr>
<tr>
<td>Summary</td>
<td>84</td>
</tr>
<tr>
<td><strong>4. DATA REPRESENTATION AND ANALYSIS</strong></td>
<td>86</td>
</tr>
<tr>
<td>Site Description</td>
<td>88</td>
</tr>
<tr>
<td>School Environment</td>
<td>89</td>
</tr>
<tr>
<td>Classroom</td>
<td>90</td>
</tr>
<tr>
<td>Participants and Interviews</td>
<td>91</td>
</tr>
<tr>
<td>Participant 1: Oni</td>
<td>92</td>
</tr>
<tr>
<td>Participant 2: Kali</td>
<td>99</td>
</tr>
<tr>
<td>Participant 3: Zola</td>
<td>107</td>
</tr>
<tr>
<td>Participant 4: Bisa</td>
<td>112</td>
</tr>
<tr>
<td>Participant 5: Amina</td>
<td>119</td>
</tr>
<tr>
<td>Participant 6: Dalia</td>
<td>125</td>
</tr>
<tr>
<td>Participant 7: Ada</td>
<td>131</td>
</tr>
<tr>
<td>Focus Group</td>
<td>136</td>
</tr>
<tr>
<td>Descriptive Data</td>
<td>148</td>
</tr>
<tr>
<td>Triangulation</td>
<td>151</td>
</tr>
<tr>
<td>Emerging Themes</td>
<td>153</td>
</tr>
<tr>
<td>Theme 1: Relationships</td>
<td>155</td>
</tr>
<tr>
<td>Theme 2: Classroom Goal Structures</td>
<td>157</td>
</tr>
<tr>
<td>Theme 3: Interest in Math</td>
<td>159</td>
</tr>
<tr>
<td>Theme 4: Academic Motivation</td>
<td>161</td>
</tr>
<tr>
<td>Theme 5: Disparate Themes</td>
<td>161</td>
</tr>
<tr>
<td>Summary</td>
<td>163</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS (continued)

CHAPTER Page

5. SUMMARY AND REFLECTION .............................................................. 166

  Findings ............................................................................................... 169
    Finding 1 ....................................................................................... 170
    Finding 2 ....................................................................................... 173
    Finding 3 ....................................................................................... 177
    Finding 4 ....................................................................................... 178
  Reflection ......................................................................................... 181
  Limitations and Recommendations ............................................. 182
  Conclusion ......................................................................................... 184

REFERENCES .......................................................................................... 188

APPENDICES .......................................................................................... 2044

  A. IRB APPROVAL .............................................................................. 2055
  B. STUDENT INFORMED ASSENT ..................................................... 2077
  C. PARENTAL INFORMED CONSENT FORM .................................... 2111
  D. INTERVIEW QUESTIONS ............................................................... 2177
  E. LETTER TO PARTICIPANTS ............................................................ 2199
<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grades and Test Scores per Participant</td>
<td>149</td>
</tr>
<tr>
<td>2</td>
<td>Achievement Goal Orientation per Participant</td>
<td>152</td>
</tr>
<tr>
<td>3</td>
<td>Themes as Factors</td>
<td>154</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Achievement Goal Orientations across Race and Gender</td>
<td>21</td>
</tr>
<tr>
<td>2</td>
<td>Factors Related to African American Female Motivation</td>
<td>164</td>
</tr>
</tbody>
</table>
ABSTRACT

ROXANNE T. A. COMEGYS

FACTORS RELATED TO NINTH-GRADE AFRICAN AMERICAN FEMALE STUDENT MOTIVATION TOWARD MATH ACHIEVEMENT: A CASE STUDY
Under the direction of DR. MARGIE WIGGINS JONES, Ed. D

This qualitative study investigated factors related to African American female motivation toward math achievement. The investigation included developing an understanding of their achievement goal orientations. This case study approach utilized semistructured interviews adapted from the Patterns of Adaptive Learning survey (Midgely, 2002). The data were analyzed using thematic coding and triangulation. Descriptive data included math scores, which were compared with data from individual interviews and a focus group. Five themes emerged from the data analysis: (1) relationships, (2) classroom goal structures, (3) academic motivation, (4) interest, and (5) disparate themes. These themes provide language to describe the findings from this study. The four main findings were: (1) the relationships of African American females with adults and peers are important and part of their cultural identities, serving as mediators between motivational processes and their learning; (2) classroom environments that support the motivation of African American females toward math achievement should include learning targets reflective of mastery goal structures and high expectations; (3) the interest of African American females is a conductor between academic motivation and motivation toward math achievement; and (4) achievement goal
theory is a suitable framework for researching different aspects of African American female motivation and learning.

Further research should include the teacher perspective on student motivation toward math achievement. Research should also consider focusing on classroom goal structures that affect African American motivation. Subsequent research should include purposeful sampling to ensure there are participants who reflect a spectrum of math competency levels.
CHAPTER 1

INTRODUCTION

“It says . . . it means . . . that I am the smartest there is. And ever was. I’ve said that myself a zillion times.”
-Moon girl (Montclaire, Reeder, Bustos, & Bonvillian, 2016)

This quote is from the graphic novel Moon Girl and Devil Dinosaur, a Marvel comic book whose heroine is an African American female as the smartest being in the universe (Montclaire et al., 2015). In Moon Girl’s own words and thoughts, the reader can learn about the confidence she has in her ability to excel in any context. There is a need for this work of art to be incorporated into the lived experiences of African American female students. In the comic book, Moon Girl must overcome limiting conditions within her school day to maintain her motivation. In reality, African American female students participate in similar circumstances to maintain motivation. It is important to learn from them about their experience in school to serve their needs better and to understand the place from which their motivation derives. This qualitative investigation of factors related to African American female motivation leads to an understanding of broader issues connected to gender, race, and math achievement.

Within math-intensive science, technology, engineering, and math (STEM) fields, African American females are at the intersection of two underrepresented groups: African American workers and female workers (American Community Survey Reports [ACS],
Research has shown that African American females are entering math-intensive STEM pathways at the postsecondary level but are not continuing to complete these pathways or enter math-intensive STEM careers (Kiefer & Sekaquaptewa, 2007). This suggests that while there are factors that sway African American females from continuing their math-orientated pathways, the gap in opportunity to take more advanced math courses is beginning to close. However, this access does not guarantee that students will be motivated to be successful in math-intensive STEM subject matter. This study investigated the achievement goals of African American female high school students to increase understanding of the factors that motivate them toward math achievement.

Motivation is a key element in learning and fosters the appetite required to engage in learning and persist in metacognitive development (Ames, 1992; Nicholls, 1984). The position from which students are motivated to learn directs their drive toward competence and is a deciding factor in how they strive for achievement (Ames, 1992; Dweck, 1986). This process can best be described by achievement goal theory, which connects the student’s motivational position to academic outcomes and can be referred to as achievement goal orientations (Nicholls, 1984; Senko, Hulleman, & Harackiewicz, 2011). For African American female students, an investigation into their achievement goal orientations can reveal how they are motivated in math classrooms to be academically successful.

This chapter provides an explanation of why the problem exists, other research avenues to address the problem, and how this study will add to the existing research. In addition, this chapter relates the purpose of the study and research questions that guided
this study. Furthermore, this chapter presents an explanation of the theoretical framework used within this study and key terms that will be useful in understanding the explanations given in this study. First, it is important to frame the context this problem seeks to address.

Context of the Study

Females are underrepresented in math-intensive STEM career fields relative to men (ACS, 2013; Ceci & Williams, 2010; Kiefer & Sekaquaptewa, 2007). While only 38% of STEM degree holders are females, 71% of female STEM degree holders pursue nonSTEM careers (ACS, 2013). When considering race and culture, only 7% of STEM degree holders are African American, and 72% of these students pursue nonSTEM careers (ACS, 2013; National Center for Education Statistics [NCES], 2015). These data reveal a trend of few African American females within STEM fields overall.

For math-intensive STEM careers, the data show a different picture for females in general. Only 3% of all STEM workers are in math-intensive careers, which has created a need for research into math-intensive STEM content in school (ACS, 2013). Females, although underrepresented in STEM fields overall, have experienced a slow increase within the last 20 years in math-intensive fields but remain low in engineering (13%). They now make up 47% of math-intensive field careers (ACS, 2013). However, African American men and females make up less than 20% of workers in math-intensive fields (ACS, 2013; NCES, 2015). The presence of African American females in math-intensive STEM careers is small, although the number of careers available has increased (ACS, 2013). As Ceci and William (2010) contended, the data indicate that, coupled with a low
percentage of African American and females receiving degrees in these fields, African American females are deciding before college about considering to not pursue careers in math. Furthermore, research also suggests this trend has occurred despite increases in the advanced courses offered to high school students (Tyson & Roska, 2017).

Researchers have aimed to determine and investigate the factors that may deter African American female students to from pursuing careers in math (NCES, 2015). Research on stereotypes has revealed that some females adopt the societal expectations of having low competency in math compared to their male counterparts and choose not to complete postsecondary courses for math-intensive careers even when they show the competency to do so (Ceci & Williams, 2010; Kiefer & Sekaquaptewa, 2007). Alongside gender specific stereotypes, African American females also face cultural stereotypes. Furthermore, while African American females have attempted to pursue math-intensive career paths, their learning experiences have lacked the necessary supports to motivate them (Adelabu, 2007).

Current research on stereotypes seeks to identify how African American females can overcome stereotypes to create goals (Finnigan & Corker, 2016; Kiefer & Sekaquaptewa, 2007). A trend in research is to address the creation of goals by seeking to understand goal orientations (Nicholls, 1984). Through a focus on goal orientations, researchers concluded that African American females create goals to protect their self-concept.

Finnigan and Corker’s (2016) quantitative study compared goals and subsequent success in math as they relate to stereotypes. Although the study did not reveal a
significant correlation between goals made to avoid stereotypes and success in math, the researchers noted the participant’s self-concept toward math success may have skewed the data. Other research that revealed stereotypes are threats to self-concept in relation to autonomy and self-esteem (Alexander & Hermann, 2016) supports this conclusion.

For example, the work of Singh, Chang, and Dika (2010) identified similar findings. First, to protect one’s self-concept, African American females who may internalize stereotypes will reduce their engagement in math, since school engagement and self-concept have a reciprocal correlation. Second, African American females show the highest levels of self-esteem, which makes the drive to protect their self-concept have a great internal importance (Bachman, O’Mailey, Freedman-Doan, Tizesniewski, & Donnellan, 2011). Their goals guide their self-concept; therefore, the way in which African American females are oriented to pursue math competence determines how they create goals to overcome stereotypical threats (Bachman et al., 2011; Finnigan & Corker, 2016).

Other research that has addressed African American student motivation has focused on cultural differences. Fordham and Ogbug (1986) contextualized the academic experience of African American adolescents within a conflict against the society’s support for the culture of the majority, which they viewed as oppressive. This study demonstrated that African American students make academic decisions based on their need to resist assimilation to the culture of the majority. As a result, African American students have internal conflicts about being academically successful, which can serve as an indication that they have assimilated (Ogbug, 2004). This study was not intended to
imply that African American students did not want to succeed. Instead, it was meant to
draw attention to the peculiar position of African American students, as they had to
navigate through views of what they wanted to be and what they were convinced they
could be (Ogbu, 2004).

Therefore, it is important to consider the cultural and affective needs of African
American students when investigating their student motivation. Their internal views in
the form of their self-concept, self-esteem, and self-efficacy are critical to discussing their
academic achievement (Honora, 2002), for research on achievement goal theory has
found connections between these areas through investigating student motivation
orientation (Huang, 2016; Hulleman, Schrager, Bodmann, & Harackiewicz, 2010).
Therefore, achievement goal theory serves as a framework to research the complex
factors that affect African American female motivation. However, some researchers have
expressed that achievement goal theory lacks research on the implications of achievement
goals regarding this cross section of gender and culture (D’Lima, Winsler, & Kitsantas,
2014; Jones & Ford, 2014; Urdan & Mestas, 2006). A qualitative investigation of
African American female achievement goal orientations will help gain a better
understanding of factors that can motivate African American female students toward
math achievement.

Purpose of the Study

The purpose of this qualitative study was to gain an understanding of the factors
that motivate African American female students toward math achievement in high school.
This study used achievement goal theory as the theoretical framework, since it addresses
the motivational orientation from which these students strive toward their goals. It also provided a framework to account for other factors shown by research to affect the academic outcomes of these students including self-concept, self-efficacy, and intrinsic motivation (Cerasoli & Ford, 2014; Niepel, Brunner, & Preckel, 2014). This study also serves to add to existing research on motivation in education as a critical focus, research on providing affective academic supports for minority students, and research on achievement goal theory.

Motivation in math decreases for many adolescents as they enter high school (Murayama, Pekrun, & Lichtenfeld, 2013; Peklaj, Podlesck, & Pečjak, 2015). This decrease in motivation can have severe academic consequences for female students. For female high school students, research has shown that female adolescents require more focused attention on their affective characteristics to be academically successful (Shin & Ryan, 2014). Thus, there is a need for research that seeks to understand underlying factors related to motivation. Existing qualitative research that has explored topics of achievement goal theory recommends the need for executing a focused study that by design attempts to observe the process of motivation of specific demographics (Schunk & Miller, 2002; Urdan & Mestas, 2006). This study provides a qualitative investigation using achievement goal theory to gain an understanding of the factors that motivate African American female students to achieve in high school math.

Research Questions

1. What are the perceptions of African American female students about their high school math classes?
2. How do African American female achievement goal orientations affect their ability to persevere in math?

3. What factors affect African American female motivation toward math achievement?

Theoretical Framework: Achievement Goal Theory

This section describes research about student motivation and achievement goal theory research across differences of culture and gender. Additionally, it highlights potential gaps in the research for which this study sought to fill. Achievement goal theory describes how students are oriented toward approaching or avoiding goals to achieve competence (Ames, 1992; Dweck, 1986; Elliot & Church, 1997; Nicholls, 1984). Achievement goals equate with performance approach goals, performance avoidance goals, or mastery goals (Senko et al., 2011).

Because research on achievement goals is vast, it offers several perspectives on the definition of these major terms and their implications (Hulleman et al., 2010; Senko & Tropiana, 2016). Although one of the core aims of achievement goal theory was to find links between motivation orientations and academic achievement, few research studies have shown a statistically significant correlation between achievement goals and achievement (Dweck, 1986; Hulleman et al., 2010). Instead, achievement goal theory has consistently shown a relationship toward antecedents to achievement while providing reasons that achievement goal theory can inform instructional practice (Hulleman et al., 2010; Senko, Hama, & Belmonte, 2013).
However, meta-analyses have shown some inconsistencies within achievement goal theory research is due in part because achievement is defined differently by the researchers, depending on where and how the study is conducted (Huang, 2012; Hulleman et al., 2010). There are also problems within the differences of methodologies chosen for this research (Elliot & Murayama, 2008). The two data instruments used within much of the research include the Patterns for the Adaptive Learning Scale (PALS) and the Achievement Goal Questionnaire (AGQ), both of which have been revised and contain similar questions but from different perspectives (Elliot & Church, 1997; Elliot & McGregor, 2001; Elliot & Murayama, 2008).

Yet, achievement goal theory has been able to relate the observable actions of students to their affective needs within a motivational context (Ames, 1992; Dweck, 1986). Research reveals that achievement goals have an expectant reciprocal relationship with self-efficacy (Huang, 2012). When students approach goals, they have higher levels of self-efficacy, and when they avoid goals, they show a lack of self-efficacy (Diseth, 2011; Huang, 2016). Research reveals that students who show performance approach goal orientations also possess positive self-concept and show test achievement (Niepel et al., 2014). Mastery goals, which characterize high achieving students, have a reciprocal relationship to intrinsic motivation and academic adjustment (Schiefele & Schaffner, 2015).

Positive metacognitive academic outcomes produce achievement in math (Ahmed, Minnaert, Kuyper, & van der Werf, 2012; Benken, Ramirez, Li, & Wetendorf, 2015). These outcomes include self-efficacy and intrinsic motivation (Pintrich, 2000;
Schunk, 1996; Schunk & Miller, 2002). It also been shown that students who achieve in math have high levels of self-concept (Pantziara & Philippou, 2015). Therefore, achievement goal theory, which links these concepts to the goals that students strive for, can offer a functional framework to investigate factors that motivates African American female students toward math achievement.

Intrinsic motivation is not only a predictor of achievement, it is also necessary for engagement (Alivernini & Lucidi, 2011; Çetin, 2015; Greene & DeBacker, 2004). For African American adolescents who need to feel a sense of belonging and engagement, the way the teacher approaches forming relationships with these students will influence their level of motivation to engage in the tasks (Diemer, Marchand, McKellar, & Malanchuk, 2016). It is important that research informs instructional practice of ways to motivate African American female students in math.

Limitations

Tesch (2013) and Yin (2009) indicated that it is important to state the perspective and background of the researcher when conducting qualitative research. As Creswell (2013) explained, this will guide how the data will be interpreted and how themes will be created from the data. I am an African American female who teaches math in the same high school where I am conducting the research. While this may cause some doubt to the credibility of the themes that I may discover in my research study, it provided me with the tools to navigate fluently through cultural norms that I may would have to otherwise become accustomed. However, I made every effort to include participants whom I did not currently teach at the time of this study. By selecting to include only ninth grade
participants, I was able to avoid this situation. To assist with credibility, I enlisted another colleague to assist with data collection.

The study site was a high school in an urban area with a high crime rate and high poverty rare. Although this study focused on African American female students, it is possible that the data collected from this study could reflect cultural norms and themes specific to those surrounded by or living in poverty. In qualitative research, all parts of the environment are considered. The entire setting and description of the case help to create an understanding of the case and its system (Woodside, 2010; Yin, 2009). While the setting of the high school possibly posed some threats to the focus of the research study, it provided further avenues of research for achievement goal theory in terms of socioeconomic status and school design.

The physical design of the school building posed another limitation to the study. The students who participated in the study attended a magnet school housed in a separated wing of the school. Some students did not matriculate with others students in the building consistently. Students in the magnet school voluntarily enrolled and experienced a rigorous curriculum and additional expectations. The application process to attend the magnet school did not include an interview process. To qualify for enrollment in the magnet school, students could not have multiple instances of out-of-school suspensions or referrals for school expulsion. Because of this singularity, the results of this study may not be transferable to other school programs (Woodside, 2010).
Definition of Terms

The following definitions are provided to facilitate understanding of the terms used in this research.

_Achievement goals_ are goal orientations that describe a position from which students are motivated toward aims for achievement.

_Extrinsic motivation_ refers to motives that derive from external factors.

_Intrinsic motivation_ refers to motives that derive from internally desiring to complete a task for the sake of completing the task.

_Math anxiety_ is the feeling of inadequacy and anxiety that arises when presented with a math related task.

_Math achievement_ refers to academic success in math classrooms.

_Performance approach goals_ are achievement goals that describe motivation from a position of approaching a goal based on normative reference.

_Performance avoidance goals_ are achievement goals that describe motivation from a position of avoiding a goal based on normative reference.

_Mastery approach goals_ are achievement goals that describe motivation from a position of achieving a goal based on personal growth.

_Self-concept_ is the way the cognitive processes are organized to form an individual’s view of him- or herself.

_Self-determined motivation_ is the learner’s intrinsic desire to engage in an activity to achieve a goal.
Self-esteem is a self-concept characterized by the knowledge that a person has of how they view him- or herself.

STEM refers to research, education, and careers that focus on science, technology, engineering, math.

Stereotype threat refers to societal expectations of a group or person that has an effect on the self-concept.

Summary

This chapter introduced the proposed concern for African American female high school students, who are at the cross section of two underrepresented groups in math-intensive STEM fields (ACS, 2013). Research shows that these students must contend with stereotypes, a lack of pedagogical understanding from teachers, and negative influences from peer relationships (Alexander & Hermann, 2016; Enyedy & Mukhopadhyay, 2007). Factors of this type influence how they view the learning aims of their teachers and direct how they are motivated to succeed in math. Due to this, researchers encourage educators to focus on the affective needs and cultural assets of African American students to maintain engagement and encourage achievement (Adelabu; 2007; Thomas & Columbus, 2010). This includes self-concept, self-efficacy, and motivation.

Research on academic motivation in math has revealed differences across race and gender (Schunk & Miller, 2002; Shin & Ryan, 2014; Zusho & Clayton, 2011). By investigating the achievement goals of African American female students, educators can gain understanding of their positioning to achieve goals to be successful in a math
classroom. Research on the achievement goals of African American students warrant further investigation into the motivation of these students within specific contexts (Adelabu, 2007; Freeman, Gutman, & Midgley, 2002; Ford, Jones, & Alexander, 2015; Thomas & Columbus, 2010). This study used qualitative methods to explore the achievement goals of African American female students in math.

Additionally, this research study added to research on achievement goals, African American female students in math classrooms, and academic motivation. Chapter 2 provides a literature review of the theoretical underpinnings related to achievement goal theory. It also presents an explanation of how research has addressed ways to motivate African American female students in high school math courses.
CHAPTER 2

REVIEW OF LITERATURE

An aim of this study was to inform teachers about the importance of prioritizing African American female motivation, since it is imperative to learning and influences how students engage in pursuing goals (Bandura, 1971; Pintrich, 2000; Ryan & Deci, 2000). It offers a focused investigation on the academic development of African American adolescents (Adelabu, 2007; Jones & Ford, 2014). Lastly, this study adds to the research within math-intensive STEM fields, since this study focuses on African American females who are an underrepresented group in math-intensive STEM fields (ACS, 2013; Ceci & Williams, 2010, Komarraju & Dial, 2014).

Chapter 1 introduced the factors that may cause researchers to deemphasize the need for this type of study. Recent years have seen increased accessibility to more advanced math courses in schools (American Community Survey Reports [ACS], 2013). Despite this increase in math course offerings, African American female students have become an underrepresented group in math-intensive STEM fields (ACS, 2013; Ceci & Williams, 2010). Furthermore, African American females are underrepresented in the math-intensive STEM fields and are at the intersection of two underrepresented groups through gender and race (Alexander & Hermann, 2016; Ceci & Williams, 2010).

Research has addressed the cause of this issue using other frameworks and focused on college-level female students. Some research has used the theory of
stereotype threat to show that female college students begin to internalize stereotypes related to the concept that males are better equipped for math-intensive STEM fields (Ceci & Williams, 2010; Kiefer & Sekaquaptewa, 2007). These studies concluded that female college students showed a decrease in motivation in math as they progressed in high school. These studies also offered that this problem does not start at the college level but reaches back to what has occurred in high school (Ceci & Williams, 2010; Norman & Aron, 2002).

Research about motivation has lacked investigations about high school students across gender and race that use self-reports to understand how they are motivated in math courses (D’Lima, Winsler, & Kitsantas, 2014; Jones & Ford, 2014; Urdan & Mestas, 2006). This study used a qualitative case study method to investigate how African American female students are motivated in math through the lens of achievement goals. Quantitative studies are limited in that they cannot explain how a phenomenon occurs and cannot offer an investigative analysis of the participants as they naturally interact with their environment and others (Tesch, 2013; Yin, 2009). This case study methodology included an in-depth analysis of how African American female students are motivated in a math classroom, which can allow math teachers to gain an understanding of how to approach instruction to serve these students better (Tesch, 2013; Woodside, 2010).

Furthermore, this study used methods of individual interviewing and a focus group together to provide a more exhaustive, credible, and valid study (Creswell, 2013; Woodside, 2010). The patterns gathered from self-reports provided a source of rich data
for the study while allowing African American female high school students to use their voice (Adelabu, 2007; Ford et al., 2015; Freeman, Gutman, & Midgley, 2002; Norman & Aron, 2002; Urdan & Mesta, 2006). Through an investigation into their achievement goal orientations, this study enhances research on strategies related to African American high school female motivation in math.

This literature review explores research on motivating African American female students in secondary math courses. Additionally, the literature review aims to give insight into the historical, empirical, and theoretical research that has led to the current understanding of motivating African American female high school students in math achievement. This chapter integrates research about the academic development of African American female students and the motivation of high school students in math.

The organization of this chapter presents research about achievement goal theory, the academic development of African American female students, and motivating high school adolescents in math. The chosen framework for this study serves as a bridge to connect the critical aspects related to African American students of self-concept, self-efficacy, and motivation (Adelabu, 2007; Huang, 2016; Hulleman, Schrager, Bodmann, & Harackiewicz, 2010; Senko, Hulleman, & Harackiewicz, 2011).

Next, this literature review provides an exploration of research on the academic development of African American female students and the ways the achievement goal theory has addressed the needs of this group. Along with this is a discussion on affective characteristics to provide an exhaustive investigation of what the research has shown about motivating African American female students within high school math.
Following this is a description of research that discusses motivation across
gender, race, secondary education, and within the math content. This literature review
depicts the gaps in the research on African American female motivation in math utilizing
student voice, along with the importance of motivating African American female students
through qualitative investigation. Finally, this chapter seeks to provide an investigation
into the literature on the connections experts have made between these themes.

Conceptualization of Achievement Goal Theory

The literature review began with a search for the major components for
motivating African American female students in high school math. First, I started with
research that linked the student’s identity and self-perception and concentrated on articles
about possible selves theory. In online databases, specifically ProQuest, I searched the
key terms possible selves and gender. This led me to the work of Oyserman and Fryberg
(2006). I reviewed the sources of those articles and key themes that arose within the
research. I began to explore the idea of self-concept. However, I recognized that the
research of self-concept, motivation, and possible selves theory centered on the way in
which students create and aim toward specific goals.

As a result, I began to research achievement goal theory and found that it
connected motivation, self-concept, and self-efficacy in a way that fit the aims of this
research study. This prompted a change in direction in the research to investigate the
achievement goal orientations of African American students. After reading historically
referenced materials about African American adolescents by Fordham and Ogbu (1986), I
searched for current research about the academic development of African American
students. My search initially focused on themes found in the Fordham and Ogbu (1986) and Ogbu (2004) research studies, directing me to research about peer relations and related academic outcomes. I also researched the key terms self-esteem and African American, self-esteem and gender, and self-esteem and motivation.

I cross-referenced the terms African-American and motivation to gain insight on research about motivating African American students. I refined my research to inquire about academic motivation and self-determined motivation, since research on the achievement goal theory showed reciprocal and casual relationships with intrinsic motivation. The research studies used in this study often differentiated between academic outcomes when related to achievement goals (Ames, 1992; Dweck, 1986; Nicholls, 1984). I also performed researched on personal best, outcome expectancy, and academic adjustment. As I began to explore the fields of self-esteem, I found resources by reviewing the reference pages for the idea of self-concept.

Finally, I reviewed literature on math instructional practices. I used the key words secondary math and gender, STEM, math and African American, and math and motivation using Science Direct, ProQuest, and JSTOR. I searched achievement goals and African American students to find qualitative research that addressed the same issues as this study. Some of the research studies from this search yielded studies that incorporated math tasks to gauge academic outcomes from the searches previously mentioned. They did not focus on math education, nor did they add to research about math education in a secondary setting. Other studies focused specific issues, such as peer relationships and the validity of using achievement goal theory to understand African
American students (Ford et al., 2015; Freeman et al., 2002). In summation, from these studies, I determined that achievement goal theory would be best suited to frame an understanding of factors related to adolescent female motivation in math.

Theoretical Framework

The theoretical framework utilized in this study was achievement goal theory. 

*Figure 1* summarizes the links within the research on African American motivation toward math achievement in conjunction with research about achievement goal theory. It presents the connections used to frame this study. The next section expounds upon achievement goal theory and its application within the context of this study.
Achievement Goal Theory

Motivation in Math

African American Female Students

Intersection of Two Underrepresented Groups

Gender
Race/culture

Stereotype Threat

Male dominated field
Culture of the majority/oppositional culture

Academic Needs

Affective characteristics that build self-concept
Cultural affects that encourage academic achievement

Performance Goals
Mastery Goals
Intrinsic Motivation
Self-concept
Self-esteem
Self-efficacy

Figure 1. Achievement goal orientations across race and gender
Achievement Goal Theory

Motivation is necessary for students to learn and be academically successful (Bandura, 1989; Dweck, 1986). Bandura (1989) expanded on this perspective by explaining that student motivation is tied to the goals or aims made during the learning process. During the learning process, students pursue these goals or aims for competency. The way in which students show and develop their competency through their performance is oriented within how they are motivated to achieve academic goals (Ames, 1992; Dweck, 1986; Nicholls, 1984).

Achievement goal theory attempts to provide an understanding of the relationships between the students’ achievement goal orientations and the academic outcomes garnered by these goals (Ames, 1992; Hulleman et al., 2010; Senko et al., 2011). Although achievement is a fluid term that can take on different meanings, much of the research has addressed a myriad of academic outcomes. Achievement goal theorists have aimed to express the complexities of achievement when students are developing their competency in the classroom (Senko et al., 2011). These academic outcomes include self-concept, self-efficacy, and intrinsic motivation.

Research suggests that since motivation is an evolving complex system involving internal and external processes, students have various motivational orientations, which are shown through achievement goals (Dweck, 1986; Elliot & Church, 1997; Nicholls, 1984; Pintrich, 2000; Ryan & Deci, 2000). Achievement goals include performance goals, which the student either approaches or avoids, and mastery goals (Dweck, 1986; Elliot & Church, 1997; Nicholls, 1984). Students approach some goals for mastery and
some for performance, while avoiding others to achieve what they view as attainable goals in a cyclical cognitive process (Pintrich, 2000; Senko & Tropiano, 2016; Wolters, Weihua, & Daughtery, 2013).

Performance goals, often referred to as normative goals, focus on the motivational orientation of a student toward showing competence in relation to others (Nicholls, 1984). Mastery goals focus on the motivational orientation of a student toward improving individual competence (Elliot & Church, 1997). Much of the research has agreed that students develop and achieve different types of goals throughout the learning process, indicating that achievement goal orientation can change (Hulleman et al., 2010; Senko et al., 2011). The achievement goals they choose can lead to adaptive or maladaptive learning strategies that manifest into academic outcomes (Ames, 1992; Senko & Tropiano, 2016).

Theoretical Inconsistencies and Criticisms

More recent studies about achievement goals often state their interpretations of the meanings of achievement goals (Huang, 2012; Senko et al., 2011). Some researchers use other terms to explain similar concepts. For this study, achievement goals will be defined using the definitions most consistent with Elliot and Church’s (1997) perspective. Performance approach goals refer to the student’s motivation to show their ability or competency in relationship to others. Performance avoidance goals refer to the student’s motivation to avoid showing their incompetence. Mastery goals refer to the students’ desire to learn a new skill and improve their level of competence or ability. Mastery goals are also at times described as approach or avoidance (Elliot & Church, 1997).
It is important to note a critical misconception surrounding achievement goals. Achievement goal theory is often confused with parts of goal setting theory (Dishon-Berkovits, 2014; Senko et al., 2011). It is derived from the theory of goal orientation theory and explores the educational realm of goal orientation (Ames, 1992; Dweck, 1986; Seijts, Latham, Tasa, & Latham, 2004). While the terms are the same between the three theories, such as goals, performance goals, avoidance, and approach, they all differ in their intention and focus. For this study, a majority of the research studies were chosen carefully to focus solely on achievement goal theory by using studies that used the work of and work focused on the themes of Ames (1992), Dweck (1986), Elliot and Church (1997), Hulleman et al. (2010), and Nicholls (1984) within the studies’ theoretical framework.

The position of achievement goal theory is to connect the student’s motivational orientation when presented with academic tasks and how this orientation influences their drive toward showing mastery, higher achievement, or toward avoidance within an educational context (Dweck, 1986; Elliot & Church, 1997; Nicholls, 1984; Pintrich, 2000). Unlike goal setting theory that focuses on occupational learning goals, training, and behavior, achievement goal theory focuses on the student’s academic development (Locke & Latham, 2002; Seijts, Latham, Tasa, & Latham, 2004). Achievement goal theory has included investigations about how students perform when the teacher presents opportunities that require students to have to compare their competency to others (Ames, 1992). It has explored student achievement when the teacher requires them to aim for mastery.
Researchers who have used achievement goal theory as their framework offered different definitions of key terms within the research (Huang, 2012; Hulleman et al., 2010; Payne, Youngcourt, & Beaubien, 2007). Recent meta-analyses of achievement goal theory have attempted to detect the common expressions or disparities amongst terms used to describe achievement goals and conclusions derived from various sources (Huang, 2012; Hulleman et al., 2010; Payne et al., 2007). Although the meta-analyses used different methodologies, they all share similar conclusions that researchers who utilize achievement goal theory categorize similar terms to describe different processes (Payne et al., 2007). Furthermore, a consensus of identifiers and definitions of mastery goals and performance goals that rely on each researcher’s interpretations of achievement exists amongst achievement goal theorists (Huang, 2012; Hulleman et al., 2010). However, the analyses expressed that cohesion does exist within the theoretical framework in that achievement goals refer to goal orientations and include goals that the student approaches or avoids (Huang, 2012; Payne et al., 2007).

Critics of achievement goal theory argue that achievement goal theory is not applicable in the classroom and does not serve a helpful purpose to educators (Hulleman et al., 2010; Senko et al., 2011). Within the research, there are low correlations (.30 or lower) between achievement goals when not viewed separately as performance versus mastery goals and academic achievement (Huang, 2012; Payne et al., 2007). Meta-analyses also indicated low correlations when considering performance goals and links to overall academic achievement (Hulleman et al., 2010; Payne et al., 2007). Some may argue that these low correlations are proof that research in achievement goal theory lacks
the strength within how it is observed and measured to warrant a justifiable investigation
(Elliot & McGregor, 2001; Hulleman et al., 2010; Senko et al., 2011).

Despite these findings, there has been an urge for research in achievement goal
theory to continue (Hulleman et al., 2010; Senko et al., 2011). Research on achievement
goals can provide positive insight about factors that are evident in students who show
engagement and achievement such as self-regulation, autonomy, and self-efficacy
(Huang, 2016; Hulleman et al., 2010). Achievement goal theory can inform educators on
how their choice of instructional practices effect student motivation long term. Although
students also learn in the classroom through peer relationships and modeling from adults,
instructional practices influence how they learn and approach learning within the
classroom environment (Bandura, 1989). Teachers should consider the achievement goal
orientation links to learning. This can lead to the development of solutions about how to
approach their instructional practices to promote the acquisition of positive academic
outcomes that last over time (Ames, 1992). This focus on motivation is critically
important for teaching underserved populations within school to support quality
culturally relevant pedagogy (Bonner, 2014).

Achievement Goals, Gender, and Race

For educators to understand how instructional practices affect students, it is
important to explore the role that achievement goals have on the individual student.
Achievement goals are typically viewed in terms of being antecedents of factors that
show achievement and predictors of academic outcomes (Dinger, Dickhäuser, Spinath, &
Steinmayr, 2013; Dishon-Berkovits, 2014; Elliot & Murayama, 2008). These goals
manifest differently within students (Hulleman et al., 2010). Research has shown inconsistent results regarding how achievement goals orientations differ across race and gender (Urdan & Mestas, 2006). As such, researchers have expressed the need for research that explores achievement goals within specific groups (Senko et al., 2011).

Zusho and Clayton (2011) argued for a cultural perspective on achievement goal orientations to best fit into research about motivation. Students are motivated from aims that derive within a social context influenced by cultural norms (Bandura, 1971, 1989). These cultural norms, which can be defined by the student’s race, can determine how the student responds to the teacher’s learning goals. Some research has supported the conclusion that performance approach and mastery goals produce positive academic outcomes when coupled with learning strategies that are in alignment with the teacher’s academic aims (Dickhäuser, Dinger, Janke, Spinath, & Steinmayr, 2016; Dishon-Berkovits, 2014). These goals encourage students to pull from metacognitive strategies to develop or show competence.

As Senko, Hama, and Belmonte (2013) described, the match of performance approach goal and mastery approach goals depends on the type of learning framework in which the student and teacher engages. Researchers explained that, in some classrooms, the learning aims of the teacher do not consistently align with student needs, due to a lack of understanding (Adelabu, 2007; Eccleston, Smyth, & Lopoo, 2011). Environmental, structural, and pedagogical factors existing within a classroom influence whether students receive the intentions of the learning aims (Enyedy & Mukhopadhyay, 2007), for they affect the position from which the student will be motivated to perform and demonstrate
competence. Thus, African American students must adjust their goal orientations to their academic surroundings.

Mih, Mih, and Dragos (2015) explained that achievement goals can predict academic adjustment and concluded performance avoidance goals lead to the adoption of negative academic outcomes, such as a lack of engagement and emotional withdrawal (Pekrun, Cusack, Murayama, Elliot, & Thomas, 2014; Pintrich, 2000). However, Mih et al.’s (2015) study used a homogenous group of 10th grade Romanian students assumed to occupy the same socioeconomic status. Consequently, these results may not be generalizable to other groups. Research on the academic adjustment of African American students revealed that a lack of engagement and emotional withdrawal are results of external constructs, such as discrimination and internalizing stereotypes (Adelabu, 2007, Ford et al., 2015; Ogbu, 2004). The research does not offer an explanation as to whether the motivational orientations of African American students can direct their academic adjustment toward positive academic outcomes, despite these external factors (Adelabu, 2007).

Performance approach, performance avoidance, and mastery goals can explain how students are motivated to engage in learning in math (Hulleman et al, 2010; Senko et al., 2011). Other newer goals have derived, such as work-based goals, social achievement, and task-based goals. Due to the meta-analytic data that described discrepancies within the research on these newer goals, this literature review is limited to the studies that differentiate between approach and avoidance goals, while focusing on mastery and performance (Huang, 2012; Hulleman et al., 2010). Research indicates this
approach is evident of a robust analysis of achievement goals (Senko et al., 2011). Newer research that explores approach and avoidance goals together suggests that research of achievement goals and academic outcomes or antecedents can use a 2 x 2 or 3 x 2 multiple goal model (Senko & Tropiano, 2016).

**Performance goals.** Performance goals reflect the student’s desire to show that he or she is more competent than their peers or to prevent others from knowing that he or she is incompetent (Elliot & Church, 1997). Some researchers refer to it as student’s desire to outperform others (Huang, 2012; Hulleman et al., 2010; Preckel & Brunner, 2015). This goal orientation explains why some students may work harder or appear to grow interested when they know the teacher will compare them to their peers. It does not imply that students have accessed deep learning strategies or that they were ultimately successful (Nicholls, 1984); rather, performance goal orientations describe the position of students to want to perform and engage in an activity with a normative focus (Preckel & Brunner, 2015).

It is not clear if performance goals always produce positive academic outcomes (Hulleman et al., 2010; Senko et al., 2011). Historically, researchers have questioned if performance approach goal orientations can be predictors of positive learning strategies toward demonstrating competence (Ames, 1992; Nicholls, 1984). Some researchers argue that the positive academic outcomes can be gleamed from performance goal orientations under certain conditions (Elliot & Church, 1997; Senko et al., 2013). The implications of this research imply that given certain conditions, students can benefit academically when they have performance goal orientations. To this end, current
research has presented arguments about the extent to which performance goal orientations can aid students by comparing these goal orientations to certain academic antecedents and consequences (Dinger et al., 2013; Schiefele & Schaffner, 2015; Senko et al., 2013).

Freeman et al.’s (2002) qualitative research study on achievement goals focused on African American students. This study showed that middle school students who showed performance goal orientations were high achievers. This is different from subsequent research, which described high achievers as having mastery goal orientations (Cerasoli & Ford, 2014; Diseth & Kobbeltvedt, 2010). Freeman et al. (2002) explained that these findings were evident of the African American cultural belief that people are interconnected. Thus, these high achieving students were acutely aware of their abilities in relationship to their peers. Some patterns established in current research about performance goal orientations may not be evident when considering race, ethnicity, and culture (Urdan & Mestas, 2006).

For instance, peer relationships are an important part of the academic development of African American students (Fordham & Ogbu, 1986; Ogbu, 2004). Current research studies that use achievement goal theory to explain the academic development of African American students suggest that the strength of peer influence can be gender specific (Ford et al., 2015). Ford et al. (2015) found that while African American female and male high school students may begin with performance goal orientations, female students shifted toward mastery goal orientations over time if their peers held the same interests and values.
It is important to note that this slight difference of results between Freeman et al.’s (2002) study and Ford et al.’s (2015) study were reflective of two different age group of students. Bong (2009) indicated that younger students are more likely to be orientated from performance goal orientations than older students are. Thus, research on achievement goal theory must address the age of the students under study. The application of Freeman et al.’s (2002) study to older students within a certain context may yield different results. As stated in the research, a qualitative focus is necessary to gain a better understanding on educating African American students and to further achievement goal theory research.

Research focused on performance goals also shows that previous knowledge can be a factor in how students demonstrate competence when they are motivated from performance goal orientations. Crouzevialle and Butera (2016) grouped students per their level of prior knowledge when they adopted performance approach goals. They expressed that students who are motivated from performance approach goal orientations can perform well when they pursue activities that may illicit some element of surprise or spontaneity or rely primarily on the student’s prior knowledge. However, Darnon, Harackiewicz, Butera, Mugny, and Quiamzade (2007) found that performance approach goal orientations yielded positive academic outcomes when the uncertainty of being successful was kept at a minimum. Although, the students may lack prior knowledge, they need to know that they can complete an activity or assignment successfully to gain positive academic outcomes from performance goals.
This conclusion about instructional practice highlights a need for specific exploration of the instructional links between competence and performance goals within the context of motivating African American female students. Law, Elliot, and Murayama (2012) examined the relationship between perceived competence and performance goals. Their multifaceted analysis considered multiple perspectives and utilized multiple measurements across and within subjects. Like the participants in Darnon et al.’s (2007) study, Law et al. (2012) found students who perceived they had competence for the task and could complete the task possessed performance approach goals. In addition, the higher the perceived competence, the lower the correlation between performance approach and performance avoidance, indicating that perceived competence can sway students toward performance approach goals.

In contrast, Law et al. (2012) discovered that performance approach goals are vulnerable to the accompanying performance avoidance goals. In conjunction with Elliot and McGregor’s (2001) conclusion that performance avoidance goals encourage surface learning and maladaptive metacognitive skills, Law et al. (2012) concluded that performance goals can pose a threat to sustainable positive learning strategies. The positive links of performance approach goals to self-concept can be susceptible to negative academic outcomes connected to performance avoidance goals, such as self-handicapping (Akin, 2014; Preckel & Brunner, 2015).

Due to this connection between performance approach and performance avoidance, researchers also seek to find positive correlations with performance goals and anticipate negative correlations between achievement and performance avoidance goals.
Hulleman et al. (2010) and Senko et al. (2013) showed that performance goals illicit a honed-in focus on performance in relation to normative competence. This honed-in focus motivates students to place high utility value on showing competence, which indicates that they view showing competence as useful and important (Elliot & Murayama, 2008; Senko et al., 2013). Thus, the intended outcome of achievement can occur during a test, since students must focus on performing to show competence. Thus, performance approach goal orientations are predictors of achievement (Elliot & Murayama, 2008).

Elliot and Murayama (2008) explained further that the student’s use of performance approach goals stems from the drive toward showing their achievement and includes their fear of failure. Although the fear of failure is typically linked to performance avoidance, in this study, students produced their best work because the purpose of the task matched the intended academic outcome (Conley, 2011; Dishon-Berkovits, 2014; Elliot & Murayama, 2008). The students’ understanding of what is important guides how they prioritize goals to help them aim to perform well. Senko et al. (2013) posited that when the goals students have prioritized match the teacher’s intentions, students can benefit from being motivated through performance approach goal orientations.

Another argument supporting the positive yields of performance approach goals is within the multiple goal perspective. Pintrich (2000) explored the concept of multiple goal perspectives as it relates to positive academic outcomes, including value and interest. In Pintrich’s longitudinal study, students who had low performance goals continued to assume academic outcomes in maladaptive ways and lose interest in math.
over the course of the study. Pintrich characterized these students as primarily defining competence normatively, in comparison to others. As with the findings of Senko et al. (2013), students with performance approach goal orientations avoided maladaptive pathways. Pintrich (2000) showed that interest, value, and self-efficacy are essential to positive learning strategies when a student has performance approach goals. His study warranted specific studies that included research about the factors of value, interest, and self-efficacy.

Conley (2011) continued Pintrich’s (2000) study by conducting a research study on multiple goals alongside multiple achievement levels that students experience in terms of knowledge and value. Conley conducted analyses of students based on their grouping, which was determined by their mastery level of competence. Middle school students who were in the high mastery group reported high levels of performance approach goals and mastery goals at the mean. This poses an alternative view for the possibility of performance goals to be related to positive academic outcomes.

On one hand, this possibility conflicts with studies that found high achieving students demonstrate mastery goal orientations (Hullemen et al., 2010; Payne et al., 2007). On the other hand, it confirms that, although some terms may be defined differently than in other studies (Payne et al., 2007), performance approach goals are present when students are experiencing positive academic outcomes (Hullemen et al., 2010). These positive academic outcomes encourage students to ascribe value to their learning.
Mastery goals. Mastery goal orientations focus on the individual’s motivation to pursue competence (Hulleman et al., 2010; Payne et al., 2007). Mastery achievement goals have been found to correlate positively with self-efficacy, intrinsic motivation, good metacognition, and academic adjustment (Al-Baddareen, Ghaith, & Akour, 2015; Dickhäuser et al., 2016; Elliot & Murayama, 2008; Huang, 2016; Mih et al., 2015; Schiefele & Schaffner, 2015). Mastery goals promote deep learning strategies (Ames, 1992; Elliot & Church, 1997; Hulleman et al., 2010; Senko et al., 2011).

Al-Baddareen and colleagues (2015) expressed that mastery goal orientations coincide with high levels of academic motivation. Thus, students who were mastery goal-oriented were motivated to use deep learning strategies to improve competence, as is consistent with most research (Hulleman et al., 2010; Senko et al. 2013). Mastery goal orientations are the link between intrinsic motivation and performance (Cerasoli & Ford, 2014). Thus, the relationships between the academic outcomes that positively correlate to mastery goal orientations are complementary to each other when using the achievement goal questionnaire (AGQ) and the performance approach learning survey (PALS).

Ryan and Deci (2000) explained, as students become intrinsically motivated, they want to engage in the task for personal satisfaction. Elliot and Murayama (2008) expressed that mastery approach goals can also predict the level of intrinsic motivation in students. When one aspect is apparent, the other is also present. The student’s improvement as a source of competence becomes the student’s motivator, which
encourages a mastery goal orientation and requires the use of deep learning strategies (Al-Baddareen et al., 2015; Dickhäuser et al. 2016).

Mastery goals are more adaptive than performance goals in that they promote positive learning experiences based on defining competence through distal means (Dickhäuser et al., 2016; Nicholls, 1984). While performance goals are driven by the need to outperform others, leaving students vulnerable to negative social comparisons, mastery goals allow students to withstand these (Chatzisarantis et al., 2016). Although self-concept has proven to have a greater relation to performance goals, mastery goals encourage strong metacognitive skills that allow students with mastery goal orientations to maintain their focus on what intrinsically motivates them toward self-improvement (Cerasoli & Ford, 2014; Dickhäuser et al. 2016; Niepel, Brunner, & Preckel, 2014). Researchers have attempted to discover how mastery orientations relate directly to achievement. It is important that teachers can help students maintain motivation throughout their learning so that they can show their competence.

Elliot and Church (1997) and Pintrich (2000) also proposed a different view of mastery goals within a 2 x 2 model, which considered mastery goals as performance goals in an approach versus avoidance construct. This is a contention within the research, whereby some researchers accept mastery goals to include mastery avoidance, and others believe it is as a low correlated separation (Huang, 2012). Current researchers have employed a mixture of both models, often grouping the effects of mastery approach and mastery avoidance together when discussing their conclusions (Senko et al., 2011, Senko & Tropiano, 2016).
Gray, Chang, and Anderman (2015) found that students who have mastery goal orientations possess a high self-concept and task value, a conclusion supported by the later research of Dickhäuser et al. (2016), which connected intrinsic motivation with mastery goals. Since students have more intrinsic motivation toward a goal, they assess more value and experience success. However, this conclusion conflicts with Niepel et al.’s (2014) findings about performance goals, which contended that self-concept is relates closely to performance approach goals. This study could have revealed similar results if the study concentrated on comparing performance approach goals with mastery goals as Senko et al. (2013) suggested of robust studies concerning achievement goals.

Gray et al. (2015) included important information about students who need more help than others do to be motivated toward pursuing academic interests, often referred to as the need for cognitive effort. In this study, the need for cognitive effort was described by students’ level of interest and engagement in the activity inside of classrooms that encouraged mastery goal orientations. Students who experienced greater cognitive growth were students who exhibited a lower need for cognitive effort than students who exhibited a higher need for cognitive growth.

Findings from Gray et al. (2015) indicate that students who have mastery goal orientations maintain that level of motivation over time and thus, have a high level of intrinsic motivation (Dickhäuser et al., 2016). This means that students who are low in their need for cognitive efforts, which could show intrinsic motivation, experience an increase in their cognitive growth because they need to grow. This accepts the perspective of Dweck (1986), who explained that goal orientations can prompt adaptive
actions toward gaining competence. In Gray et al.’s study, students increased their interest and engagement in the activity as they needed to reach competence.

Another exploration of mastery goals involves the goal orientation of students who aim for perfection. Students who aim for perfection based on their own drive toward self-improvement are more mastery goal-oriented (Damian, Stoeber, Negru, & Băban, 2014). Using Elliot and McGregor’s (2001) adjusted model, Damian et al. (2014) found that self-driven perfectionism can predict approach and avoidance mastery goals. While mastery avoidance goals were present, the link between self-perfectionism and mastery approach goals matched the role of intrinsic motivation to self-efficacy (Ryan & Deci, 2000). As students want to approach perfection, they are motivated to want to approach mastery of the concepts.

On the other hand, performance approach goals positively correlated to socially prescribed perfectionism, since students want to approach perfectionism in relation to outperforming others (Damien et al., 2014). This finding furthers the research on mastery goals because it shows that mastery goal orientations do not immediately refer to students who want to perform well. In the case of perfectionism, students who have performance approach orientations also want to perform well to the point of reaching perfection, but use the competence of others as their aim (Ames, 1992).

Moreover, when there is a blending of mastery and performance approach goals, Martin and Liem’s (2010) research on personal bests serves as an argument that self-improvement can predict engagement and achievement. As students strive for their personal bests, they become more interested in achieving the goal set by the teacher and
receive gratification through increased engagement (Collie, Martin, Papworth, & Ginns, 2016). More research that connects personal bests with mastery and performance goals is necessary (Martin & Liem, 2010). Yet, Collie et al. (2016) and Martin and Liem (2010) described results that show the academic outcomes of mastery goals in students who are intrinsically motivated, which encourages their level of engagement and subsequent achievement.

Nevertheless, these studies do not prescribe the proverbial “one size fits all” approach to instructional practices for teachers. While it may appear that the research has slanted toward teachers focusing instructional practices on guiding students toward mastery goal orientations, it is unclear how this type of focus would affect students who may lack the factors that characterize mastery goal orientations (Ames, 1992; Hulleman et al., 2010).

Internal Factors

It is important to explore the internal factors that characterize students to help determine how they are oriented toward being motivated (Dweck, 1986; Nicholls, 1984). Pintrich (2000) concluded that performance goal approach orientations encourage interest and value, which are factors integrated with the student’s self-concept. Preckel and Brunner’s (2015) study on overachievers and underachievers revealed a connection between self-concept and performance approach goals. While the study showed that self-concept does not have direct correlations to increases in academic achievement, it indicated that performance approach goals positively correlated with self-concept. Positive self-concept of ability and performance goals can manifest into increased
academic achievement (Dweck, 1986). This is observable in overachievers, as there was a positive correlation between achievement goals and their self-concept (Preckel & Brunner, 2015).

A broader look, longitudinally, revealed that self-concept has a reciprocal relationship with performance goals. Performance goals predicted self-concept, such that as one changed, so did the other (Niepel et al., 2014). Notably, Niepel et al. (2014) and Preckel and Brunner (2015) argued that the research lacks an explanation to the strong link between performance goals and self-concept. However, Niepel et al.’s study contrasted with Preckel and Brunner’s (2015) study because it confirmed the predictive relationship that self-concept has of measurable achievement. Despite the lack of research regarding the explanations of the mechanisms that mediate these relationships, the studies showed that performance goals can have positive academic outcomes when considering self-concept.

Research findings of the reciprocal relationships between self-concept and performance goal orientations are important for African American students who show lower academic persistence related to their self-concept (Butler-Barnes, Chavous, Hurd, & Varner, 2013). Research has suggested that the development of African American student achievement goals and academic pursuits hinge on their acceptance of their cultural assets, such as self-acceptance, racial pride, and self-efficacy beliefs (Butler-Barnes et al., 2013; Shim, Ryan, & Anderson, 2008). To determine how these factors intertwine to foster goal creation for academic progress and achievement requires further
investigation into the motivation of African American students (Butler-Barnes et al., 2013; Ford et al., 2015).

Not all research has concluded that performance approach goals and self-concept can predict positive academic outcomes. Polychroni, Hatzichristou, and Sideridis (2012) showed that performance goals have a negative effect on affective characteristics. This means that students who tend to be motivated from performance goal orientations do not maintain positive classroom relationships that are helpful toward academic outcomes. This is likely due to students consistently engaging in normative comparisons, which encourage surface learning strategies (Hulleman et al., 2010; Senko et al., 2013). As a result, the student’s desire increased to wanting to pursue competence.

However, Polychroni et al.’s (2012) findings are in opposition with research that has suggested that African American students who have high achievement have a greater sense of how they compare normatively due to their cultural identities (Ogbu, 2004; Thomas & Columbus, 2009). The findings of Polychroni et al. could have reflected the cultural norms of the Greek middle school age children who were the participants of the study. Other research also shows that African American students need to feel a sense of community within the classroom, for it promotes engagement (Adelabu, 2007; Honora, 2002). Current research has followed similar qualitative methodology as Freeman et al.’s (2002) study by investigating these phenomena as they occur in the lives of students while focusing on the achievement goal orientation to determine how students are motivated. Qualitative studies can help provide clarity on the type of academic outcomes that come from specific types of achievement goals.
It is important to note the critical role of self-efficacy and the ways it mediates between achievement goals and academic outcomes. Bandura (1989); Elliot and Church (1997); and Ryan and Deci (2006) stressed the importance of the interrelation between goals and self-efficacy. They explained that the goals held by an individual drive the level of self-efficacy. Self-efficacy influences the motives that propel a student’s approach to learning. Huang’s (2016) meta-analysis on achievement goals and self-efficacy revealed that performance approach goals positively correlate with self-efficacy. Diseth’s (2011) study showed that self-efficacy can also predict the goal orientations of the student.

Diseth (2011) expounded that performance approach goals correlate with deep learning strategies. This analysis of self-reported inventories of college students produced the results that performance approach goals can yield positive academic outcomes, much like mastery goal orientations. Using the 2 x 2 framework that compares approach versus avoidance goals, Chiang and Lin (2014) discovered that performance and mastery approach goals predicted the good grades of middle school level students. Self-efficacy, which has shown to predict performance approach goal orientations (Diseth, 2011; Huang, 2016), was also a predictor of good grades at this grade level. This implies that as students get older, they can gain positive benefits from performance approach goals through a greater level of self-efficacy. Yet, Niepel et al. (2014) showed that there was not a direct correlation between achievement as defined by grades and performance goals when holding for self-concept. This indicates that age changes how students incorporate normative comparisons into determining their competence.
It is important to note that self-concept is a factor that educators should consider because of its ties to achievement (Singh, Chang, & Dika, 2010). However, African American students typically have a greater need to feel they belong in school, rather than preserve their positive self-concept (Oyserman & Fryberg, 2006; Singh et al., 2010). This indicates that an investigation that focuses on self-concept alone will not provide a thorough and relevant study about African American female students in math, an area where they feel they do not belong (Bachman, O’Mailey, Freedman-Doan, Tizesniewski, & Donnellan, 2011; Diemer, Marchand, McKellar, & Malanchuk, 2016).

McGoewn et al. (2014) explored predictors of academic motivation and discovered that when students have a higher sense of self-efficacy, they have a higher consciousness of their identity and abilities. This higher consciousness of their self-concept correlated to higher levels of intrinsic motivation (Alivernini & Lucidi, 2011; McGoewn et al., 2014). As Ryan and Deci (2000) explained, when there are high levels of intrinsic motivation, the student is more determined to engage in an activity. Thus, adolescents who have a higher sense of self-efficacy are more intrinsically motivated to meet challenges presented during learning with more determination, and they will be more academically motivated (Alivernini & Lucidi, 2011; McGoewn et al., 2014; Ryan & Deci, 2000).

Self-efficacy is also strongly linked to academic achievement as students have a higher expectancy of their ability to succeed (Alivernini & Lucidi, 2011; Weiser & Riggio, 2010). Weiser and Riggio (2010) explained that undergraduate students showed higher self-efficacy that relied more on the quality of social interactions with their parents.
than their socioeconomic status. However, greater positive relationships were linked to self-efficacy and achievement.

Komarraju and Dial (2014) also provided evidence that self-efficacy can predict self-determined motivation. This study merited the implication of the results of McGoewn et al.’s (2014) study in that adolescents who had higher levels of self-efficacy were more willing to engage in learning activities. Komarraju and Dial (2014) explained that when the students assign a high value to an academic situation, they identify that academic situation in a positive light. Due to this, they have a higher level of self-determined motivation. Komarraju and Dial’s (2014) and McGoewn et al.’s (2014) study make a concrete tie from the concept of self to academic motivation. They indicated that an investigation into how adolescents are motivated warrants the necessity to determine how they decide the importance of academic tasks and challenges within a given context (Komarraju & Dial, 2014; Matusov, DePalma, & Smith, 2010; McGoewn et al., 2014).

Conversely, performance avoidance goals are positively related to avoiding learning due to a fear of failure (Akin, 2014; Hulleman et al., 2010). Pekrun et al. (2014) found that although the fear of failure is an achievement emotion, it influences the types of goals that the students aim to achieve. Students interpret the teacher’s normative feedback as meaning that competence relates only to how they perform against others and not as a motivator (Shin, Lee, & Seo, 2017), thus evoking negative emotions such as fear that orient them toward performance avoidance goals, resulting in the display of less self-efficacy (Diseth, 2011; Pekrun et al., 2014).
These negative emotions transform into self-handicapping conditions where students can begin to create reasons as to why they cannot complete a task (Akin, 2014). With college-level students, Akin (2014) utilized a 2 x 2 achievement goal orientation scale that considered achievement goals as approach versus avoidance. Akin concluded that self-handicapping could be predicted by the evidence that students were motivated from performance avoidance goals. This occurred since students placed a higher value on the competence of others. This link confirms the findings from other studies on the positive academic outcomes of performance approach goal orientations. As the research suggests, self-concept (Niepel et al., 2014; Preckel & Brunner, 2015) and self-efficacy (Diesth, 2011) are positively correlated to performance-approach goals. Students who have performance approach goals orientations are less likely to engage in self-handicapping since they have a desire and willingness to perform.

Showers, Ditzfeld, and Zeigler-Hill (2015) indicated that students’ self-efficacy and academic identities are tied to their self-esteem. It drives how they assess value. While this study did not directly address self-esteem in the academic context, it added to the understanding of why the self-concept is important for African American female adolescents. The self-concept can be characterized as either compartmentalized or integrative (Showers et al., 2015) and has inseparable cultural connections (Strandell, 2016). When adolescents possess a more compartmentalized self-concept, they have more knowledge of who they are as compared to external concepts, resulting in higher levels of self-esteem (Showers et al., 2015). This makes external concepts and factors important to those with compartmentalized self-concepts.
Cultural influences propel the comparisons that adolescents make between their self-concept and external concepts (Matusov et al., 2010; Strandell, 2016). How individuals determine what constitute as threats to their self-esteem is culturally determined, and it affects how they react to certain tasks (Strandell, 2016). In the case of African American female students, who are considered to have higher levels of self-esteem than other groups, it is important to identify those external factors they view as threats to their self-esteem to ensure their cognitive health (Bachman et al., 2011).

Showers et al. (2015) explained that while self-esteem was lower for those who have a healthy self-concept of their abilities and limitations, their level of self-esteem was more stable and not as susceptible to threats that cause maladaptive orientations. This means that African American female students who show higher levels of self-esteem are more susceptible to exhibiting maladaptive learning strategies when their self-esteem is threatened. The aim for educators should be to help African American female students to navigate through school in a way that helps direct them toward achievement goal orientations that encourage positive academic outcomes. This could help thwart the internalization of stereotypes (Bieg, Goetz, Wolter, & Hall, 2015), such as math fields being better suited and restricted to males.

Bachman and colleagues (2011) revealed that although African American females are often underserved, they have the highest levels of self-esteem. However, Showers et al. (2015) explained this high level of self-esteem means that their self-concept is more compartmentalized and their self-esteem is more unstable, subject to the effect of external forces. Furthermore, it means that their higher levels of self-esteem indicate they should
have higher levels of academic motivation in subjects unlikely to expose any negative versions of themselves (Eccleston et al., 2010). This occurs when female adolescents are introduced to nonSTEM careers. Stout, Dasgupta, Hunsinger, and McManus (2011) presented evidence to support that female students tend to respond positively to nonSTEM courses because they view success in these areas to be attainable. This stereotype internalization (Bieg et al., 2015; Kiefer & Sekaquaptewa, 2007) indicates a need to focus on how to steer female students into viewing possible success in math courses.

This focus relies on how female students’ self-concept reflects what they understand to be true about their cognitive ability and how it manifests itself into motivational efforts (Ahmed, Minnaert, Kuyper, & van der Werf, 2012; Greene & DeBacker, 2004; León, Núñez, & Liew, 2015). When students feel as though they cannot perform cognitively in math and possess a self-concept of low math ability, they experience higher levels of math anxiety (Adelabu, 2007; Ahmed et al., 2012; León et al., 2015). High levels of anxiety create the anticipation of negative outcomes, which allows for stereotype internalization (Ahmed et al., 2012; Bieg et al., 2015; León et al., 2015). In this regard, if they are anxious, they will accept the stereotype that males are better at math-intensive fields and fail to perform or achieve as well as they can (Kiefer & Sekaquaptewa, 2007; Núñez-Peña, Suárez-Pellicioni, & Bono, 2013).

Eccleston et al. (2010) presented the argument that while African American students have higher self-esteem, they do not receive feedback in the same way as their European American counterparts. African American students sift through external
factors such as stereotypes and negative feedback and receive as threats to their self-esteem. Eccleston and colleagues (2010) showed that the lack of achievement is not solely based on embracing an Ogbu’s (2004) oppositional race that tries to reject aspects of the race of the majority. In this study, African American students devalued the negative feedback they received that could help them make corrective changes.

Some research has shown that African American students are conditioned to dismiss forces that may influence how they view themselves (Eccleston et al., 2010; Ogbu, 2004). They reject the corrective feedback to protect their self-esteem, resulting in lower academic achievement. These findings imply that the way in which African American female students are academically motivated is characteristically different and not necessarily aimed at lower standards in comparison to European American students (Greene & DeBacker, 2004; Ogbu, 2004).

Research also has shown that to protect their self-esteem, African American female students reorganize their self-concept in a way that devalues what happens in school (Eccleston et al., 2010; Peixoto & Almeida, 2010). It does not mean that all African American females are underachievers in their math classes, nor does this imply that these students automatically aim low or do not desire to be successful, as previously thought of underachievers (Peixoto & Almeida, 2010). However, it suggests that there is paradigm in which African American females exist inside of a classroom where they may not feel academically secure, indicating that there should be a change in instructional practice (Matusov et al., 2010; Murayama, Pekrun, & Lichtenfeld, 2013).
Stout et al. (2011) conducted a study that explored the self-concept of undergraduate level female students enrolled in STEM pathways. The results of the study confirmed Bandura’s (1989) notion that modeling must be a part of the learning process, for female students experienced more success after having a role model. It suggests that there are external factors that can help guide female students toward being motivated in math. Like their postsecondary counterparts, female high school students may need to observe directly someone who is successful in a math-intensive STEM field in order to experience personal success.

Ability level is also a factor of predicting the type of performance goals toward which students gravitate. Jõgi, Kikas, Lerkkanen, and Mägi (2015) suggested that elementary students’ ability coincided with choosing a performance approach or performance avoidance goals. Students who displayed low ability chose more performance avoidance goals and showed low interest. Students who chose more performance approach goals developed more interest the following year. Bong (2009) explained that this trend is due to the malleability of elementary school age children who gravitate toward either performance approach or performance avoidance goals as they mature in their conceptions of success and failure. Jõgi et al. (2015) expressed that students can grow to enact performance approach goals as they experience success at the elementary school level.

These findings highlight the need for research of links between factors, such as age, school level, and other demographics, with performance goals (Conley, 2011). Bong (2009) used Pintrich’s (2000) multiple goal perspective to show that age impacts the
ability of the student to accept benefits from performance goal orientation. The effects of performance goals are applicable to elementary school children only if they have a clear sense of what failure and success means to them (Bong, 2009). Thus, high school students may gravitate more toward performance goals or mastery goals, as they would have attained certain developmental milestones (Hulleman et al., 2010).

Studies of other grade levels are necessary to fill gaps in the research regarding the understanding of academic outcomes as it relates to students under age 18. Middle school students, for example, change often during this grade band in ability, school interests, and ways they assess value (Chiang & Lin, 2014; Conley, 2011). Chiang and Lin’s (2014) study on achievement goals in a middle school setting echoed many of the findings in other grade levels that performance goals were indirectly related to measurable forms of achievement (Elliot & Murayama, 2008).

While age is a factor in the link between academic outcomes and achievement goals, cultural differences could change how teachers choose instructional practices that aim to discourage students away from performance avoidance goals (Hulleman et al., 2010). Performance goal orientations elicit surface learning strategies (Elliot & McGregor, 2001; Senko et al., 2013). Students use strategies that will ensure they do not appear to be less competent than their peers are. However, research has not concluded that teachers should dissuade all students from performance avoidance goals.

King (2016) discovered that research questions posed about performance avoidance goals should have culturally situated answers. This study revealed that students who are collectivists have strong value systems and beliefs that incorporate
feeling connected to others, thereby making normative comparisons a consistent part of their identities. King (2016) found that performance avoidance goals drive the interests for collectivist students and intrinsic motivation, resulting in performance avoidance goal orientations as a precursor to academic success for these students, since intrinsic motivation is related to higher interest, value, and good metacognitive strategies (Ryan & Deci, 2000).

Given the culture-specific factors that can mediate the benefits of performance goals, it is questionable if teachers in the U.S. should intervene when they recognize characteristics of performance goals. King (2016) emphasized the need for more research that accounts for the complexity of the demographical makeup that characterizes many classrooms today. Performance goals within approach orientations can yield students who are engaged in their learning (Mih et al., 2015). In addition, performance goal orientations encourage the need to perform, since they correlate with students’ self-concept (Nicholls, 1984; Niepel et al., 2014). For teachers, this can be particularly helpful in gauging the effectiveness of their instructional practice.

Still, teachers have the responsibility to use instructional practices wherein students are encouraged to learn through rigorous environments. Their ability to incorporate instructional practice that is inclusive toward performance approach goal orientation can leave their students susceptible to the negative academic outcomes of performance avoidance goals (Chatzisarantitis et al., 2016). It is debatable if a teacher can offer instructional practice that maximizes the positive academic outcomes without compromising more sustainable goals, such as increases in metacognition and deep
learning strategies. Elliot and Church (1997) explained that students are not consistently motivated through goal orientations. Given the conditions necessary for the positive academic outcomes of performance goals, it is important to identify if mastery goal orientations provide the best learning condition for students (Senko & Tropiano, 2016).

Academic Motivation, Race, and Gender

Academic motivation refers to the student’s desire to achieve academically (Schunk, Meece, & Pintrich, 2014). Programs dedicated to motivating students have revealed that motivation is a major factor in how students form their perceptions of their ability to succeed, and it has a positive effect on achievement (Greene, Lee, Constance, & Hynes, 2013; Reid & Roberts, 2006). Furthermore, studies that have discussed academic achievement often take considerable time in discussing student motivation (Beal, Qu, & Lee, 2008; Benken, Ramirez, Li, & Wetendorf, 2015; Hallinan, 2008; Murayama et al., 2013). Instructional practices that lack cultural relevance and fail to include motivational aspects can have negative effects on the students’ self-concept, which affects students’ overall ability to succeed (Alivernini & Lucidi, 2008; Hallinan, 2011).

There are classrooms wherein African American students endure unintended discriminatory practices (Adelabu, 2007; Honora, 2002). Through parental influences and relationships, African American female high school students have learned how to be resilient through perceived academic challenges or obstacles (Cunningham & Swanson, 2010; Oyserman & Fryberg, 2006). On the other hand, some African American female students arrive to math class with the intentions to avoid the perceived possible negative situations, resulting in negative academic outcomes (Elliot & Church, 1997; Pintrich,
2000). This is slightly different from the way in which Ogbu (2004) situated the reasoning behind low academic achievement and the seemingly low performance of African American students. While Ogbu’s (2004) description was based on the historical relationships between African American adolescents and the race of the majority, the research does not offer a complete picture as to what happens to African American adolescents academically (Matusov et al., 2010; Oyserman & Fryberg, 2006). The social and affective needs of African American adolescents are just as important as the intellectual knowledge necessary to complete the learning tasks (Cunningham & Swanson, 2010; Diemer et al., 2016; Oyserman & Fryberg, 2006). Since their sociocultural needs have a historical context, it is important that educators discover how these students are motivated.

All students require some level of academic motivation to engage cognitively in the learning process (Bandura, 1989; Ericksen, 1974; Schunk et al., 2014). Academic motivation encompasses how self-concepts interact to allow learning to happen (Schunk et al., 2014; Schunk & Miller, 2002). Academic motivation in adolescents is linked to self-efficacy, self-esteem, personality characteristics (McGoewn et al., 2014; Schunk & Miller, 2002). Academic motivation can be addressed within achievement goal theory in that it explains why students may be more prone to participate in certain challenges as opposed to others (Dweck, 1986; Nicholls, 1984; Ryan & Deci, 2006).

Bandura (1989) emphasized that, when existing within a social context, self-regulatory processes is a valuable indicator of cognitive development. Self-regulation involves the process of identifying academic goals that the student views are possible to
attain (Çetin, 2015; Ryan & Deci, 2000). During the process of self-regulation, students create goals by which they are motivated to reach. This requires autonomy, which produces the intrinsic motivation to push through challenges (Ryan & Deci, 2006). Researchers have posited that African American students require autonomy and environmental structures that support their autonomy (Ford et al., 2015; D’Lima et al., 2014). This is important because this process of attaining autonomy influences their development of identifying their capabilities to attain goals within that subject (Legault & Inzlicht, 2013), which in turn guides their motivation to approach or avoid goals within a math classroom—where ability matters.

Motivation in Math and African American Female Students

For math-intensive fields, research poses a foundation for the idea that since motivation is changeable and exists on a continuum, it is possible to motivate or provide a motivating environment where students view math-intensive tasks as attainable goals (Ryan & Deci, 2000; 2006). It also prompts the need to investigate how students can be motivated to engage in self- regulatory processes that encourage intrinsic motivation in math-intensive courses. Academic motivation is tied to achievement (McGoewn et al., 2014; Singh et al., 2010). In math-intensive STEM careers, African American females are an underrepresented group. A contextual or external force affects how this group is academically motivated in math classrooms.

Murayama et al. (2013) presented a longitudinal study that explored the effects of motivation and cognitive learning strategies on math achievement. The researchers tracked and tested students at the fifth, seventh, and tenth grade levels. Study results
revealed that when students are more motivated, they perform better in the short term. Motivation in conjunction with cognitive learning strategies results in better student performance in the long term (Ryan & Deci, 2000; 2006). The data indicated that instructional practices that teach students how to think about the math while encouraging them to succeed have significant positive effects on student achievement (Murayama et al., 2013).

Numerous programs seek to motivate students in math. Greene et al. (2013) sought to identify the effective characteristics found in successful youth programs. This qualitative study investigated the differences of youth age, differing number of participants in each youth program, the various subjects of interests of the youth programs, and the youths themselves. The results indicated that the most significant factors for retaining engagement were student perception of the staff as caring and the opportunity to learn about new skills directly associated with specific careers and college entrance. Monetary incentives were negatively associated with engagement (Greene et al., 2013).

Greene et al. (2013) provided evidence that achievement is tied to the value that students attach to what they learn (Komarraju & Dial, 2014). In this situation, learning was met with relevance and the self-concept of their ability was addressed which research indicates is needed for learning (Eccleston et al., 2011; Lave & Wegner, 1991; Mezirow, 2012; Schunk & Miller, 2002). These results revealed two critical factors for motivating students to achieve in a classroom. First, students need to feel supported in math to maintain motivation (Schunk et al., 2014). Next, the tool, aim, or mechanism used as a
motivator must be relevant to the student. The interpretation of actions that deem support is a cultural construct (Adelabu, 2007; Thomas & Columbus, 2010).

Researchers have tested the validity of trying certain instructional practices to improve academic achievement in math (Furinghetti & Morselli, 2009; Reid & Roberts, 2006; Roesken, Hannula, & Pehkonen, 2011). These studies highlighted the importance of addressing the issue of academic motivation in math. Math instruction poses separate issues for adolescents in high school and deserves specific attention (Ahmed et al., 2012).

As students transition from middle school to high school, they display low motivation in math (Ahmed et al., 2012; Peklaj, Podlesck, & Pečjak, 2015). Students also show decreased achievement in math that corresponds to the decrease in motivation, indicating that there is a link between math achievement and motivation. The results of Peklaj et al.’s (2015) quantitative study revealed that the level of motivation can serve as a predictor for achievement in math. Although this study used the grades earned in math, which can be subjective, it provided evidence that teachers should focus on building the motivation of their students to increase student achievement. Peklaj et al. (2015) also integrated the effects of self-regulation in terms of self-efficacy to frame the research, which adds to research about the integral influence of self-concept on learning outcomes (Bandura, 1989; Ryan & Deci, 2006). As results showed, these aspects of self-concept intertwine with previous knowledge to form a bridge between motivation and achievement (Showers et al., 2015).

Students’ beliefs in their math ability play a part in their level of motivation in that it guides their willingness to engage in math activity. As Diemer et al. (2016)
discussed, the beliefs of African American students are linked to their achievement. This longitudinal study confirmed that relevant math instruction can promote positive math beliefs when controlling for previous knowledge and gender. This can create a positive environment that could motivate students. However, Deimer et al (2016) found that gender can have an effect on how students’ math beliefs manifest into motivation.

Furinghetti and Morselli (2009) presented qualitative research that supported the idea of a close relationship between affective and cognitive factors of learning math. This study concentrated on the problem-solving efforts through writing mathematical proofs, which requires prior knowledge. However, Furinghetti and Morselli (2009) discovered that when students had low confidence, they met challenges with negative views and performed poorly. The results of this study indicate the need to look at self-determined motivation, as it is rooted in viewing the intrinsic motivation of a student to complete a task. It also stressed that it is necessary to view math through an academic motivation lenses, which accounts for the challenge that math poses for adolescent students (Furinghetti & Morselli, 2009).

Furinghetti and Morselli’s (2009) findings were expanded in Callejo and Vila’s (2009) study, which was an investigation of problem solving with respect to the students’ math belief systems and motivational factors. Callejo and Vila (2009) did not establish a causal relationship between beliefs and problem solving. Instead, they continued the conversation that there is a link between the students’ willingness to approach problems and their level of success in solving the problems, implying that viewing the belief system alone is not enough to investigate motivation in a math classroom.
Roesken et al. (2011) discovered that the views that students form in math are shaped partly by motivational aspects. Although conducted in Finland, the study showed that motivational aspects are an inseparable part of cognitive development. Roesken et al. (2011) found that students who view themselves as being successful in math perform better in math. Furthermore, the level of difficulty that students may experience is less than when they have positive self-concepts.

Because teacher-student relationships are vitally important for classroom management and student engagement, Maulana, Opdenakker, Stroet, and Bosker (2013) sought to explore the impact of the change in the teacher-student dynamic from middle school to secondary school. Maulana et al. (2013) surveyed teachers and students during the first year of high school in the Netherlands (Western culture) and Indonesia (non-Western culture). To compare teacher involvement and rejection, the researchers reviewed questionnaires about student motivation. While the data revealed teacher-students relationships are a vital factor of student performance, Maulana et al. (2013) also found differences among how teachers interact with students. The way in which teachers demonstrate involvement and rejection differed per their socioeconomic class and stereotypical views of the individual student. This study revealed that it is important for teachers to overcome their own views to make motivating students a priority.

Hallinan (2008) compared the influence of teacher attitudes on their students’ attitudes and sought to determine if their students liked school. Participants were students from Chicago’s public and Catholic schools. Although several school and individual students within participating schools desired not to participate, the study
contained data from more than 50% of Chicago public and Catholic schools. Due to the diversity of the participants, Hallinan (2008) also included an analysis of other factors, including sex and race. The results showed that when teachers show they care about the students’ overall success, their students have positive outlooks of their abilities to learn and thereby like school more (Hallinan, 2008).

Reid and Roberts (2006) conducted a longitudinal study and found that at-risk adolescent female students can be motivated by instructional practices. At-risk adolescent female students elected to participate in a program that focused on improving their attitudes toward school and building their self-perception. In the program, the students participated in focus groups where they would receive feedback about problems they expressed. By aiding students in processing the world around them and helping them reform their self-concept toward healthier views of what they can be, students reshaped their thinking about math. Reid and Roberts (2006) reported that their success in math increased over time.

Lagana-Riordan et al. (2011) explored the success of an alternative school that motivated its students toward having greater success in school. Per the student participants, the alternative-choice school created an environment that made the students feel supported and provided space for community building. For African American female students, these findings echoed the findings of Reid and Robert (2006). To motivate African American female students, the environment that the students interact with provided context to determine how these students are motivated.
It is possible to argue that environment has more bearing on achievement in math than on academic motivation in math. The findings of Beal et al. (2008) indicated that the status of the self-concept and achievement in math are independent of the other. These results showed that there is not a research-based causal relationship between the two constructs. However, self-concept is the crux of how adolescents are motivated. When students are highly motivated, they find the information they are learning to be more engaging, resulting in higher academic success in math.

Thus, it is important to note that teachers have a task in ensuring that the instructional environment provides a space for the development of their self-concept. Teachers need to know how to organize their instructional time with students so that they can make connections between the information that the teacher presents to them and their own interests. While this has become a euphemism amongst teachers, it is important to consider that students can development the motivation to persist through the challenges presented of through the class (Ryan & Deci, 2000; 2006).

Summary

Achievement goal theorists have attempted to understand how student motivation steers action when pursuing academic competence (Dweck, 1986; Elliot & Church, 1997; Senko et al., 2011). Mastery and performance goals are critical to learning and can determine how much students benefit from instruction (Dweck, 1986; Elliot & Church, 1997; Pintrich, 2000). This theory provides explanations for the processes that lead from motivational aims to demonstrating competence. Achievement goals are malleable and utilized by the student during the learning process (Dweck, 1986; Pintrich, 2000).
Achievement goal theorists describe the process in which self-concept, self-efficacy, and motivation interact to produce the demonstration of competency and achievement (Hulleman et al., 2010; Huang, 2016; Payne et al., 2007).

Research on motivation indicates there are different processes that mediate the students’ willingness to accept challenges and their determination to pursue learning (Ryan & Deci, 2000). Achievement goal theorists have sought to answer questions about these motivational processes, while considering performance and mastery goal orientations. Research on achievement goals attempted to validate two critical points: (a) to validate the conjecture that students will have better academic adjustment if teachers focus their instructional efforts on motivation and adopt orientations toward mastery (Ames, 1992; Dweck, 1986; Elliot & Church, 1997; Mih et al., 2015; Pekrun et al., 2014); and (b) to identify if there are conditions that warrant teachers to focus on normative references to increase interest or performance, given that this focus could encourage maladaptive learning strategies (Lau & Nie, 2008). Both focuses are important for informing instructional processes for students.

Dickhäuser et al. (2016) deduced that the motivational position of a student guides the level of benefit received from instruction. Furthermore, achievement goals account for the most change in achievement shifts. These results agree with previous research that has posited that a focus on the motivational orientation of students maximizes learning for the students (Senko et al., 2013). Given the importance of student motivation to learning, research that has indicated that adolescents decrease in
motivation as they matriculate through high school is troubling (Roesken et al., 2011; Schunk & Miller, 2002).

However, more research is necessary to discuss how these findings occur across race and gender (Zusho & Clayton, 2011). This research study focuses on the achievement goals of African American female students in math. African American students achieve in classrooms that address their cultural assets (Honora, 2002). This includes their self-concept, self-efficacy, and self-esteem. While there has been research on culturally relevant pedagogy that addresses the needs of these students in the classroom, research shows that students must first be motivated to be engaged (Enyedy & Mukhopadhyay, 2007). This study investigates the achievement goals of African American female students to explore how they are motivated to be successful in math. Chapter 3 provides a description of the qualitative methodology chosen to investigate this case.
CHAPTER 3

METHODOLOGY

The acronym STEM has become a fixed focus of American education. STEM relates to the research, occupation, fields of study, and education course that focus or relate to science, technology, engineering, and math (STEM). There has been an increase in the amount of STEM related jobs in the last 30 years as society moves toward being more technological dependent (American Community Survey Reports [ACS], 2013; National Center for Education Statistics [NCES], 2015). Due to newer graduation requirements that require more math and science, more female students have access to STEM education, and at least 53% of female students report that they like math courses (NCES, 2015). However, there is still a gender gap in STEM careers.

While 62% of STEM degree holders are men, only 38% of STEM degree holders are females. Furthermore, 71% of females STEM degree holders pursue nonSTEM careers (ACS, 2013). When considering ethnicity, only 7% of STEM degree holders are African American, and 72% of these students pursue nonSTEM careers (ACS, 2013). African American females have experienced underrepresentation in these careers, although the number of careers available has increased (ACS, 2013).

For math-intensive STEM careers, the data show a different picture for females in general. Only 3% of all STEM workers are in math-intensive careers (ACS, 2013). Females, although underrepresented in STEM fields overall, have experienced a slow
increase within the last 20 years in math-intensive fields and now make up 47% of this field. However, African American men and females make up less than 20% of in math-intensive fields (ACS, 2013). African American females also represent a low percentage of receiving degrees in STEM fields and elect to not pursue careers in math before college (Ceci & Swanson, 2015).

A qualitative approach can offer an understanding of potential variables responsible for the failure of female students to earn STEM degrees and pursue careers in the related field. It is suggested that recent graduates born after 1990 will be more likely to pursue STEM careers (ACS, 2013). However, data reveal that they may not stay in the career (ACS, 2013). Researchers have attempted to uncover what happens to female students at the postsecondary level. The data revealed males dominate STEM-related careers, including those in math, which may influence the stereotype that males are better equipped for math-intensive STEM careers. Kiefer and Sekaquaptewa’s (2007) research on stereotypes reveals that females adoption of current societal expectations that males are better suited for math-intensive STEM careers influences their choice to not remain in a STEM pathway.

A component of the self-concept of female students prohibits them from overcoming their understanding and internalization of the stereotypes (Ceci & Swanson, 2015; Kiefer & Sekaquaptewa, 2007). Bandura (1989) described this ability to view what a person is capable of as self-efficacy. However, overcoming stereotypes to attain a goal requires more than self-efficacy (Kiefer & Sekaquaptewa, 2007). Internalizing stereotypes also reflects a lower level of intrinsic motivation that inhibits an individual
from envisioning a self that flourishes in a STEM career (Ryan & Deci, 2000; Oyserman & Fryberg, 2006).

Stout, Dasgupta, Hunsinger, and McManus (2011) attempted to motivate postsecondary students through female role models. Female students showed an increase in self-efficacy and subsequently interest and achievement. Stout et al. (2011) also noted additional benefits to the participants’ self-concept. By imploring qualitative observations, the researchers found the participants had greater confidence in math. This boost of confidence was shown through an increase in self-efficacy, autonomy, and a determination to succeed, even in the presence of male professors (Komarraju, & Dial, 2014; Legault & Inzlicht, 2013; Stout et al., 2011). Research showed this mix of increased self-efficacy, sustained interest, and positive self-concept has academic implications on the increase of self-determined motivation, too (Ryan & Deci, 2000; 2006; Schunk & Miller, 2002). Moreover, the qualitative focus of this study contributed to the understanding of the benefits of self-concept and provided evidence that a quantitative investigation of an intervention for academic motivation is not enough to learn about how female students are motivated.

Motivation is a significant factor for learning math (Ericksen, 1974; León, Núñez, & Liew, 2015; Ryan & Deci, 2006). Learning occurs within a direct proportional relationship with motivation; students must be motivated to learn (Dewey, 1916/2012; Ericksen, 1974; Ryan & Deci, 2000). Motivation is a predictor of math achievement and necessary for the student to persist through problems solving (León et al., 2015; Schunk & Miller, 2002). Once the motivating goal or incentive is visible to students, they begin
to set goals to demonstrate competence (Bandura, 1989; Ryan & Deci, 2000). Thus, an investigation about the achievement goal of African American female students can give insight to how these students are motivated within math classrooms.

Achievement goals situate these aims within the context of the students’ motivation. Since motivation is complex, the research suggests that it is important to not limit studies to view each type of achievement goal separately in relationship with another construct (Hulleman, Schrager, Bodmann, & Harackiewicz, 2010). Rather, researchers urge for achievement goals and metacognitive constructs to be placed in comparison with one another to understand the relationship that each achievement goal type has with academic outcomes for the student (Dweck, 1986; Senko & Tropiano, 2016).

Komarraju and Dial (2014) explained that when the students assign a high value to an academic situation, they identify that academic situation in a positive light. Due to this, they have a higher level of self-determined motivation. This showed that it is possible to create an environment that can motivate females toward interpreting challenges associated with STEM careers to be necessary for their success in these fields. The importance of motivation and the self-concept to female students can be explained using the framework of achievement goal theory. Research shows that high levels of intrinsic motivation can serve as predictors of academic success in math (Froiland & Davison, 2016).

Apart from the gender effects of motivation and achievement goal orientations, there are cultural differences. As stated above, only 7% of STEM degree holders are
African American (ACS, 2013). This means that African Americans lose motivation to continue toward STEM pathways after high school. African American females show the highest levels of self-esteem (Komarraju & Dial, 2014). This makes them vulnerable to external threats to their positive self-concept, since higher levels of self-esteem correlate with a higher sensitivity to protecting the self-concept (Peixoto & Almeida, 2010). Thus, African American female students occupy a peculiar place where they need to be academically motivated in math to overcome stereotypes that serve as external threats to their self-esteem (Ceci & Williams, 2010; Kiefer & Sekaquaptewa, 2007).

While these studies established positive relationships between motivation and positive academic outcomes, these studies do not provide an explanation about how female students are academically motivated toward succeeding in math. Considering the importance of motivation on achievement for female students and the underrepresentation of females in math-intensive STEM career fields, a qualitative study can provide an understanding of how female students are motivated in math (Stout et al., 2011).

Rationale for Research

The methodology of a study refers to the method chosen by the researcher to explore the topics of the study and answer the research questions (Stake, 2003; Tesch, 2013; Yin, 2009). Methods are categorized by the ways in which the researcher collects data (Gerring, 2004). In education and other social sciences, quantitative studies give insight as to what is quantifiable and often rely on narrow questions (Tesch, 2013). The type of data that are collected can come from test scores, grades, grade point averages, and surveys. In quantitative studies, phenomena are quantified, and the data are used to
form conclusions. Quantitative researchers attempt to maintain distance from the participants in their studies (Tesch, 2013).

There are limits to quantitative research. While quantitative research offers some understanding of why certain factors may affect each other, it does not answer questions about how certain groups react and interact the way they do (Baškarada, 2014; Gillham, 2010; Stake, 2003). Qualitative research offers an investigative approach to studying some phenomena and does not rely solely on causal relationships. Rather, qualitative methods allow the researcher to care for the participants and explore interactions that occur between the participants and their environment (Tesch, 2013). Qualitative researchers seek to understand how something happens over time and want to understand why groups of people behave or respond in the way they do (Baškarada, 2014; Stake, 2003). For this study, a qualitative methodology is appropriate to investigate the achievement goal orientations of African American students to understand how they are motivated to be successful in math.

This chapter includes the purpose for this study, the research questions that guided this study, as well as the description of the research design. The Research Design section describes how the study was conducted, including how the data were collected and analyzed. The Participants, Setting, and Sample Study section describes the criteria used for the selection of the participants. It also consists of a detailed description of the setting used to conduct interviews and the focus group session. The Data Collection and Instrumentation section includes the description of the methodology to collect data and its appropriateness for this study. It addresses the appropriateness of using case study
methodology and the reasons for conducting a focus group interview. The Data Analysis section is a discussion about the methods for analyzing the data and the personal connections between the researcher and the research. The Internal Validity and the Dependability and Credibility sections explain the actions that I employed to ensure the collection of dependable data from credible sources to ensure reliability and validity. Finally, in the Ethical Safeguards section, I describe how I made sure the study was conducted ethically. This also includes how I ensured that the participants followed their school’s code of ethics.

Study Purpose and Research Questions

Motivation in math decreases for many students as they enter high school (Murayama, Pekrun, & Lichtenfeld, 2013; Peklaj, Podlesck, & Pečjak, 2015), which is a cause for concern since motivation is a predictor of achievement (Peklaj et al., 2015; Ryan & Deci, 2000). Research that has explored the topics of race, gender, and achievement goals has indicated that further research should use the students’ voices to investigate how African American students are motivated within specific contexts (Adelabu, 2007; Ericksen, 1974; Ford, Jones, & Alexander, 2015; Jones & Ford, 2014). This qualitative study is an investigation using achievement goal theory to gain an understanding of the factors that motivate African American female students toward math achievement in high school.

1. What are the perceptions of African American female students about their high school math classes?
2. How do African American female achievement goal orientations affect their ability to persevere in math?

3. What factors affect African American female motivation toward math achievement?

Research Design

This section offers a description of the study’s method for research, the research design, and the rationale for its choice for this study. The research design details the procedures that the researcher followed to collect data and analyze the data. The purpose of the research and the research questions guided the data collection process.

I used a case study qualitative methodology. Creswell (2013) explained that case study is a qualitative approach where the researcher uses multiple ways to collect data to investigate a bounded system over a timeframe. This study incorporated interviews with seven African American female students in a magnet school in an urban high school setting. The qualitative data of the study consisted of the individual interviews and a focus group interview. Quantitative data collected was comprised of academic records from the participants’ school, including the participants’ grades and math test scores, to gain an understanding of their level of math achievement. Data collection occurred over a 12-week period in which students experienced unscheduled school closings and three weeks of scheduled school closings. All the interviews and focus group sessions occurred in person and were audio recorded.

The greatest limitation of using a case study is the researcher’s challenge to recognize if the case study method is useful for the research questions. From Creswell’s
(2013) definition of case study, it is imperative for cases to be thought of as existing within a system (Stake, 2003). The investigation of the system enables researchers to gain access to knowledge about the case through a qualitative approach (Stake, 2003). Yin (2009) explained that case studies are appropriate when research questions focus on how things operate within a system and why they may operate in that way. The how and why questions should be the focus of the investigation of the case. The purpose of this study was to investigate the achievement goals of African American students to understand how they are motivated in a math classroom.

Creswell (2013) and Miles (2015) explained further that a case study is suitable when the researcher can identify the case and define its boundaries, and seeks to provide a thorough analysis of the case. The purpose of this study was to learn more about the factors that motivate African American female students in a math classroom. The case was comprised of African American female students existing within the physical boundaries of using female students in one magnet high school. Lastly, the investigation also stayed within the bounds of what occurs while they engaged or disengaged in math related tasks and content.

The case study method requires the researcher to be meticulous and intentional in his or her approach toward analyzing the case. Stake (2003) argued, “A case study is both a process of inquiry about the case and the product of that inquiry” (p. 136). The way a researcher chooses to study the case is as important as the products of that case study. I interviewed the participants to gain understanding about their achievement goals
individually and conducted focus groups to gain familiarity and maintain credibility (Onwuegbuzie, Leech, & Collins, 2010).

Miles (2015) explained that case study is a methodology where the process allows the researcher to gain a better understanding of the case because it gives the researcher access to less obvious parts of the case’s system. A qualitative approach was chosen for this topic because previous research includes quantitative methods, and this study departs from the prevailing literature. Yin (2009) argued that this dedication to the process of inquiry separates case studies from other forms of research because the process of inquiry leads to information that can be transferable to other cases and expand theoretical knowledge.

Interviews served as a way of inquiry to provide a comprehensive understanding of the students’ achievement goal orientations using their descriptions of motivation toward math achievement, as used in other research studies (Freeman, Gutman, & Midgley, 2002). The focus group sessions provided another source of data to gain an understanding of students’ perceptions of their math classes. As Stake (2003) explained, a case study provides an opportunity to learn more about the case. Using a combination of interviews and focus group promoted triangulation and provided in-depth understanding of how to motivate African American female students in their math classrooms.

The process of inquiry of a case study is a rigorous endeavor (Yin, 2009). This case study used two of four strategies of analyzing the data as defined by Yin (2009). First, achievement goal theory was used to describe the motivational orientations of each
 participant. As Gerring (2004) explained, the theoretical proposition is a determining factor in how the researcher defines the case and its system and articulates the purpose of the research. Thus, the participants’ data were analyzed according to their achievement goal orientations as *mastery goal orientations*, *performance approach goal orientations*, and *performance avoidance goal orientations*. Research also has suggested that achievement goal orientations can be extended to describe the environment and culture that the teacher cultivates in the classroom, called *classroom goal structures* (Senko, Hama, & Belmonte, 2013; Singh, Chang, & Dika, 2010). The participants’ responses were also analyzed for the description of their math classes according to these classroom goal structures.

Next, the case description was used to analyze the data. Stake (2003) argued that case descriptions are critical because they determine how simple or complex the case will be. Gender, race and culture, school level, and content knowledge bounded this case study, which focused on African American female students in high school. Students were interviewed to learn about factors related to their motivation toward math achievement.

It is important that the researcher not only implements different processes of inquiry, but also gathers information from multiple forms of resources to analyze. The use of many different sources of information makes case studies robust and relevant forms of research and adds internal validity. It also ensures there is an explicit understanding about the case and its system. Due to this rationale, self-reports were gathered through individual interviews and focus groups (Sagoe, 2012). This provided a
comprehensive understanding of the case, since focus groups yielded data that supported conclusions developed from the data collected from individual interviews (Sagoe, 2012; Viscek, 2010). The descriptive data consisted of grades and math test scores to establish credibility of the responses given by the participants. Yin (2009) and Creswell (2013) argued for researchers to consider collecting extensive amounts of data, since it is paramount to establishing validity for the case study. Stake (2003) and Gillham (2010) added that this is also important toward expressing why knowledge from the case study has analytic generalizability toward theory and practice.

As Gillham (2010) explained, case study methodology considers the whole picture of the case while incorporating evidentiary data to support the exploration of the study. Case studies reside within the boundaries of the nuances and details of the case’s system (Stakes, 2003). The interview questions helped to gain an understanding of how the participants described their math classrooms and their understanding of motivation. It helped to reveal nuances that were essential to understanding the factors that motivate African American female students toward math achievement, such as the impact of classroom goal structures and cultural affects.

There are several drawbacks to using case study methodology. For example, Miles (2015) described case study as “a method and a methodology that seeks to embrace complexity in the account and analysis of practice which is itself complex” (p. 311). The complexity of case study and the case itself discourages researchers from employing the case study approach. Yin (2009) also explained that researchers find case study methodology to be time consuming and meticulous in nature.
Many consider case study as a collection of stories that is susceptible to interpretative error (Gerring, 2004; Gillham, 2010).

Regardless of its complex nature, the case study approach offers an extensive and concentrated look at the case. It provides expansive knowledge that helps the understanding of practical, real-life representations of theory. It makes sense of what is not quantifiable (Baškarada, 2014). How African American female students are motivated is not a quantifiable endeavor. A qualitative approach was necessary to not only investigate African American female students’ achievement goals, but also gain an understanding of their academic lives inside of a math classroom. Thus, the case study approach served as the methodology for this study.

Participants, Setting, and Sample Study

In case study research, it is important to understand the participants (Baškarada, 2014; Yin, 2009). The setting of the study is a boundary of this study. Defining the setting offers a clear frame of reference when exploring the ways in which the participants interact with their environment (Stake, 2003; Yin, 2009). The study took place in the magnet wing of the campus of a Title I high school in the southeastern part of the United States. The students who matriculate through the high school generally come from two neighboring cities, characterized by the lowest median income and highest crime rates in the state. Of the approximately 1500 students attending the school, the composition was such that 96% of the students were African American, 3% of the students were Hispanic students, and 1% of the students were multiracial. Students with disabilities comprised 22% of the school’s population.
The school’s data and description changed during the study. When the site was selected for the study, the school had received the lowest ranking in the district in the year prior to the study in all areas, including student achievement, attendance, graduation rate, and days of suspension. The school experienced two principals in the last five years and retained on average of 60% of staff from year to year. However, at the time of the study, new data about the site emerged. The school climate experienced a shift with the presence of new leadership and the new magnet school. At the time of the study, the graduation rate increased by 25%, the number of days of suspension reduced from over 1000 days collectively to just under 600 days, and the students increased their end of course test scores by 7% or more in most content areas. This was the third year the administrative staff had remained the same with the exception of an additional assistant principal who was a teacher at the school. At the beginning of the school year, all teaching jobs were filled, and the teacher retention rate improved. In addition, the school was removed from the state’s failing school’s list.

The school was a themed magnet school and structured to operate as a school within a school. Due to the new nature of the theme of the magnet school, the description of the theme and any other identifiable information have not been provided to protect the anonymity of the participants. There were limited prerequisites for entering the program. Students must have passed classes the year before and not have severe and chronic behavior infractions. Students were allowed free admittance into the program and were not interviewed for the application process. A parent of the entering student was required to complete a three-part application process. The magnet school had a team of
administrators, teachers, and students. As a part of the aim of the magnet school to encourage student involvement, students were encouraged to recruit other applicants to apply for the program. The magnet school was relatively small with 300 students enrolled at the time of the study. Although the high school had an open floor plan, the magnet school occupied one wing of the high school. Since the magnet school only had three grade levels at the time of this study, there were no graduation statistics available.

The participants of this study were all students of this magnet school program, chosen randomly, from students in their ninth-grade year in the magnet school. Over 20 students were asked to participate in the study with a letter that explained the purpose of the study (see Appendix E). The students were asked to return the parent’s consent form to confirm their agreement to participate in the study. Since the focus of this study was on African American female students, only students that identified themselves as African American were asked to participate for this case study.

Students received an opportunity to participate in the study by signing up and agreeing to participate in an after-school focus group and individual interview sessions (see Appendix B). Students also received snacks during all sessions, both individual interviews and the focus group sessions. Only the students who turned in written permission from the parents participated in interviews (see Appendix C).

I did not teach any of the students included in this study and did not have a relationship with any of the students before the study. However, since I teach in the magnet school, the students were familiar with my role as teacher in the school. I
informed them that I taught math, and I was researching factors related to African American female motivation in math.

Data Collection and Instrumentation

Yin (2009) asserted that interview questions should be designed to gain understanding of the case. To accomplish this, the subject of the interview question protocol focused on the students’ background and their experiences in a math classroom. Additional questions that the participants answered provided an understanding about the students’ definition of motivation and math achievement. These questions also garnered data to help provide contextual understanding of the participant’s responses.

The interview questions were structured similarly to questions asked in previous research that addressed African American motivation and achievement goal theory (Anderman, Urdan, & Roeser, 2005; Freeman et al., 2002; Midgley, 2002). This study followed a similar approach utilized by Freeman and colleagues (2002), who conducted interviews using questions adopted from the Patterns of Adaptive Learning Survey (PALS). I collected data from conducting interviews with each participant and a focus group. The interview questions (see Appendix D) focused on the research questions, each participant’s background, and their achievement goal orientations (Anderman et al., 2005). During the focus group, I presented the same questions to those posed in individual interviews. They were slightly adjusted during the focus group for clarity.

The second set of interviews served as a member check after an initial data analysis of individual interviews. I verified the correctness of answers provided during the interviews and asked the students if they had additional comments related to each
question. This design of utilizing both interviews and a focus group helped to maintain credibility during data analysis and ensure that the data collected during the individual interviews were as unbiased as possible (LeCompte, 2000; Onwuegbuzie et al., 2010). After the individual member checks, I held a focus group with all the participants.

Alone-side an audio recording of the interviews and the focus group, I took notes during the interviews and the focus group session to guide the discussions. The interviews were semistructured interviews following a specific line of questioning. The questions were altered slightly to adjust to the responses provided during the interviews. The focus group was conducted with questions adjusted from individual interviews to prompt an ease of response from the participants.

Data Analysis

Creswell (2013) stated that coding is an essential part to qualitative methods. Coding establishes categories to organize qualitative data that can reveal themes to help understand the case. Data analysis incorporated deductive thematic coding in this study within a process of assembling the data, dissembling the data into codes, and reassembling the data to display the results using themes derived from the codes (Yin, 2015). After transcribing the audio recordings of the interviews and focus group, I coded and categorized the students’ responses according to their relevance to the research questions. Each category contained similar responses. I also recorded disparate themes that did not directly relate to the research questions but gave implications for further research relating to achievement goals, academic motivation, and the instructional needs of African American female students in math. I organized the codes in a chart to
compare the data collected from the interviews to the focus group data and triangulated the data with their grade reports (Viscek, 2010; Yin, 2009).

Stake (2003) cautioned that the manner in which data are collected can have unforeseen effects on the case and its system. A separate analysis was conducted from the responses provided during the focus group. Froiland and Davison (2016) explained that peer relationships can make a small difference in a student’s perspective of challenges presented in a math class. A table was created to discuss any possible outcomes or data that may be linked to having the focus group itself.

It is important to note that I am an African American female who teaches math. I identified myself as a highly motivated and high-achieving student in math while I was in high school. I attended a school with demographics similar to the high school in the study within the same state. There were cultural, racial, and gender-specific language, customs, and norms that I was able to navigate to access meaning. Since I share a similar background to the student and it may influence my interpretation of the data, the transcripts were reviewed by my dissertation committee. This ensured there was no exclusion of any notable and observable cultural and gender-specific nuances that I may have trivialized, since I identify with the demographic of the participants (Sagoe, 2012).

Subjectivity Statement

Case study researchers work inductively to form contextual generalization (Creswell, 2013). They do not draw conclusions about the case before they look for deeper and underlying understandings in their findings (Gillham, 2010). To accomplish this, the researchers must be aware of their philosophical assertions and beliefs, as with
all qualitative research (Creswell, 2013). I am a math educator who believes all teachers should care for the affective needs of their students. Thus, I am invested in learning about the factors that motivate students toward math achievement. I also am a firm supporter of giving positive reinforcements for students for behavior management and encouraging students to become self-advocates through student voice. During interviews, I encouraged students to express their answers. However, I did not force them to continue to answer questions they expressed made them uncomfortable or for which they had no answer.

The qualitative researcher who conducts a case study includes a self-investigation of his or her conceptual understandings (Baškarada, 2014). Stake (2003) described these conceptual understandings as the driving forces of choosing the topic of inquiry and determines the theoretical knowledge that the inquiry is trying to identify. I have an egalitarian belief that every person or group has a unique perspective. I chose a qualitative methodology to learn about the unique perspective of African American female student motivation in a math classroom. As a math teacher, I had developed an understanding of certain factors that contribute to the low math achievement of my students, such as lack of organization, a lack of focus, poor study habits, and low prerequisite knowledge. To combat this understanding, I focused on interviewing students whom I did not currently teach and refrained from commenting on the participants’ academic habits during the interviews and focus group. Over the course of the study, the students became more comfortable with providing self-reports.
Internal Validity

It is important that the process to collect data and interpret data is valid. To ensure validity, this study used triangulation to promote a convergence of the conclusions drawn from the interviews and focus group session. The focus group session also served as a vehicle for member checking, since I asked members to validate initial findings from the first set of interviews. Triangulation is to ensure that there is convergence of the conclusions drawn from the data collection data of more than one source (Yin, 2015). In addition, students within the focus group setting displayed nonverbal communication that indicated when certain responses were important or not representative of how the student would normally respond (Onwuegbuzie, Dickinson, Leech, & Zoran, 2009).

Although there was a recording of these responses, it was not possible to provide an exhaustive inquiry of these responses outside of the member check interviews because there was one sole researcher. This was a limitation of this study. Lastly, each participant had a follow-up interview after the focus group to give feedback on her responses to limit misinterpretations of the data.

Dependability and Credibility

I made every attempt to ensure that the data were collected from dependable and credible sources. The participants were selected through random sampling to ensure that the same participants individually interviewed were the same participants in the focus group. Participants received a choice to participate and reassurance that their participation would not jeopardize their grades throughout the study. As consistent with the organization of the school and its policies, the school counselor who coordinated the
students’ scheduling and personal information provided the quantitative data. I could not confirm if the participants had valid or stable addresses during the study. The focus group consisted of six of the seven participants, and the session did not occur until all of the participants participated in individual interviews.

The focus group and interview sessions were audio recorded. I read the interview questions to ensure that I asked the same questions to all participants. Some of the questions were restated when the participants gave verbal or nonverbal cues that they needed clarification. Questions that arose during the interview process that occurred due to a discussion were recorded and asked later in the focus group. The site of the focus group session was in the same classroom as the individual interviews. The school provided transportation, so students were available to participate in after-school sessions. The data collection of test scores and math grades occurred after the participants elected to participate in the study.

Ethical Safeguards

All ethical procedures mandated by Mercer University and the Institutional Review Board (IRB) were followed during this study. I submitted a proposal and acquired approval from the Mercer University IRB (see Appendix A). Participants received permission for their parents before I conducted any interviews. Participants and their parents were informed of their option to withdraw at any point during the study for any reason without penalty. The participants and their parents also received a letter stating that they would not be graded for participating in the study. Participants were reminded at the beginning and end of each interview that they may choose to stop or
pause the interview or the focus group session at any time for any reason. It was also explained that all transcripts of their individual interviews would only be shared with that participant, the parent of the participant as requested, and required faculty of Mercer University.

A letter described expectations for student conduct during the sessions. Students were asked to speak freely; however, students were expected to maintain the following norms to maintain respect of all participants. Participants who were disrespectful to each other during the focus group or were involved in any type of physical or verbal conflicts that could not be resolved would not be asked to return to the focus group. If conflicts arose that were caused because of the discussions from the focus group, then subsequent interviews and focus group would discontinue to protect the positive learning environment for the participants. All students were held to the school’s code of conduct. All participants adhered to this code of conduct and the study was able to continue.

I remained sensitive and respectful of the desire and emotional state of each participant. The interviews were conducted in an environment that was safe for the students. I consistently checked for signs of emotional distress. No participants exhibited emotional distress during the study. The participants did not report any instances of abuse during the study.

Summary

The qualitative investigation using case study method allowed for a comprehensive understanding of how African American female students are academically motivated in math. In a case study, the researcher can learn about the
nuances of the case and its system (Stake, 2003; Woodside, 2010). The process of interviewing each student individually and utilizing a focus group format allowed for a combination of qualitative methodologies that ensured a thorough analysis of the codes and themes derived from the collected data (Tesch, 2013; Viscek, 2010).

Research has indicated the need for a study that integrates race and culture, gender, and motivation using achievement goal theory (Freeman et al., 2002; Zusho & Clayton, 2011). This research study was designed to provide a study that merges race and culture, gender, and motivation while utilizing qualitative methods. The use of these methods provided rich data regarding factors related to African American female motivation. Chapter 4 presents the data and the data analysis of this study.
CHAPTER 4

DATA REPRESENTATION AND ANALYSIS

The purpose of this study was to understand factors related to African American female motivation toward math achievement. African American females are underrepresented in math-intensive STEM fields, and research has shown a trend reflecting low completion of math-intensive degrees from secondary institutions for African American females (American Community Survey Reports [ACS], 2013; Ceci & Williams, 2010). This indicates that African American female students may not be encouraged to complete postsecondary programs in math-intensive fields before they leave high school (Ceci & Williams, 2010; Kiefer & Sekaquaptewa, 2007). As students matriculate through high school, their motivation in math decreases (Murayama, Pekrun, & Lichtenfeld, 2013; Peklaj, Podlesck, & Pečjak, 2015). This study used achievement goal theory to discuss the position from which high school African American female students are motivated toward math achievement.

Achievement goal theory maintains that students are motivated from performance goals, which are norm-referenced or mastery goals (Ames, 1992; Dweck, 1986). Achievement of positive academic outcomes for African American female students requires that teachers consider their cultural affects (Adelabu, 2007; Honora, 2002). Researchers investigating the motivation of African American female students have supported achievement goal theory as a framework to explain the complex dichotomy
existing between unintended discriminatory practices and their cultural needs that may impact their ability to connect with the academic content (Adelabu, 2007; Thomas & Columbus, 2010). Achievement goal theory can explain the place from which African American female students are motivated toward math achievement (Ford, Jones, & Alexander, 2015). This theory links self-concept, self-efficacy, and motivation to explain the interconnected factors related to African American female motivation in math (Hulleman, Schrager, Bodmann, & Harackiewicz, 2010; Senko, Hulleman, & Harackiewicz, 2011).

Because achievement goal theory lacks qualitative data regarding culture and specific focuses on content (Urdan & Mestas, 2006), this study used a case study methodology to gain insight from the self-reports of high school African American female students regarding their motivation toward math achievement. It relates achievement goal theory to culture and a specific content. This study focused on three research questions:

1. What are the perceptions of African American female students about their high school math classes?
2. How do African American female achievement goal orientations affect their ability to persevere in math?
3. What factors affect African American female motivation toward math achievement?

The students were interviewed individually through a constructed interview protocol and then within two small focus groups. After analysis, the participants were asked to
participate in a focus group together. The interview questions were adapted from the PALS survey (Midgley, 2002). The next section offers a description of the research site and background information on the participants.

Site Description

Yin (2014) claimed that the setting of a study is as important as the participants in the study are because it forms the bounds of the case. This study was conducted in a Title I high school in a large district within the southeastern part of the United States. The high school was in a city named amongst the most violent areas in the state. During the time of the study, community leaders successfully formed a new city to gain more influence on issues with historical negative impacts on the community. As a Title I school, at least 85% of the student’s population qualified for free-or-reduced lunch, indicating that it was also a high poverty area. School staff and administrators navigated through issues such as chronic homelessness, unstable or absentee parental units, and the socially induced maladaptive behaviors of students. The school had two resident social workers, a fully staffed counseling center, and community partners to assist with students’ nonacademic needs. This made the high school a critical place for students in that it was one of the most stable and consistent structures for them.

The high school serviced a large area. At the time of this study, approximately 1500 students were enrolled in the high school. Most students who attended this high school had matriculated through one of two middle schools. The district allowed students to have free choice to choose the high school where they attended. However, the district
only provided transportation to the students’ zoned high school or to the school location that housed their choice of magnet school.

School Environment

The high school had experienced a reformation within the past three years. At the time of study, the school was fully staffed and in its third year of having the same administration. The graduation rate of the school increased from 45% to 75%, which was atypical of traditionally low-performing schools in high poverty areas with a predominantly African American normally categorized as having poor teacher retention, unstable administration, and persistent low opportunities for students to have high standards (Adelabu, 2007; Richardson, Alexander, & Castleberry, 2008). One week before the first round of interviews, the high school was removed from the state’s failing schools list.

Stake (2003) recommended a thorough discussion of the environment and the participants to build an understanding of the bounds of the case. In this study, it is important to note that the participants were magnet school students, housed in a wing of the school. However, during the year of this study, one of the ninth-grade classrooms was placed near upper class nonmagnet school classrooms. Thus, ninth-grade students matriculated with other students throughout the school day. While the magnet school students traveled different pathways of curricula than other students, they were not entirely separated from nonmagnet school students in elective courses. To offer comfort for the students, the researcher conducted interviews and focus groups in a magnet school classroom located near the magnet school wing.
Classroom

The participants were ninth-grade magnet school high school students. Since the magnet school was small and a school within a school, two teachers taught ninth-grade math. The teachers shared common planning time and participated in professional learning community meetings in which they received similar directives regarding their instructional practice. This included an intensive use of technology, since all students had school-issued personal devices. Alongside direct instruction from the teachers, the students were required to participate in a computer program that provided an online tutor and software that gave immediate feedback. The class sizes were held under 30 students. The classes contained female and male students, which reflected the demographic of the rest of the school. The classes also consisted of first year ninth-grade students who shared similar backgrounds as the participants. Students participated in standard-based testing at the end of their math courses.

Students were placed in their high school courses with the use of test scores and recommendations from their middle school teachers. All eighth-grade students participated in an end-of-course test if they were Algebra I students or the end-of-grade test if they opted to take the eighth-grade math course. Algebra I, a ninth-grade course, was offered at the middle school level. This is significant because research has shown that when students have early exposure to Algebra, their cognitive ability in math in the long term improves which leads to an increase in intrinsic motivation (Benken, Ramirez, Li, & Wetendorf, 2015).
Middle school teachers determined which students could take the course during their eighth-grade year. If the students were successful, they received high school course credit, and they were eligible to take geometry in their ninth-grade year of high school. If students failed the course, they were placed in their ninth-grade course based on the middle school teachers’ recommendation. The participants in this study were either placed in the accelerated Algebra I course or in geometry for their ninth-grade school year. In some special cases, students who were not successful in the Algebra I course during their eighth-grade school year were placed in a general level Algebra I course for the ninth-grade math course. Students who did not take Algebra I during their eighth-grade year might be placed in accelerated Algebra I. Thus, the participants’ classes contained students on various academic levels. It should also be noted that students who were enrolled in an accelerated or honors course received an extra seven points to the grade they earned.

Participants and Interviews

This section provided a description of each participant, the data collected from their interviews, the student’s achievement level as described by their standardized test scores, and the analysis of the data as it relates to their achievement goal orientations. The analysis of the data was used to determine their achievement goal orientation and identify factors that related to their motivation toward math achievement.

The participants, randomly chosen, to participate in the study, were ninth-grade female students who identified as African American females enrolled in the magnet school program. They interacted with each other during a school week. It is also
important to note that all the participants had one of the two math magnet school
teachers. The participants were not screened for their math ability, level of motivation,
attendance history, or academic performance. Although this type of screening would
have placed more bounds on the case, it would have limited the scope of what could be
learned by having multiple levels of academic performance and math ability represented
in the study (Stake, 2003). The researcher asked over twenty students to participate in
the study, but only seven students returned their forms that gave parental consent for
them to participate in the study. Of these students, six of the students were accelerated
Algebra I students, and one of the students was a geometry student.

Yin (2014) and Stake (2003) explained that the researcher can influence the data
collection and is not detached from the case. As the researcher, I developed a rapport
with the students while collecting data during the interviews. This extended to the
students’ level of comfort during the member check interviews and the focus groups.
Each participant received a pseudonym and responded to that name in the focus group to
protect her identity. This may have had further influence on how comfortable they were
with giving their responses to questions and prompts. The students gave more feedback
as they became comfortable and understood their anonymity would be maintained
throughout the study.

Participant 1: Oni

Oni was an accelerated Algebra I student. This was her second year in the state at
the time of the study. Oni’s former school district experienced severe economic
hardships. She transferred to the study site’s community middle school during her
eighth-grade year. While in the eighth-grade, Oni took the end-of-grade test and scored in the 62nd national percentile on her test in math. She scored as a developing learner, which means that she showed some level of proficiency on her test in math. As indicated in her end-of-grade tests, her strongest content subject was English and literature. Oni entered high school with a high school credit in a STEM elective course. At the time of the interview, she enrolled in another complimentary STEM elective course. She had experienced overall academic success in her first semester and earned an 84% in her math class. She also took advanced courses in other subject areas.

At the time of her interview, Oni exhibited positive relationships with her peers and teachers. She became more active in afterschool activities after the interview. She joined an organization that provided mentors and career development for minority high school female students. The organization also offered academic support and focused on helping students develop positive self-image. Her interview revealed insight into her achievement goal orientation and factors that motivated her toward math achievement.

Researcher said, “So please describe your math class.”

Oni replied, “I take accelerated math.”

Researcher said, “Okay. That’s it? Okay.”

Oni added, “It’s kind of hard, but it’s not really hard. ’Cause, at first, I get the stuff. And then as it goes on, it starts getting a little tricky.”

Researcher replied, “Okay.”

Oni said, “But, overall, I can manage it. It’s not that hard.”
Researcher said, “Alright. What’s your level of motivation to achieve in math, or to do well?”

Oni replied, “Oh, very high.”

Researcher asked, “What motivates you to do well?”

Oni replied, “I wanna get straight As. And math is part of my classes, so I wanna get an A in there too. But right now, I have a 85. So that’s close.”

Researcher said, “Okay. How important is it for you to learn a new concept in math?”

Oni replied, “It’s not that important [chuckle] ’cause it’s hard. So, I mean, I like to be challenged with stuff. But if I don’t have to take it, I’m not gonna take it.”

Researcher said, “Okay. What are your goals in math?”

Oni replied, “My goals? I don’t think I really have any goals in math. Okay. My goal is to know everything I have to know for the outside world about math.”

Researcher said, “Okay. And are there skills that you want to improve on?”

Oni replied, “Yeah. I would like to improve everything about my math, really. But, I mean, math is fun, I guess. I don’t know.”

Researcher said, “Okay. What makes it fun?”

Oni replied, “Learning new ways, like learning the different ways to solve problems for math.”

Researcher said, “Okay. What are your thoughts about showing others your progress in math, how you're doing in your math class?”
Oni replied,
I feel honored to show them 'cause I'm, I'm . . . what's that word? [chuckle] I'm sorry. I'm proud of myself. So, to show others they should be proud of me too. And I like that feeling when others are proud of me too.

Researcher said, “Okay. And then what actions do you take to look smart compared to other kids?”

Oni asked, “To look smart?”

Researcher said, “Mm-hmm.”

Oni replied, “I mean, just do the work. I mean, you don’t have to act. . . . To at least try, ’cause I mean, nobody’s really dumb. So, I mean, just do the work, and I guess you'll look smart.”

Researcher said, “Okay. Let me rephrase the question. When you see someone else in the class doing really well, how does that make you feel about what you're doing?”

Oni replied, “I mean, we'll probably be doing the same thing, cause I'm not gonna goof around in math. I'm not gonna goof around in any of my classes, really.”

Researcher said, “Okay. Alright. So what goals do you make so you don't look like you know less than other students?”

Oni asked, “What? Hunh?”

Researcher asked, “Do you make goals or do you do things in the class so that you don't look like you know less than somebody else?”
Oni replied, “No, I don’t have any goals ’cause if you don’t know, you just don’t know it.”

Researcher said, “Okay. So what are some goals that you make when you have trouble understanding or doing the work?”

Oni replied, “Definitely go to the teacher and ask her as many questions as you need to.”

Researcher said, “Okay. How often do you do that?”

Oni replied, “Anytime I need help.”

Researcher said, “Alright. Sorry about that. So you said that you ask questions all the time?”

Oni replied, “Yes, I do.”

Researcher: “Do you feel like you get help, or you feel more . . . ?”

Oni replied, “Yeah, I feel like I get help.”

Researcher said, “Okay. Okay. So what actions do you take so the teacher doesn’t know you’re having trouble, more trouble than other people?”

Oni asked, “What do you mean?”

Researcher asked, “Do you do anything so that the teacher doesn’t know you don’t know?”

Oni replied,

I would just keep doing what I would like . . . maybe I would like work on something or something, or make it at least look like I’m working or at least do
the problem. But even though I know it’s wrong, just continue to do it however, the way I feel is right. I don’t know.

Researcher said, “Okay. That’s fine. Once you know the teacher may have figured out that you don’t know what’s going on, is that when you ask your questions?”

Oni replied, “No. If I have questions I’m going to ask them right then and there.”

Researcher said, “Okay. And once you get the answers for your questions, then do you feel more motivated to continue, or do you feel worse?”

Oni replied, “More motivated.”

Researcher said, “Okay. Why?”

Oni replied, “Because I feel like if I can do this, then I can do the next step.”

Researcher said, “Okay. That’s really all the questions I have. Did you have anything else you wanna add about your experiences in your math class?”

Oni replied, “I love my teacher. She’s the best math teacher I’ve had so far.”

Researcher said, “Okay. Why do you say that?”

Oni replied, “Okay. I’m from […], and their school system is terrible. Last year, when I moved here, at […], we didn’t have a math class. We had TTO, which is basically math class online. But it really did not help. So now that I have an actual good math teacher, it comes in handy.”

Researcher said, “Okay. I gotcha. Does she make you want to work harder?”

Oni replied, “Yes.”

Researcher asked, “How?”

Oni replied,
She motivates her students. She tells us things that no other teacher will tell us. And she’s really understanding, too. Like she’ll say, “You can do whatever—Whatever you put your mind to, you can do it.” That’s what she’ll be saying all the time. And, “Don’t let nobody stop you.”

Researcher, “How does that make you feel about your goals of getting straight As, when you hear things like that?”

Oni replied, “Makes me feel like I could do it and I am going to do it.”

*Oni’s responses showed that she was a student who was motivated in school.*

*Huang (2016) asserted that high achieving students show higher levels of intrinsic motivation, have higher levels of self-efficacy, and engage in help seeking for understanding more often. This is also descriptive of students who have mastery goal and performance approach goal orientations (Elliot & Murayama, 2008; Hulleman et al., 2010; Midgley, 2002; Senko et al., 2011). While it was evident that Oni liked when others were proud of her, this does not indicate that she was motivated more by comparing herself to others. A deeper look into her responses about performance approach goals revealed a student who was transitioning from performance approach goals to forming mastery goals.*

*However, Oni displayed performance goal orientations. When asked questions about performance approach goals, she responded with “I mean, we’ll probably be doing the same thing”. This showed that she had rationalized that there was little need to compare herself to others because they were on the same level. Students can transition toward other achievement goals and react differently under different circumstances*
(Elliot & Church, 1997; Gray, Chang, & Anderman, 2015; Koopman, Bakx, & Beijard, 2014; Pintrich, 2000). The zeal Oni expressed physically when describing how she looked for others to be proud of her implies that having a positive self-concept deepened her motivation toward math achievement.

Oni also described that she had a negative experience while being a student of an online program, which she called TTO. In TTO, the students were placed in a large open communal space with computers and two to three teachers to assist students as they completed a virtual math course. In this setting, community, relationship, and social interaction were limited, causing Oni to have a negative experience. However, due to her sense of intrinsic motivation, this experience had limited impact on her level of motivation toward math achievement.

Participant 2: Kali

Kali was in an accelerated Algebra I math course. She went to a local middle school and elementary school in a different district. Due to this, it was not clear if she took an end-of-course test or an end-of-grade test in her eighth-grade school year. Despite the significant struggles in achieving math competency, she remained positive in her aspirations to be successful in math. She explained that she received a grade of C or below in previous math courses. She failed math during her fifth-grade year, indicating a lack of understanding.

Kali took virtual high school elective courses the summer before she entered high school as a part of a summer bridge program. This program provided students with opportunities for acclimation to the high school culture and building before arriving in
the fall for the beginning of school. At the time of the study, she was taking one advanced placement course and a STEM elective course. She had some trouble adjusting to the academic rigor of her high school courses and earned a 77 in her math class. Her interview showed further introspection into factors that affected her motivation toward math achievement. She had some positive relationships with peers and teachers.

Researcher asked, “Can you describe your math class for me as of right now?”

Kali replied, “My math class is small, it has nine students. They are very loud, well, we are very loud. We have a lot of tests. But overall it’s really good and it’s easy if you just pay attention.”

Researcher said, “Okay. Now, what’s your level of motivation to achieve in math?”

Kali replied,

I would like to be a veterinarian, so in order to be a veterinarian and have the medicine amounts right for the dogs, I have to know math. And the receipts and all of the adding and subtracting stuff and stuff in math. But in veterinarian, I have to know my math class.

Researcher asked, “If you had to rate how motivated you are in your math class, what would you give yourself? “

Kali asked, “A rate?”

Researcher replied, “Mm-hmm.”

Kali replied, “Seven.”

Researcher asked, “Why do you say seven?”
Kali replied, “Because I have a lot of my friends in there and they like to play. But overall, I’m trying to make it out of there so I can pass and so I can get a good college.”

Researcher said, “Okay. Alright. How important is it to you to learn new concepts in math?”

Kali replied,

It’s kind of not important to me but then it kind of is because I understand that I have to know all of these concepts to pass, but it’s not important because half of these concepts I already know, but it’s just making it harder.

Researcher said, “Okay. What do you mean by making it harder?”

Kali replied, “In lower grades we went over this stuff, but it was only one, two, and three and low numbers, and no fractions, but now it’s fractions, exponents, variables, coefficients.”

Researcher said, “Okay. What are your goals in your math class?”

Kali replied, “To pass with a B or higher because from fifth grade to eighth grade, I got nothing but a C in math.”

Researcher said, “Okay. Are there skills that you want to improve on?”

Kali replied, “Anything with fractions, expect for adding and subtracting them. Fractions are my hardest. They are my weakness.”

Researcher asked, “Is it because they're your weakness, is that why it’s important to you?”
Kali replied,

Yes, because in fifth grade it was the worst F of my life. And that’s all because we started on fractions. And ever since we started on fractions I couldn’t get rid of them. I did not like fractions, still don’t. Too hard.

Researcher asked, “Why are fractions hard for you?”

Kali replied, “Because they make a lot of things confusing. I just like doing things with whole numbers and not half of a number. Numbers like three, four, seven or other numbers.”

Researcher said, “Okay. Alright. What are your thoughts about showing others your progress in math, how well you’re doing?”

Kali replied,

I would love to if I make more than a C. I would love to show everybody I have made higher than a C. That’s literally what we were just discussing in my class today ’cause I brought it up.

Researcher said, “I got you. Why did you bring it up?”

Kali replied,

Because, I don’t know what we were doing . . . ’cause before lunch we just talk, and we went over the study guides. I think, and they were saying something about how their past math was and how they wanted to go back to it, and I said, “I don’t wanna go back, ’cause fifth grade was horrible. I had the biggest F and all throughout the rest of the years, I made nothing higher than a C.” And I was like, “I wanna pass with a B or higher and nothing less.”
Researcher asked, “What actions do you take to look smart in comparison to the other students in your math class?”

Kali replied, “I sit right beside the board, well, we’re literally right in front of board. Say that this is the board and my desk is right there. And I work while she’s explaining.”

Researcher said, “Okay. Is that your way to make sure that you look like you know what you’re doing?”

Kali replied, “No. It’s my way of separating myself from my friends so that they don’t distract me.”

Researcher said, “Alright we’re gonna continue. So, you were saying that you sit in front of the board to separate yourself from your friends?”

Kali replied, “Yes.”

Researcher asked, “Why is that?”

Kali replied, Because I know if I sit back there, I am one to talk and laugh and play. Because there’s literally what happens other than work in Ms . . . in my class. It’s like, just because it’s a small class, they think they can just do anything, so they can just talk and unless we’re on IXL. And that’s it

Researcher asked, “What goals do you make so you don’t look like you know less than the other kids?”
Kali replied,

I don’t really make any goals because I know that I’m going to at some; at some point in time I’m not going to be as smart as some other people. But at other times, at the same time, I know I am smart than others, than some of them in class. So, I just, I don’t make any goals because it’s like it’s no way I can put myself above them. Well I can put myself above them if I apply myself. Right now, I’m just focused on getting work done and not just . . . just try ’n’ make higher than a C.

Researcher said, “So you say you don’t really make goals. However, what do you do when you have trouble understanding something?”

Kali replied, “I ask her a question or I go to the back.”

Researcher asked, “What actions do you take so the teacher doesn’t know you are having trouble more than somebody else?”

Kali replied, “I sit in front of the board and act like there is no problem.”

Researcher asked, “Why do you do that?”

Kali replied, “So, I’m not targeted like the rest of the kids that mess up.”

Researcher asked, “What do you mean by targeted?”

Kali replied, “So, she won’t focus on me. Like not focus like need help, but like focus like they run their mouths.”

Researcher said, “Okay.”

Kali replied, “So, I don’t get called out because I have a very loud, loud speaking voice, so I won’t get called out.”
Researcher said, “Okay. Does that determine what you do in class?”

Kali replied,

No, well kind of ’cause after, after she is finished giving her instruction, I move back there. I move back, back to my seat in the back, and then I do work. But if they start talking to me, I will start talking back, and then I end the conversation. Then I get back to work, and if someone else tries to having a conversation with me, then I try to end that as quick as I can. I’m not really big on conversations, but I like to be in them.

Researcher said, “Okay, okay, I gotcha. Well, is there anything else you wanted to add about how you feel about math, what motivates you in math?”

Kali replied, “No.”

Researcher asked, “No, that’s just a few background questions for you. What is your grade in math right now?”

Kali replied, “I just checked and it was a 73.”

While students who are motivated from performance avoidance goals enlist strategies to help them succeed, these strategies are often vulnerable to unfavorable academic consequences (Mih, Mih, & Dragos, 2015; Nicholls, 1984). Kali’s strategy of physical placement is an example of this. When she perceived that she might receive positive affirmations from help seeking, then she placed herself in the front of the classroom. She further described that she would place herself in the back of the room to avoid uncomfortable academic situations.
However, Kali struggled with being distracted in class. She reported, “I separate myself so that I don’t talk to my friends.” This indicated that she was cognizant of her weaknesses and strengths and would enlist actions to compensate for them (Benken et al., 2015). Although she replied, “I don’t have any goals”, she described goals that focused on avoiding poor grades. She also reported that she changed her seating to avoid what she described as the teacher “calling her out”, which is a point where the teacher probes the students for understanding as well as to retain their focus. Kali’s behavior is indicative of students who tend to be oriented from performance avoidance goal orientations (Elliot & Murayama, 2008; Hulleman et al., 2010; Midgley, 2002; Senko et al., 2011).

Although this is descriptive of avoidance behaviors, it showed the behaviors that manifested from the place in which she was motivated toward math achievement (Ames, 1992, Butler & Shibaz, 2008). Kali’s way of removing herself is reflective of her having the need to separate herself from the sense of community in the classroom. This is reflective of her cultural understanding that closeness requires a level of expectation and accountability (Diemer, Marchand, McKellar, & Malanchuk, 2015). As research has indicated, although avoidance behaviors can bring negative or vulnerable behaviors, they still show motivation toward a goal (Ames, 1992; Elliot & Church, 1997). In this case, Kali was highly motivated toward maintaining the appearance of math achievement. It is important to note that Kali’s performance avoidance goal orientation was possibly not congruous to a lack of interest in math achievement. Rather, it is indicative of the intertwining of self-concept and motivation in that her understanding
that she might not be able to perform as well as others pushed her to enact avoidance behaviors (Evans, Copping, Rowley, & Kurtz-Costes, 2010; Peixoto & Almeida, 2010).

Participant 3: Zola

Zola described herself as a high-achieving, accelerated math student. She attended a middle school from which students matriculated to the high school where she attended. She took the end-of-grade test in eighth grade and scored in the 69th national percentile. She also scored at level 2 for achievement, indicating that she had some proficiency in her knowledge of the math content. She did not earn any high school credits before attending high school.

At the time of the study, Zola experienced academic success and received a 86 in her math course at the end of the semester. She was enrolled in one advanced placement course in another subject, as well as an elective that helped students adjust to the rigor of high school. Alongside this course, she enrolled in an afterschool community program that matched students with community volunteers to learn life and soft skills. Her interview revealed factors that not only motivated her toward math achievement specifically, but also academic achievement.

Researcher said, “Describe your math class.”

Zola replied, “It’s small. It’s not a lot of kids. It’s talkative a little bit. And most of the time, it’s very energetic, and you’re able to walk around and stuff.”

Researcher said, “Okay. What’s your level of motivation to achieve in math?”

Zola replied, “It’s high ’cause I think math is really important so I really wanna achieve in there really good.”
Researcher asked, “Why do you think math is important?”

Zola replied, “Because we use math in our everyday lives and most jobs will require you have to use Math. So, I think math is important.”

Researcher said, “Okay. Please describe how important it is to learn new concepts in math.”

Zola replied,

It’s important because math changes over the years, like we’re learning new math and some older people may not know about it, so it’s just good to know new concepts and you’re able to learn something new and be able to create something new by learning new math.

Researcher asked, “What are your goals in your math class?”

Zola replied, “My goals in my math class is to just make a A and learn something new.”

Researcher said, “So you said you wanted to make an A. What is your grade now?”

Zola replied, “An 81.”

Researcher asked, “So since you have a 81 but you want an A, are there skills that you want to improve on?”

Zola replied, “Most definitely. I wanna improve on polynomials.”

Researcher asked, “What else?”

Zola replied, “Slope and I think unit rate, stuff like that.”
Researcher said, “Okay. Now, what are your thoughts about showing others your progress in your math class?”

Zola replied,

I think that you should show others. . . . Well, I should show others because they may not understand and maybe I can just help them in a better way. My way of learning it instead of the teacher’s way.

Researcher said, “Okay. What actions do you take to look smart in comparison to other students in math?”

Zola replied, “I sit alone and I don't talk at all in the class. I just listen and take notes.”

Researcher said, “Okay. So, does it matter to you how others view how you’re doing in your math class?”

Zola replied, “No, not really.”

Researcher asked, “Why is that?”

Zola replied, “Well, I’m choosing the way I wanna learn, so why would I care how other people think about what I'm doing in my class?”

Researcher said, “Okay. What goals do you make so you don’t look like you know less than other students?”

Zola replied, “A goal that I just made is to pass and pass all my tests, not to look any smarter or anything, just do my work and pass.”

Researcher said, “Okay. Describe the goals you make when you have trouble understanding or doing the work.”
Zola replied, “The goals I make is to study, make sure I study when I get home, ask the teacher for help if I need it and just really study.”

Researcher said, “Okay. What actions do you take so the teacher doesn’t know that you have some trouble in math more than others?”

Zola replied, “I go on the Internet and try to find out myself, like watch YouTube videos and someone else teach me, so the teacher doesn't know that I have a problem with it.”

Researcher said, “Okay. Is there anything else you want to add about what motivates you in your math classroom?”

Zola replied,

My teacher because she . . . even though my class talks a lot, she always keeps her calm and she always tries to help us. She does tutorial, and she really just wants us to pass her math class not just let us fail because that’s not her motivation is to make us pass.

Researcher said, “Okay. All right, well, thank you very much. Anything else you wanted to add?”

Zola replied, “Math is my favorite subject.”

Researcher asked, “Why is it your favorite?”

Zola replied, “I always had a . . . I never really had a hard time in math. Well, not until I got to Algebra, but math never really felt hard to me, so I always liked just doing math problems.”
Researcher said, “Okay. And you said you liked doing the math problems because they just come easy to you?”

Zola replied, “Mm-hmm.”

Researcher asked, “What makes it so easy?”

Zola replied, “I don’t know. I think ’cause I have a good understanding of it just automatically, and I just teach myself how to do it and then I can easily do it myself.”

Zola’s description of her math classroom supported research on students who have mastery goal orientations. She expressed that her teacher was good at explaining concepts, which indicated this was an important factor for her to have a positive learning experience. Her interview also showed that she was intrinsically motivated to develop her competence in math. Her level of intrinsic motivation is indicative of students who have mastery goal orientations (Huang, 2012; Hulleman et al., 2010).

Zola had an interest in math and stated that math “has always come easy”, indicating that she described herself as competent in math. She considered herself as highly motivated toward academic achievement. Zola expressed that math was a necessary component of being a productive adult. Zola had a grade of 86 in her math class. Although she spoke briefly, she demonstrated that she was motivated from a mastery goal orientation (Elliot & Murayama, 2008; Hulleman et al., 2010; Midgley, 2002; Senko et al., 2011). As she declared, “Well, I’m choosing the way I wanna learn, so why would I care how other people think about what I’m doing in my class?” She did not have elaborate responses to questions about changing her behavior or goals for norm-referenced aims. Her responses to these prompts were indifferent, indicating that
she was not motivated from performance orientation goals (Elliot & Murayama, 2008; Midgley, 2002).

Participant 4: Bisa

Bisa was an accelerated math student who also explained that she had a history of being successful in math. She received a 77 in her math class. She also had two other honors classes: physics and English literature and composition. She was not involved in any other afterschool activities. However, she frequently stayed after school for tutorial sessions with her teachers. She placed high values on peer relationships. She had experienced academic success since she had been in high school.

She attended a charter middle school. Many students from this school attended two other neighboring high schools in the school district. However, several students from her middle school attended this high school to participate in the magnet school. She scored in the 70th national percentile in math in her end-of-grade math assessment. However, she scored at the developing learner level. Her interviews gave further implications as to how she was motivated toward math achievement.

Researcher said, “Please describe your math class.”

Bisa replied, “My math class is small. It’s an accelerating ninth grade class, but I took a 10th grade teacher and I like it in there.”

Researcher said, “Okay. Why do you like it?”

Bisa replied, “Because I'm surrounded by people that I'm familiar with and who won't judge me.”
Researcher said, “Okay. Okay. Describe your level of motivation to achieve in math.”

Bisa replied, “I just like math, so I just do it.”

Researcher asked, “Why do you like math?”

Bisa replied, “Because it’s easy too.”

Researcher said, “Okay. What makes it easy to you?”

Bisa replied, “I don’t know. It's just easy. I don’t know why, it’s just easy to me.”

Researcher said, “Okay. That's fine.”

Researcher said, “Okay. So pardon the interruption. Let’s continue. You said math is easy to you, just because it is?”

Bisa replied, “Mm-hmm. Way easy to remember than any other subject.”

Researcher said, “Okay. Please describe how important it is to learn new concepts in math.”

Bisa replied, It’s very important because enable to get to know everything about math. . . .

Well, first, you got to start from the easy and then go to the hard. I don't think there's an end to math, honestly. I just think it’s important because every other subject has math somewhere.

Researcher said, “Okay. What are your goals in your math class?”

Researcher said, “Okay, part three. Okay, you said it's very important in that there's not an end to the math.”
Bisa replied, “Mm-hmm.”

Researcher asked, “Right?”

Bisa replied, “Yes.”

Researcher said, “Okay. And then you were saying something about . . . you said, ‘in every subject’?”

Bisa replied, “I believe it pops up in every subject.”

Researcher said, “Okay. So what are your goals in your math class?”

Bisa replied, “To get what I need to learn. Really.”

Researcher asked, “Do you believe you get what you need?”

Bisa replied, “Yes, I do.”

Researcher asked, “How do you know?”

Bisa replied, “Because since I work in a smaller environment, it’s more easy for me and my teacher to communicate, like when I need help or something, so I will get it.”

Researcher said, “Okay. Do you have any other goals?”

Bisa replied, “To pass. I don’t really plan on majoring in anything with math.

Researcher said, “Okay. Why don’t you want to major in anything in math?”

Bisa replied, “I don’t know. I just don’t want to.”

Researcher said, “Okay. You said that you wanted to pass? What’s your grade now?”

Bisa replied, “A 70 something.”

Researcher said, “Okay. What do you want to major in?”

Bisa replied, “I want to major in cosmetology.”
Researcher said, “Okay. Why did you choose cosmetology?”

Bisa replied, “Because I like to do hair, nails, and makeup.”

Researcher said,

I got it. Okay. So back to your math class. It comes easy to you but you don’t think you want to major in it, and that’s fine. That’s good. Are there any skills involved that you want to improve on?

Bisa replied, “Not really. I believe I’m pretty good at it, so . . . .

Researcher said, “Okay. So, what are your thoughts about showing others your progress in math?”

Bisa replied, “I would like to show others my progress in math. I show my parents.”

Researcher said, “Okay. Is that important to you, to show your parents?”

Bisa replied, “Yes.”

Researcher asked, “Why?”

Bisa replied, “Because they motivate me to do better or to keep going.”

Researcher asked, “How do they motivate you?”

Bisa replied, “They push me to do hard, and if I don’t. . . . If they believe that I haven’t tried my hardest, they tell me to try my hardest.”

Researcher said, “Okay. Do you feel like you’re pushed to do your hardest in your math class now?”

Bisa replied, “No.”

Researcher asked, “What makes you feel that way?”
Bisa replied, “To me, my teacher seems very nice, like too nice.”

Researcher said, “Okay.”

Bisa replied, “But she does believe in us, so she believes we could do better than what we are now.”

Researcher said, “Okay. But you said you believe she's too nice? What makes her too nice?”

Bisa replied, “I mean, we talk a lot. She doesn’t really tell us, you know, be quiet or anything, she just lets us talk. Nowhere does she finish teaching. So, I just think she’s an easy pushover sometimes.”

Researcher said, “Okay. If she was more stern or required more disciplined, how do you think your motivation in her class would change?”

Bisa replied, “I think it would change a lot. I would pay attention more, and my grade would be higher.”

Researcher said, “Okay. Thank you for that response. Thank you. What actions do you take to look smart in comparison to other students in math?”

Bisa replied, “I honestly don’t know. I don’t like to compare with them. I believe everyone in my class . . . me and everyone in my class has the same mentality when it comes to math.”

Researcher said, “Okay. What mentality is that?”

Bisa replied, “We’re all pretty smart. We all know what we’re doing so I don’t really think that I’m better.”
Researcher asked, “Well, what goals do you make so you don't look like you know less than other students?”

Bisa replied, “I just keep up with the class, pay attention.”

Researcher said, “Okay. Describe the goals you make when you have trouble understanding or doing the work.”

Bisa replied, “Ask. I ask, and if I still don't get it, I keep practicing.”

Researcher said, “Okay. Now, what actions do you take so the teacher does not know you're having trouble more than others?”

Bisa replied, “Again, I ask.”

Researcher said, “Okay. Is there anything else you wanted to add about your math class, how you feel about math?”

Bisa replied, “Nope.”

Researcher said, “Okay, anything you want to talk about as far as what motivates you in math?”

Bisa replied, “Mm-mm.”

Researcher asked, “No?”

Bisa replied, “I pretty much said everything.”

Researcher said,

Okay. Well, thank you so much for your participation. Again, I’m going to type everything you’ve said and I’ll show it to you. If there’s anything you want to add or take away or change then you can at that time.

Bisa replied, “Okay.”
Researcher said,
And then we’re going to have a focus group with all of the girls that I have
interviewed so far. And then we will answer some of the same questions, but it
may be a different experience with other students. Okay?
Bisa replied, “Okay.”
Researcher said, “And of course, at any time you don’t wanna participate, just let
me know.”
Bisa replied, “Okay.”
Researcher said, “Okay, thank you.”
Bisa replied, “You’re welcome.”

_Bisa responded to being concerned with others in the classroom. Her responses
were of a performance approach orientation, as she wanted to be on task with other
students (Elliot & Murayama, 2008; Hulleman et al., 2010; Midgley, 2002; Senko et al.,
2011). She had a positive self-concept, for she stated that the math came “easy” to her.
Her responses aligned with research on students with performance approach goals that
found positive academic benefits of performance approach goal orientations (Jõgi, Kikas,
Lerkkanen, & Mägi, 2015; Senko et al., 2011). Bisa wanted to achieve in the class, had
positive long-term goals, positive social relationships, and showed an interest in school.
However, from her perspective, she was not motivated toward math achievement; rather,
she wanted to excel in school overall. She stated, “I don’t really plan on majoring in
anything with math” and gave the reason, “I just don’t want to.” Bisa elaborated that
she wanted to pursue a career in cosmetology. She also felt that the expectations set in
her math class were not high enough to encourage her to work harder and maintain motivation. She considered the teacher as too lenient toward what she considered poor academic habits that she explained she exhibited along with her peers.

Participant 5: Amina

Amina was a ninth-grade geometry student who earned a 93%. Since Amina took the Algebra I course in eighth grade, she did not take her end-of-grade math test for eighth grade. Instead, she took the Algebra end-of-course test. Her scores were not provided for her end-of-course test in Algebra I. At the time of the interview, she was highly successful in high school. She was enrolled in a tenth-grade honors English literature and comprehension course, a tenth-grade honors science course, and an advanced placement course. She was also enrolled in a STEM elective at the time of the interview. Her transcript showed that she earned high grades in all subjects, indicating that she was a high-achieving student.

Amina took a rigorous course load while in middle school. She earned three high school credits while in a district middle school, including Algebra I, English literature and composition, and science. She chose to go to her high school to participate in the magnet school. Her interview revealed the place from which she was motivated toward math achievement and provided information to understand factors that relate to the motivation of student with an interest in math.

Researcher said, “Please describe your math class for me.”
Amina replied, “Umm, it’s pretty easy. I think because math is my favorite subject because I like dealing with numbers its simple. It’s easy for me to understand. Most people say they hate math. I just like it.”

Researcher: Okay. Why do you like it?

Amina replied,

I don’t . . . I mean . . . it’s just always been something that I understood. Like, I don’t know. Maybe because I like money. I like counting money. So, it’s kind of interesting too. Like, some of it don’t make sense, but it’s interesting

Researcher asked, “What is your level of motivation to achieve in math?”

Amina asked, “On what scale?”

Researcher said, “On a scale of 1 to 10.”

Amina replied, “9.”

Researcher asked, “Why do you say that?”

Amina replied,

Ummm, I mean, I’m eager to do it. So, it’s just like I have to do it. And then it kinds of goes hand in hand with what I want to be when I grow up. So, I need this. So, I know I got to do the math so I can be what I want to be when I grow up. So, it motivates me to do it.

Researcher asked, “What would you like to be when you grow up?”

Amina replied, “An accountant.”

Researcher asked, “Why do you want to be an accountant?”

Amina replied, “Because I like math.”
Researcher said, “Okay. How important is it to learn new concepts in math?”
Amina replied, “It just important. It’s not too important or less important. It’s just important.”
Researcher asked, “Why it’s it important to you?”
Amina replied,
Umm, some stuff you need in life. Like some stuff we learn in math it goes hand in hand with life. But some stuff with math, I know what it has to do with life, but, you got to learn it.
Researcher asked, “What are your goals in your math class?”
Amina replied, “To understand everything and pass the class with an A. And try to use some of the stuff I learned in my everyday life.”
Researcher said, “What do you have in the class now?”
Amina replied, “A 93, I know it’s an A.”
Researcher said, “Okay. How did you do last semester?”
Amina replied, “Pretty good.”
Researcher asked, “Okay, what was your grade?
Amina replied, “95.”
Researcher asked, “Are there any skills you want to improve on?”
Amina asked, “In math?”
(Interview interrupted.)
Researcher said,

Thank you so much for returning. This is part 2. I’m just going to back track a bit just to make sure I have all of your responses. So, please describe how important it is to learn new concepts in math.

Amina replied, “It is very important because you may need some concepts of math in life. And also, you need to learn anyway to pass to go to the next grade.”

Researcher asked, “What are your goals in your math class?”

Amina replied, “To pass it with an A.”

Researcher asked, “Why do you want to pass it with an A? Why is that your goal?”

Amina replied, “Because I want to make all As so I can have a 4.0. So that is a part of achieving my goal.”

Researcher asked, “Are there any skills you want to improve on?”

Amina replied,

Maybe my understanding skills. Like, I can get something, but then, I can get something one day and then forget it. Like, my memory skips around. There was a unit that I didn’t understand at all. I forgot what it was called.

Researcher said, “Okay. What are your thoughts about showing others your progress in your math class?”

Amina replied, “I feel like it can motivate people to do better or stay on track.”

Researcher asked, “What actions do you take to look smart in comparison to other students?”
Amina replied, “Try to complete all my work with higher than a passing grade.”

Researcher asked, “What goals do you make so you don’t know look like you know less than other students?”

Amina asked, “Can you repeat the question?”

Researcher asked, “What goals do you make so you don’t look like you know less than other students?”

Amina replied, “Umm, I don’t think I have those type of goals.”

Researcher said, “Okay. What type of goals do you have?”

Amina replied, “To pass the class with an A, understand everything. Like what’s it called? Umm, actually obtaining the knowledge instead of just learning it just to learn it.”

Researcher said, “Describe the goals you make when you have trouble understanding or doing the work.”

Amina replied, “First, I try to figure it myself before asking the teacher a couple of times and try to connect it with something else; like maybe something in real life or something in math that I have already learned.”

Researcher asked, “What actions do you take so the teacher does not know that you are having more trouble than others?”

Amina replied, “Try to do it myself; barely asking for help unless I really need it.”

Researcher asked, “What do you mean by barely asking for help?”
Amina replied,

Not really asking for help cause some stuff is like you can get it without really asking for the teacher for help. So, asking the teacher for help at a minimum unless I really don’t like understand it at all.

Researcher asked, “Is there anything else you want to share about being motivated in your math classroom?”

Amina replied,

I feel like everybody should be motivated in math. I think a lot of people, like, math is their weak subject. But it’s not actually that hard if you pay attention and make it make sense. A method I use is, like okay. So, some stuff that a teacher teach it, I may get it a different way, like, using my own method to understanding something than the way the teacher perform. So, if there’s a way, like, you can get it but you can get the same outcome, but not using the same method the teacher give you, you should use your own method.

Researcher said, “Okay. Is there anything that motivates you to do well that you haven’t talked about yet?”

Amina replied,

I will be the first to graduate college. I want to be able to have a 4. 0. I definitely want to be able to have a 4.0 when I leave high school. To be the first girl in the family to actually branch off and have my own business in accounting.

Researcher said, “Okay. Is there anything else you want to add?”

Amina replied, “No ma’am.”
Amina’s responses indicate a student who has mastery goal orientation. When asked questions about performance goals, she responded, “I don’t make those type of goals”. This showed that outside of the interview questions, she typically did not consider the performance level of peers in relationship to her daily goals. Through her responses, she also showed very high self-efficacy and intrinsic motivation, which research has shown has a reciprocal relationship with mastery goals (Huang, 2016).

Amina was highly motivated toward math achievement. Unlike the other participants, she reported that she wanted to pursue a career in accounting, which is a math-intensive career field. She also reported that she would be the first female in her family to go on to college if she were to continue her trajectory of academic success. This fact amplified her desire to be successful and inspired her to persevere. Her responses also focused on what she had the ability to do within the classroom as opposed to the performance of her peers.

Participant 6: Dalia

Dalia was an accelerated Algebra I student. She was enrolled in honors courses at the time of the study, which included the second course year of Spanish, ninth-grade English literature and composition, and science. She achieved some level of academic success during her first semester in high school and earned an 80% in her math class. She also participated in extracurricular activities, including a team sport.

While she attended middle school in the same state that she attended high school, she spent much of her school life in another state in the southeastern part of the United States. Dalia attended a charter school that ranged in grades from primary school grades
through secondary grades. However, she chose to come to the high school where the study was conducted to participate in the magnet school. She received high school credit in Spanish while in middle school. Dalia took the end-of-grade test in middle school and scored in the 89th national percentile. However, she scored as a developing learner on her end-of-grade test in math. Her math score was the subject in which she scored the highest, as she scored as a beginner learner in all other subjects. She had to take the English literature and composition portion of the end-of-grade test again in the summer before she attended high school. This could be descriptive of test anxiety as opposed to her achievement level. Her responses from her interview revealed some factors that affected her motivation toward math achievement.

Researcher said, “Please describe your math class for me.”

Dalia replied,

I will say, it’s kind of hard to explain. Like, I mean, we get some stuff done. But sometimes, it’s distracting basically. I know how to isolate, like, myself. It’s a lot of noise and other stuff. But as far as work, it’s kind of easy to me.

Researcher asked, “Why do you say the work is easy?”

Dalia replied,

I mean ’cause some of that stuff I learned from my sisters when they were in high school. Because sometimes I would just ask them what they doing with their math stuff, and I really like math, so I can kind of do it on my own. I know what I’m doing and once I understand it, it’s really easy to me.

Researcher asked, “Why do you like math?”
Dalia replied,

Because when I was little, my dad would always teach me math. If I was just sitting around, my dad always teach me math, and like now it’s real easy, and every time I need help with math, I talk to my dad. I feel like it’s just easy. It’s something I can really do.

Researcher asked, “Can you describe your level of motivation to achieve in math?”

Dalia replied,

It’s really high because I mean it’s like I want to pass, but I mean passing not just like, I mean I just not want to pass to pass. I want to exceed in it and do more than pass. I want to be at the top of my class. That’s what I’m trying to do.

Researcher asked, “Can you describe how important it is to learn new concepts in math?”

Dalia replied,

High because I feel like everybody needs math when we grow up. It’s certain thing that we need to know about math, and I definitely need math in college. Because I definitely plan to go to college, and I’m pretty sure I need math in college.

Researcher asked, “What are your goals in your math class?”
Dalia replied,

Last semester I made a, I think, 85. But this semester I want to make a 95. Last semester, I really, I played a lot. I did my work, but I played a lot and could have done a lot better than I did, to be honest.

Researcher asked, “What do you mean that you played a lot?”

Dalia replied,

I let distractions, I got into things that distracted me. A lot of work I didn’t turn in—not because I didn’t know, not because I didn’t know I was doing, but just because I was just being careless. And I really didn’t feel like I didn’t complete it, so a lot of my stuff was incomplete.

Researcher asked, “Why was it incomplete? Why didn’t you finish the work?”

Dalia replied, “Because I got distracted. With everybody else started talking and doing other things and instead of doing my work and staying on task.”

Researcher asked, “What could have motivated you to stay on task?”

Dalia replied,

I know it might sound weird, but I work better when I have a lot of pressure on me. So, like if my teacher would have really got on me about it, I probably would have did it because I know if I would have a lot of pressure on me, I would work better under pressure.

Researcher asked, “Are there any skills you want to improve on?”

Dalia replied, “My comprehension skills.”

Researcher asked, “Why do you want to work on your comprehension skills?”
Dalia replied,
I’m well at taking notes and reading over them. But sometimes I really don’t comprehend what I think. Like I can think I’m comprehending. But, when it come down to something serious, I might forget and think something is the same as something that it’s not.

Researcher asked, “What are thoughts about showing others in your progress in your math class?”

Dalia replied, “To motivate them to be focus on something instead of being distracted by everybody else try to reach their goals in their math class make them better.”

Researcher asked, “What actions do you take to look smart to other students in math?”

Dalia replied,
I sit by myself when everyone else is talking. I try to pay attention to her and stay focused. I help people when they need help. I always come prepared. I keep up with all my notes, so I can refer back to them when I don’t get something and just don’t say, “I don’t have my notes” and stuff.

Researcher asked, “What goals do you make so you don’t look like you know less than other students?”
Dalia replied,

Try to ask more questions; participate more in class activities because I really don’t a lot. Instead of trying to be the first person done, I really look over my work and make sure I’m correct the first time instead of going back to re-do it.

Researcher asked, “Why don’t you participate in a lot of things?”

Dalia replied, “Because it’s too many people and like everybody always jumping up to do everything. I don’t really care to get in the mix of all of that.”

Researcher said, “Describe the goals you make when you have trouble understanding or doing the work.”

Dalia replied,

Come to tutorials, ask my peers, and try to read over someone else’s notes, so I can see if there’s anything that they have that I don’t have or something that they understand, but I have the same thing but put in a different way so I can better understand myself.

Researcher asked, “What actions do you take so the teacher does not know you are having more trouble than others?”

Dalia replied, “Try to self-teach myself when I have my own time.”

Researcher asked, “Does that work for you?”

Dalia replied, “Yes.”

Researcher asked, “How do you know it works for you?”
Dalia replied,

Normally I would watch a few videos and ask my mom and ask my dad; and then once I get to my homework or ask my teacher for extra work so I can have more practice, and once I get the hang of it, then I know it’s working.

_Dalia’s responses showed the fluidity of achievement goals as described in the researcher (Pintrich, 2000; Senko et al., 2011). Some of her responses such as “try to self-teach myself” and “instead of being the first one done” were indicative of students who have mastery goal orientations (Hulleman et al., 2010; Senko et al., 2011). However, when she was probed further within questioning about performance goal orientations, she described an experience that was affected by the actions and performance of her peers. Thus, this indicates a performance approach goal orientation._

_It is important to note that she also described that she had high motivation in math, but she did not express this within those responses. She explained that she received an 85 for the first semester of her math course because she turned in incomplete work and provided the reason that she was “being careless”. She also described that she suffered through distractions from her peers. Ford, Jones, and Alexander (2015) described that these types of responses are characteristic of African American female students at this level in their schooling, since peer relationships are important. Furthermore, they reveal performance approach goal orientations._

**Participant 7: Ada**

Ada was an accelerated Algebra I student who earned an 80 in her math class. Math was her only accelerated level course. She was not enrolled in any other STEM
related electives. Ada did not take any high school courses while in middle school. She was involved in afterschool activities, which included team sports. She experienced academic success during the first semester of high school.

Ada attended a community middle school. On the eighth-grade end-of-grade math test, she scored in the 32nd national percentile as an achievement level 1 learner. This meant that she showed limited understanding on the math test. While this may seem atypical for a beginning learner to be placed in an accelerated course, it should be noted that some students are placed by teacher recommendation. Her interview allowed for an investigation into factors that influenced her level of motivation, given her achievement level.

Researcher said, “Please describe your math class.”

Ada replied,

Umm, I take an accelerated math class so it’s quiet. It’s not a lot of people in the room. So, I like that because I’m able to ask more questions without a distraction, so I know the teacher can get to me. But you know when they have a lot of kids, that’s not possible.

Researcher asked, “Can you describe your level of motivation in your math class?” Ada paused indicating that she did not understand the question. Researcher asked, “If you had to rate you level of motivation, from a scale of 1 to 10, what would it be?”

Ada replied, “9.”

Researcher asked, “Why did you rate yourself a 9?”
Ada replied, “I would rate myself as a 9 because I want to, have to, pass math. Me motivating myself to get it done, to get the math work done, it’s helpful.”

Researcher asked, “Is there anything that motivates you to do well in your math class?”

Ada replied, “My mom and my math teacher.”

Researcher asked, “How do they motivate you to do well in math?”

Ada replied,

I used to make Cs all the time. So, I always struggled in math. Last semester, I passed with a B, and they were just telling me that they know I can do it, and it just takes more practice and studying, and I can become an A student in math.

Researcher said, “Please describe how important it is to learn new concepts in math.”

Ada replied,

It’s important to learn new concepts in math because you need math in life, and you never know if you go to the grocery store the concepts you have to use to have to pay for whatever you’re getting and paying bills, just going places and using money.

Researcher asked, “What are your goals in your math class?”

Ada replied, “My goals are to earn a better grade or get a higher grade and to study more; pass quizzes and tests with an 80 or higher.”

Researcher asked, “Are there skills you want to improve on?”

Ada replied, “Umm, yes, I would like to come to tutorial more.”
Researcher asked, “Okay, why do you want to come to tutorial more?”
Ada replied, 
I feel like I’ll be able to get it, like get more information, like more than what I know if I go to tutorial. I’ll be able to get the concepts better than just doing a worksheet in class, just getting it in class and getting it at the moment.
Researcher asked, “What do you mean by getting it at the moment?”
Ada replied, 
I mean when your teacher goes over it and you understand, but you understand then. So when you go home and do homework and you’re like, “How do I get this?” And then you don’t know ’cause you ain’t write notes down. So, going to tutorial, you understand the concept more.
Researcher asked, “What are your thought about showing others your progress in your math class?”
Ada replied, “Like showing them, it will motivate them more.”
Researcher asked, “What are your actions that you take to look smart in comparison to the other students?”
Ada replied, “I ask a lot of questions or I try to ask a lot of questions if I don’t understand.”
Researcher asked, “What are your goal that you make so you don’t look like you know less than other students?”
Ada asked, “Goals? A goal would be taking notes, and turning in work on time.”
Researcher asked, “Are those the things you do so you don’t look like you know
less than the person sitting next to you? Is that what you do?”
Ada replied, “Oh no. I do take notes. That’s all I can think of. I ask questions.”
Researcher asked, “Can you describe the goals you make when you are having
trouble understanding or doing the work?”
Ada replied, “I started studying more. And that’s about it.”
Researcher asked, “What actions do you take that the teacher does not know that
you are having more trouble than others?”
Ada replied, “Sometimes I’ll just listen to music, and I’ll do the work, and I’ll go
over the problem over and over and try to get it right. If I don’t, then, I won’t say
nothing.”
Researcher asked, “Why don’t you say anything?”
Ada: ‘Cause I wouldn’t look like, if it’s easy, if it’s real easy and then she show
me, then people see that. Then I look a little slow.”
Researcher asked, “Do you do things so people don’t know you might be slower
than others?”
Ada replied, “Yes, I won’t say nothing if I had it wrong or only the teacher would
know if I stay after school or have to go up to her.”

Much of the research on achievement goal orientation found that mastery goal
orientations are linked to positive academic outcomes (Ames, 1992; Elliot & Church,
1997; Huang, 2012; Hulleman et al., 2010; Senko et al., 2011). However, there has been
discussion whether or not a student who has struggled can have mastery goal
orientations (Hulleman et al., 2010; Senko et al., 2011). In this case, Adam who reported that she has struggled in math, showed that she is motivated from mastery goal orientation. She expressed that when she did not understand, she engaged in help seeking and attempted to encourage herself to study more, thus showing a high level of intrinsic motivation. She expounded that she went to tutorial so she could “get the concepts better” because she did not want to settle for “just getting it in class and getting it at the moment”. Her aim was to gain mastery. Furthermore, Ada became confused about the questions of performance goals, showing that she did not consider the actions of her peers. She responded with “I do take notes. That’s all I can think of. I ask questions.”

It is important to note that Ada responded using the language of students with performance avoidance goal orientations when she stated, “If I don’t, then, I won’t say nothing”. In this scenario, she described a situation in which her attempts to persevere through gaining conceptual understanding did not produce a desired outcome. This was her only response that reflected this achievement goal orientation.

Focus Group

Focus groups provide information that are sometimes undisclosed in individual interviews (Viscek, 2010; Yin, 2014). In the focus group for this study, the intention was to follow the same interview protocol as the individual interviews. However, given their previous responses in their individual interviews, some of the questions were changed slightly to accommodate the group of participants. Six out of the seven participants were present for the focus group. Oni did not participate because she started an afterschool
program that conflicted with the focus group schedule. Due to the new rules regarding students in the building during after school hours, she was not allowed to return to the interview room to participate in the focus group. Viscek (2010) explained that the composition of the focus group can affect the data gleaned from the focus group. Thus, it is important to note that, since the focus group only contained six out of the seven participants, the data collected could have revealed different patterns. This information is noted to present a limitation of the study, as well as describe the composition of the focus group.

The participants in the focus group exhibited clear relationships with one another during the session. This indicates a level of comfort in giving their responses. The dynamics in the focus group also highlighted their previous responses from their individual interviews that revealed the importance of peer relationships. The participants did not choose to answer all of the questions. As consistent with honoring the IRB, the students were not forced or coerced into answering those questions. The students did not address each other in the focus group. However, the focus group was stopped due to the actions of a few of the participants who were playful. Despite that interruption, the data revealed another point from which to analyze the data collected from their individual interviews. The data from this focus group follows, as it offers rich information that summarizes the individual interviews from which themes emerged.

Researcher said, “Please describe your math class.”

Bisa replied, “My math class is small, goofy, smart, and accelerated.”
Kali replied, “My math class is loud and off task and crazy and wanna be rappers.”

Zola replied, “My math class is small but we tend to get our work done in a fun way.”

Dalia replied, “My math class is large, intelligent, good people.”

Amina replied, “My math class is large also. Umm, it’s not that challenging to me and it’s a lot of distractions but not that many.”

Ada replied, “My math class is also small. Its challenging at times. It’s quiet.”

Researcher said,

Okay, thank you. So for the next question please rate your level of motivation and describe what you chose that rating. So, rate yourselves on a scale of 1 to 10 and then let me know why you rated yourself that way.

Zola replied, “My level of motivation is a 7 or a 8 maybe because I feel like I need math in the future and it’s a big part of my career.”

Dalia replied, “My motivation is probably like a 7 and a half because I always want to do good in the class but like some days I have those days that I don’t really feel like doing nothing.”

Bisa replied, “My motivation for math is a 3. I don’t really think I need math for what I want to do.”

Kali replied, “My motivation for math is about a 6. Only because the career choice I have does not include math but I need it to pass or whatever.”

Amina replied,
My motivation in math is a 9 because math is not really that hard for me, and I do need it in my future career. I want to be an accountant, so I know I’m going to have to deal with numbers and also the outcome of what you could learn. But at times, it’s not that motivating to me because I think in real life all you really need to know is how to add and subtract and divide and multiply and not all the stuff we are learning now.

Ada replied,

My motivation is an 8 because I really need to pass math class to get to the next grade and I know I will need it for my future. It’s a big part for life. It plays a big role in life.

Researcher said, “Thank you for your responses. Now we are going to talk about what actually happens in your math class.”

Kali replied,

Sometimes it’s motivational, but not always. But when it’s easy, it’s motivational ’cause it’s easy to do or whatever. And then like other times, it’s hard. All we do is do now and FEB tutor and work and like packets and we do IXL. That’s it.

Zola replied,

I feel like the teacher motivate us. But, like, some of the students be talking and they be talking about random stuff like they friends and boys. I just be like it’s not necessary. And they sit in a group, but I sit alone, and they sit in a group and be focused and stuff. But our teacher do be teaching us, and if our teacher see
that we need help, she comes to us. Because our class is small, she can come to us individually.

Dalia replied,

I feel like my peers motivate me because they want me to be successful. And they know I have goals, so they try to push me as hard as they can to help me in math. But my teacher also, because she says she sees the bright in me, and that pushes me to make her feel like there is bright in me, and I can be successful.

Amina replied,

For the most part in my math class, the teacher teach the class like she can get control the class. So, if its people talking, she know how to handle it, which I like, so she can, like, still teach. 'Cause some teachers have to stop, so they can address ascertain amount of students because they’re not on task, but my teacher, she know how to control the class.

Ada replied,

In my math class, my teacher motivates me and my peers. She comes to all of us individually, since the class is small. She makes sure she’s explaining it, and if you don’t understand, she always wants you to ask questions.

Researcher asked, “What goals do you have in your math class?”

Bisa replied, “Umm, my goal is to pass.”

Amina replied, “My goal is to pass it with an A and like understand; actually, understand what I’m doing not just doing it to get it done.”
Zola replied, “My goal is to also pass but with a B or higher and to understand; not just to know but to get the concepts.”

Kali replied, “My goal is to pass it with an A and nothing less than an A, and that’s it.”

Ada replied,

So, my goal in my math class is pass it with an A also. But I want to understand it what I am learning so I can use it in my career and in college and all that good stuff.

Dalia replied, “My goal in my math class is to enhance in my comprehension skills because last year I did my work to just get it done and not really comprehending.”

Researcher asked, “What actions do you take so that you don’t look like you know less that someone sitting next than you or one of your peers?”

Dalia replied,

I try to take more notes and ask my peers for notes because maybe they heard something that I didn’t hear, or I try to ask more questions than them, so I can get a better understanding of what she says instead just holding my tongue to make it seem like I don’t understand. I try to ask more questions.

Zola replied,

I sit alone but I still talk to the people around me to help me like understand if I miss something or if I don’t understand something. If someone answer questions and try to explain how I got the answer and stuff to my teacher.

Amina replied,
In my math class, so I won’t look less smart, I try not to ask the teacher as many questions, I try to do it myself and ask other people before I ask the teacher and I also just try to comprehend, like, and I try to make because you know how stuff they like intertwine and try to refer back to something else to see if it something else; make relations.

Ada replied, “I try to review notes and make sure I write down examples when I do take notes, so I’m not confused by the words or the meaning of what the problem is talking about.”

Researcher said, “Thank you for those responses. Describe the goals you make when you have trouble understanding or doing the work.”

Zola replied,

When I have trouble doing my work or understanding the work, I set goals like read over my notes, practice questions, and watch guidance videos to help me understand, rather than always just giving up and not trying.

Dalia replied,

When I don’t understand, I go over my notes or watch a YouTube video to understand it better, or I ask my mom ’cause she tends to understand, or I actually do go to my teacher to for tutorial. I’ve been twice!

Kali replied, “I go to IXL or watch videos about how to do it.”

Bisa replied, “When I don’t understand, I just ask, and I look it up.”

Amina replied, “When I don’t understand I’m usually in class so I’ll ask questions and when I still don’t understand when it’s time for homework, I’ll come to tutorials.”
Researcher said, “You guys have described situation where sometimes you feel challenged or sometimes you aren’t feeling very motivated. When you aren’t feeling very motivated in the classroom, what’s happening?”

Zola replied,

Most of the time when I’m not feeling motivated is because it’s a lot of distraction going on, and my teacher really can’t get her words out. The teacher gets frustrated because the class is getting too loud. But, most of the time I try to, like, listen to as much as I hear. Always, whenever, like, the lesson is over, I try to go back, have her reteach the lesson to me because I didn’t really hear her because people were distractions.

Dalia replied,

So, when I feel less motivated is because the people surrounding me, like, they either distracted me so like I’m engaged with what their saying, or like the teacher has to stop and address them, and she can’t keep going on with her lesson.

Kali replied,

It’s when these four students in my class, they’re just always talking or having a conversation about something going on in their lives, and they always get loud, and then it’s one of them that always singing, and the teacher always has to stop and get their attention to tell them to be quiet or something, and that when I get less motivated ’cause I’m like y’all need to hush so we can get this work done.
Bisa replied,

:Well I feel less motivated, well, I really don’t feel motivated. Most of the time when I don’t pay attention, ’cause I really don’t pay attention in class. The people in my class are the people I’m usually surrounded by, so of course it’s going to be distracting to me.

Amina asked, “Can you repeat the question?”

Researcher said, “So you guys discussed times when you feel like the class is challenging, sometimes it’s a little difficult, in those times where you are not feeling very motivated, what’s happening in the classroom?”

Amina replied, “When I don’t feel motivated, it most like a lot going on the in the class that takes my attention off what I’m supposed to be doing ’cause I get distracted easily.”

Researcher said, “Thank you. This will be our last question. What can be done to get your level of motivation up to a 10? If you could change anything or improve on anything, what would it be?”

Dalia replied, “I would definitely change the students that are in that class because they don’t belong in there because they’re not focused enough, and I would improve on my comprehension skills so I can comprehend stuff.”

Zola replied,

It’s three different things. You can remove me from the class and put me in a different class where it’s a different setting where the students are more engaged into the lesson. Or you can remove the students that aren’t engaged that are
talking and talking and are on their phone. Or you can add more students into our class. And so, like, you put us in different areas in my class. Because like in my classroom, you can’t really separate us because we just gone talk across the room. So, if you put more students in there, it’s really like no other way, but you can still talk a lot, but you just gotta stay in your group.

Kali asked, “What was the question again?”

Researcher asked, “What can be done, or what would you like to change that can increase your motivation in your math class?”

Kali replied, “Umm, I’m not sure; taking me out. Yeah, that’s good, taking me out and put in a different class.

Researcher asked, “In a different class, what would happen?”

Kali replied, “I think I would learn better or learn more. She sometimes just stops, and some students in there don’t take her seriously, and so they just continue to talk over her.”

Bisa replied, “Umm, in my class, umm, I would add more students, and I think if I had a more strict teacher, I would most likely be more motivated.

Amina replied,

I don’t feel like I can get more motivated in math. I think that the highest I’ll be to do something because the only thing that motivates me is the deadline because I know it’s due and I know I have to do it.

Ada replied, “That’s not really nothing more that I could really do either. I would have to push myself more. Other than that, the classroom and teacher is alright with me.”
Researcher said, “Thank for participating. Is there anything anyone would like to add or comment about motivating African American female students toward math achievement?

Amina replied,

I feel like maybe if the class was like split, like all girls class and all boys class, learning, it would be little bit better because you wouldn’t have that many distractions. Like, wait, you would have distraction. But you would have, like, all girls. So, if the teacher could find like a certain teaching style that can help girls, or could relate to things that we deal with in real life, it’ll be more motivational because we could connect with the math.

Zola stated,

I feel like if you bring more people that have made a career out of using math and made a successful career and brought them in and showed girls, African American girls, that they done this math and it’s not as stressful as it may seem, that it’ll motivate them more to be more focused in math and want, like, have more interest in math and stuff.

*During the focus group, the participants answered the questions similarly to their individual interview responses. The group expressed several factors that affected their motivation. This included providing detailed accounts about being affected by interactions within the classroom, including distractions in class from their peers and opportunities for one-on-one engagement with their teachers. Kali gave the example of “four students” who were “always talking or having conversation about something going*
on in their lives”. She expressed that this scenario characterized a time where she felt less motivated in her math class. This account was made to discuss that peer distractions limit student interactions with the teacher. Zola gave the account of “try[ing] to go back to have her [teacher] reteach the lesson” when there were peer distractions.

The participants also accounted for their actions related to help seeking and their level of interest in math. Bisa described that when she did not understand, she “just ask[ed]” and “look[ed] it up”. Amina and Ada gave the similar answers of seeking help. Amina also enlisted help by asking questions, although she also displayed more interest than did the others. She stated, “I don’t feel like I can get more motivated in math.” Her interest was prompting her to ask questions and inquire about what Dalia described as getting “comprehension”.

The group also showed the effects of the relationships they had with their peers as they related to their motivation in the classroom and the relationships that they had with adults as they related to their parents and teachers. Ada determined that her “teacher motivates [her] and [her] peers”. Zola also gave a similar account by stating, “I feel like the teacher motivate us” and that “if our teacher see that we need help, she comes to us”. Dalia also commented on being reliant on peers by asking them “for notes because maybe they heard something” that she missed or did not understand.

The participants’ responses echo research focused on the cultural effects on achievement goal orientations and female motivation (Thomas & Columbus, 2010; Zusho & Clayton, 2011). There are factors that relate to the specific cultural affects of students. The data from the focus group show that relationships serve as a conduit for learning
toward motivation. The focus group dynamic also revealed connections with relationships. Since the students were familiar with each other because they were enrolled in a small magnet school, their dependency on their peers could be observed during the focus group through facial expressions and the willingness to answer questions. While observable nonverbal communication was not a part of this study, it raised pertinent insight into factors related to their math motivation.

Descriptive Data

Quantifiable data were reviewed, providing varied sources of information in qualitative research to help gain a perspective on the achievement positions of the students and to ensure their achievement goal orientations were correctly assigned based on research (Yin, 2014). This study was designed to maintain validity throughout the data analysis process. Along with each interview, descriptive data were collected from the participants to get an understanding about their level of math achievement.

The three main sources of descriptive data collected were the participants’ math scores, their math scores from a standardized test, and math scores as shown by their classroom grades. Their test scores were used to discuss the level of achievement, alongside their grades from the completion of the first semester of high school. Table 1 summarizes this data as it related to each participant. The standardized scores are described using the national percentile equivalent score and the achievement level as prescribed by the test. The state used four levels to describe the students’ level of mastery concepts. The four levels were beginner learner, developing learner, proficient
learner, and distinguished learner. The participants’ math grades, reported on a scale of 0 to 100, are also listed.

Table 1

Grades and Test Scores per Participant

<table>
<thead>
<tr>
<th></th>
<th>Grade Based (0-100) Scale</th>
<th>Achievement Level</th>
<th>National Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oni</td>
<td>84</td>
<td>Developing Learner</td>
<td>62</td>
</tr>
<tr>
<td>Kali</td>
<td>77</td>
<td>No score</td>
<td>No score</td>
</tr>
<tr>
<td>Zola</td>
<td>86</td>
<td>Developing Learner</td>
<td>69</td>
</tr>
<tr>
<td>Bisa</td>
<td>77</td>
<td>Developing Learner</td>
<td>70</td>
</tr>
<tr>
<td>Amina</td>
<td>93</td>
<td>No score</td>
<td>No score</td>
</tr>
<tr>
<td>Dalia</td>
<td>80</td>
<td>Developing Learner</td>
<td>89</td>
</tr>
<tr>
<td>Ada</td>
<td>80</td>
<td>Beginning Learner</td>
<td>32</td>
</tr>
</tbody>
</table>

These data provide some insight into the participants’ level of math achievement. Two participants, Kali and Amina, did not have test scores. Kali took an end-of-grade test in a neighboring district. She was the only participant who did not attend a middle school within the district. At a 77, she had a similar math grade as Bisa. Bisa, who scored at the 70th percentile, had shown to have moderate success in her math class. Amina was the only participant who took an end-of-course test. Although her scores were not available, her placement in geometry indicates that she experienced some success on that test. Her math grade of 93 for her first semester shows that she was continuing to
experience success in math. Oni and Zola both scored under the 70th percentile on their test scores and experienced some success in their math classes. Dalia, who scored in the 89th national percentile, scored an 80 in her math class. From the reported test scores, Ada experienced the largest amount of growth, as she scored in the 32nd national percentile but earned an 80 in her math class.

As consistent with qualitative research, this quantitative data provide additional sources of information to both maintain validity and reliability of the analysis (Creswell, 2013; Yin, 2014). However, this data did not provide the details needed to gain holistic understanding of the participants’ level of motivation. As Stake (2003) described, qualitative research seeks to define the phenomena that occurs in relationship to what can be quantified. There were differences and similarities that warranted further investigation into the participants’ motivation and their achievement goal orientations.

The participants displayed differences within the test scores as compared to their math grades. Ada, who scored as a beginner learner and within the 32nd national percentile, showed that she began her ninth-grade year at a low level of math achievement. However, she managed to have similar scores to the other participants, who scored higher than she had. She reported that her mother and her math teacher motivated her to do well in her math class. She stated, “They were just telling me that they know that I can do it, and it just takes more practice.” As a result, she was able to overcome what she described as having a struggle in math and aim for math achievement.
Although Dalia and Zola both scored as developing learners, their national percentiles show that Dalia outperformed Zola by 20 percent. However, Zola earned an 86 as a math grade, which was higher than Dalia’s math grade of 80. This difference was also shown between Bisa and Oni. Bisa scored eight percentage points higher than Oni on the test, but scored seven points less for her math grade than Oni. Per their reports, in both cases, Oni and Zola both reported to have been more motivated in their math class.

There were also similarities amongst the participants’ scores. Oni, Zola, Bisa, and Dalia scored at a developing learner achievement level. Some may contend that since they were accelerated students, they may have similar achievement goal orientations. However, the data from the interviews show they differed amongst their motivation levels and their achievement goal orientations. Kali and Bisa earned the same math grade, yet they showed two different motivation profiles. Kali showed moderate motivation level in math with a performance avoidance goal orientation, and Bisa showed low motivation in math with a performance approach goal orientation. Ada, Dalia, Oni, and Zola also had similar math grades. While their level of motivation in math was similar, their achievement goal orientations varied. Ada and Zola displayed mastery goal orientations. Oni and Dalia displayed performance goal orientations.

Triangulation

Table 2 displays the participants’ achievement goal orientation and level of motivation juxtaposed with their achievement level provided by their test scores. Although the participants did not receive a survey, some of the students were unclear on
how to answer the questions regarding their level of motivation. To help the students answer the questions appropriately, the students were asked to rate themselves on a scale of 1 to 10 and then were asked to explain why they assigned themselves that rating. The rating from 5 to 7 was considered moderate; the ratings from 8 to 10 were high. The participants did not provide any ratings below 5 in the individual interviews. However, Bisa described that she did not have any motivation during the focus group with a rating of 3 and had a low level of motivation during her individual interview. Thus, her level of motivation was rated as low.

Table 2

Achievement Goal Orientation per Participant

<table>
<thead>
<tr>
<th>Achievement Goal Orientation</th>
<th>Level of Motivation toward Math Achievement</th>
<th>Achievement Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oni</td>
<td>Performance approach</td>
<td>High</td>
</tr>
<tr>
<td>Kali</td>
<td>Performance avoidance</td>
<td>Moderate</td>
</tr>
<tr>
<td>Zola</td>
<td>Mastery</td>
<td>High</td>
</tr>
<tr>
<td>Bisa</td>
<td>Performance approach</td>
<td>Low</td>
</tr>
<tr>
<td>Amina</td>
<td>Mastery</td>
<td>High</td>
</tr>
<tr>
<td>Dalia</td>
<td>Performance approach</td>
<td>Moderate</td>
</tr>
<tr>
<td>Ada</td>
<td>Mastery</td>
<td>High</td>
</tr>
</tbody>
</table>

From this data, the participants who had mastery goal orientations, Zola, Amina, and Ada, were highly motivated toward math achievement. Oni was the only participant with performance goal orientation who was also highly motivated. Kali, Dalia, and Bisa, who were orientated from performance goal orientations, reported low to moderate levels of motivation. These findings are consistent within research on achievement goal
orientations, as the participants’ level of motivation is characteristic of their achievement goal orientations (Dweck, 1986; Elliot & Church, 1997; Ford et al., 2015). However, there are not direct correlations between the participants’ level of achievement and their level of motivation. This is an indication of other factors that influence their motivation toward math achievement. This is a consistent theme within achievement goal theory research that contends its focus is to discuss the motivational position from which students pursue learning, rather than their ability to attain a certain level of achievement (Hulleman et al., 2010; Senko et al., 2011).

Emerging Themes

This study used thematic coding to learn about factors related to African American female motivation. This involved dissembling the participants’ data into codes and then assembling them into categories that serve as themes. Five themes arose from the data: (1) relationships, (2) classroom goal structures, (3) interest in math, (4) academic motivation, and (5) disparate themes. Table 3 shows these themes as they relate to each of the participants and the codes used to identify those themes within their responses.
Table 3

*Themes as Factors*

<table>
<thead>
<tr>
<th>Theme 1 Relationships</th>
<th>Theme 2 Classroom Goal Structures</th>
<th>Theme 3 Interest in math</th>
<th>Theme 4 Academic motivation</th>
<th>Theme 5 Disparate themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oni</td>
<td>Adult</td>
<td>Help-seeking &amp; positive feedback</td>
<td>Likes it; applicability</td>
<td>All As</td>
</tr>
<tr>
<td>Kali</td>
<td>Peer</td>
<td>Peer distractions</td>
<td>Applicability</td>
<td>&gt; C</td>
</tr>
<tr>
<td>Zola</td>
<td>Adult</td>
<td>Help-seeking &amp; peer distractions</td>
<td>Likes it; applicability</td>
<td>All As</td>
</tr>
<tr>
<td>Bisa</td>
<td>Adult &amp; Peer</td>
<td>Peer distractions &amp; positive feedback</td>
<td>Likes it</td>
<td>To pass</td>
</tr>
<tr>
<td>Amina</td>
<td>Adult</td>
<td>Positive feedback</td>
<td>Likes it; applicability</td>
<td>All As</td>
</tr>
<tr>
<td>Dalia</td>
<td>Adult &amp; Peer</td>
<td>Peer distractions &amp; positive feedback</td>
<td>Likes it</td>
<td>All As</td>
</tr>
<tr>
<td>Ada</td>
<td>Adult</td>
<td>Help-seeking</td>
<td>Moderate</td>
<td>&gt; 80</td>
</tr>
</tbody>
</table>

While relationships were factors for the participants, they differed in the type of relationships reported. These relationships were defined as adult relationships, which included those of their teachers and parents and their peer relationships. They reported various degrees of interest based on whether they liked math, their future of the usefulness of math in their prospective careers, and their self-concept as it relates to their math ability. The participants described the classroom goal structure in terms of their desire to need opportunities for help seeking, the extent to which peer distractions influenced their ability to persevere, and the level of expectation set by their teachers. Their academic motivation was not directly asked in any of the interview questions. However, the participants shared their motivation toward academic achievement as it
related to their goals in striving toward specific grades. Disparate themes were evident in the participants’ responses regarding what influenced their motivation in math outside of the research questions. These disparate themes included the impact of previous struggles in math, influence on their motivation from their family, and past negative academic experiences. The following sections describe each of the themes.

Theme 1: Relationships

Relationships were an important factor for all the participants and influence the other factors related to academic motivation. Some research posits that African American students have a need to feel a sense of community within the classroom (Adelabu, 2007; Honora, 2002). This research has referenced this need in terms of building curricula and providing a positive learning environment for students, necessary for creating an environment that is inclusive to the student’s culture and maintaining equity in the classroom (Thomas & Columbus, 2010; Zusho & Clayton, 2011). The participants’ reports show that relationships serve as conductor for motivation for African American female students.

The details regarding the participants’ relationships with their peers and adults surfaced in different ways. Oni reported that she had positive interactions with her math teacher. She described her math teacher while stressing the importance of the role she played in her motivation. When discussing her teacher, Oni remarked, “She motivates her students. She tells us things that no other teacher will tell us. And she’s really understanding too. Like she’ll say, ‘You can do whatever. Whatever you put your mind
to, you can do it.” Oni also stated that her teacher “makes me feel like I could do it and I am going to do it”. This relationship was a positive factor in her motivation.

Kali, who had a performance avoidance goal orientation, exhibited the same concentration during her responses. Her responses focused on peer relationships. Research has shown that peer relationships, of great importance for female students especially, can have an impact on African American student performance (Fordham & Ogbu, 1986; Jones & Ford, 2014). This importance is demonstrated in Kali’s responses as she described peer relationships in terms of avoiding unwanted interactions. In response to questions about her reasons behind relocating to another part of the classroom during instruction, she stated, “It's my way of separating myself from my friends so that they don’t distract me.” Throughout the interview, she continued to discuss her behavior in reaction to the behavior of her peers. She explained, “I know if I sit back there, I am one to talk and laugh and play.” These peer interactions gave support to her performance avoidance goal orientation.

In contrast, Dalia’s explanations of peer relationships included positive effects on her motivation toward math achievement. In the focus group, she stated, “I feel like my peers motivate me because they want me to be successful.” She also described that adult relationships were similarly as important in the individual interview. She detailed, “When I was little, my dad would always teach me math.” A correlation exists between the achievement goal orientation of parents to their children, showing that the relationship between the parent and student has an impact on their motivation (Zubković, & Kolić-Vehovec, 2014). The importance of adult relationships to Dalia’s motivation
was also shown through the relationship with her teacher, for her teacher saw “the bright” in her, causing her to be motivated toward math achievement.

This theme resonated with all participants, despite their achievement goal orientation. This was not an expected finding of the research. African American female students who have performance goal orientations will organically place value on peer relationships (Jones & Ford, 2014; Ford et al., 2015; Freeman, Gutman, & Midgley, 2002; Peklaj et al., 2010). Yet, in this study, peer relationships were important to the participants’ motivation independent of the student’s achievement goal orientation. It became a dominant theme during the focus group as the participants discussed their interactions with their peers and teachers. Amina, who had a mastery goal orientation, did not state the same level of importance as the other participants. However, she often stated that she would seek her peers for help before going to her teacher. She also indicated that she liked her teacher because she could control the students. Thus, even for Amina, relationships were shown to have impact on African American female motivation.

Theme 2: Classroom Goal Structures

Classroom goal structures reflect the way in which the teachers create learning targets that can reflect achievement goal orientation (Senko et al., 2013; Senko et al., 2011). Research on classroom goal structures not only considers an understanding of the learning environment, it also explains how classrooms can be structured to influence student motivation (Senko et al., 2013; Skaalvik & Federici, 2016). Classrooms with mastery goal structures are more consistent in providing beneficial academic
environments for students in that they promote the use of deep learning strategies, increase engagement and interest, and can cause students to be more willing to attempt challenging tasks (Federici, Skaalvik, & Tangen, 2015; Lau & Nie, 2008; Poondej & Lerdpornkulrat, 2016). Classroom goal structures that are more performance goal-oriented are based in competition and outperforming others. Their effectiveness toward motivating students is inconclusive (Duffy & Azevedo, 2015; Lau & Nie, 2008; Pekrun, Cusack, Murayama, Elliot, & Thomas, 2014; Senko et al., 2013; Shin, Lee, & Seo, 2017).

The participants reported information regarding the classroom goal structures of their classrooms. All the participants expressed that when they did not understand, they often sought help from their peers or the teacher. This means they valued the opportunities to work cooperatively and seek help which encourages deep learning strategies (Collie, Martin, Papworth, & Ginns, 2016; Poondej & Lerdpornkulrat, 2016). This is evident in several of their comments in response to the question about how they persevered in math. Dalia’s actions included going to tutorials, asking her peers, and trying “to read over someone else’s notes”. Amina described that this is a part of her “obtaining the knowledge instead of just learning it just to learn it”.

The participants mentioned their opportunities to ask questions and receive individual help. Bisa articulated that it was easy for her to communicate with her teacher. Ada commented, “I ask a lot of questions or I try to ask a lot of questions if I don’t understand.” Zola also explained her motivation was at its lowest when there were barriers to gaining mastery. While this is a byproduct of her mastery goal orientation, it provides evidence that she needed a classroom goal structure that complimented her goals.
for mastery. Questioning and being able to process feedback from questioning are examples of deep learning strategies linked to mastery goal classroom structures (Pekrun et al., 2014; Shin et al., 2017).

When this type of environment was not supported, the participants reported to have lower levels of motivation. This included comments about peer distractions and their impact on their ability to get help and work with others. Zola attempted to describe that she felt that “some students don’t belong” in her accelerated class and their interruptions caused her to be frustrated. Due to her determination to gain understanding, she was motivated to find ways to engage in help seeking. Bisa and Dalia also described issues with peer distractions that impeded their ability to work cooperatively and get feedback from their teachers.

Theme 3: Interest in Math

Interest was found to be linked to motivation toward math achievement. Research has linked interest as a conduit for students who have performance goal orientations toward enacting behaviors that are antecedents to positive academic outcomes (Lau & Nie, 2008; Pintrich, 2000). Interest is particularly important for students who are prone toward performance goals. This is due to the connection between performance goals and self-concept, which research has shown has influence on how students assess value to a task and consequently their interest (Niepel, Brunner, & Preckel, 2014; Preckel & Brunner, 2015). For African American female students, interest was referenced to their perceptions of the applicability of math to their postsecondary goals. Some of the participants also stated if they liked math.
Bisa, who was motivated from a performance goal orientation, reported that she liked math but lacked motivation because she found it had little relevance. She also had one of the lowest reported grades (77) and stated that her goal for math achievement was to make a C. She said, “I don't really plan on majoring in anything with math.” She expressed this same sentiment in the focus group as she gave the rationale that her motivation was low because she did not think math was applicable to her future career goals.

In contrast, Oni, who also shared the same achievement goal orientation, showed more interest in learning the math concepts. As she related by the statement, “My goal is to know everything I have to know for the outside world about math”, her interest was guided by her perceptions of its applicability to her postsecondary plans. Since she could assess value as described by Pintrich (2000), then she was interested. Her interest was a factor in her motivation toward math achievement.

This study has shown that for African American female students, interest was a factor independent of their achievement goal orientations. Amina, who possessed mastery goal orientations and reported the highest level of motivation, expressed her interest in math, as she wanted to pursue a math-intensive field. Amina stated she wanted to be an accountant. Her level of interest is also evident in other comments she made, such as “I’m eager to do it. So, it’s just like I have to do it.” As research has suggested, Amina’s report of her eagerness to engage in the math also affected her level of intrinsic motivation, which made her want to persevere more through challenges (Ryan & Deci, 2000; 2006). It was reflected in her math grade (93).
Theme 4: Academic Motivation

Academic motivation refers to students’ motivation to make goals to be academically successful (Ericksen, 1974). It serves as an impetus for the goals that students make in the classroom. This pattern was revealed throughout the participants’ responses to questions about the goals they make in the classroom. Kali expounded, “I'm trying to make it out of there so I can pass and so I can get a good college.” Her motivation to get into a good college enabled her to maintain motivation to continue to engage in learning in her math class.

Academic motivation can also be explained in terms of students’ goals for their desired grades in all their classes. Bisa and Kali, who reported the least amount of motivation in math and also earned the lowest math grades, reported their overall academic goals included passing and getting higher than a C. Conversely, Oni, Ada, Amina, and Zola, who had higher grades and levels of motivation, described that they wanted to get all As or higher than an 80. Their motivation to be successful academically influences their motivation in math. However, it should be noted that it is not evident if this relationship is reciprocal in nature. In that scenario, the participants’ academic motivation could be reflective of their motivation in math, which would have a greater impact on the importance of this study and warrant deeper investigation.

Theme 5: Disparate Themes

The disparate themes were not intended to be apart of this study as they describe the participant’s responses with little relation to other responses or the research questions. However, they posed relevance to understanding African American motivation.
Achievement goal theory research addresses antecedents and consequences of achievement goal orientations, stressing the importance to understand the paths that lead students to their achievement goal orientations (Dinger, Dickhäuser, Spinath, & Steinmayr, 2013; Diseth & Kobbeltvedt, 2010). These themes reflect how the participants arrived to the position of their achievement goal orientation. One of the themes concerned the influence that the family had on their motivation. Bisa made note of how her mother “pushes” her to excel in school. Dalia also detailed accounts of asking her siblings about their experience in high school. Consequently, Bisa and Dalia described experiences whereby they tried to perform in relationship to others to make sure they were meeting their families’ expectations. Amina also expressed that she would “be the first to graduate college”. This influenced her intrinsic motivation to be successful, and she aimed for mastery. These three experiences motivated them toward academic motivation and subsequent math achievement.

Another disparate theme included the past negative experiences the participants had in previous math courses. Oni’s description of the TTO program and her bad experience at the school in her previous state made her aware of certain aspects of the classroom goal structure that stressed mastery. She explained, “A good teacher comes in handy.” This influenced how she viewed her teacher and placed value on the adult relationship she had with her teacher.

Lastly, past struggles in math also served as factors toward their motivation. Ada expressed that she had many struggles with math in the past. Due to this struggle, she was more apt to engage in activities, such as help seeking and remaining on task. This
positioned her to approach learning from a mastery goal orientation, which in turn provided positive academic outcomes. Zola did not express any disparate themes; instead, her current experience prompted her to aim toward mastery.

Summary

Factors related to African American female motivation are reflected in the themes revealed through data analysis. The five themes share an interconnected relationship, whereby some themes have more influence than others did on the participant’s motivation. The first theme dealt with relationships. Relationships are important because they refer to the cultural need of individuals to feel a sense of community (Honora, 2002). Relationships also were the foundation from which the participants could process certain components of the classroom goal structure. The second theme was related to classroom goal structures, which affected the self-concept of the participants in regards to math ability, motivating them to seek understanding (Singh, Chang, & Dika, 2010; Showers, Ditzfeld, & Zeigler-Hill, 2015). Classroom goal structures can contribute to deep learning strategies that lead to positive academic outcomes. The third theme, interest, can stimulate students’ willingness to persevere through challenges, which is indicative of motivation (Ryan & Deci, 2000, 2006). The fourth theme, academic motivation, can counteract low motivation in students who lack interest. In addition to this, disparate themes determine how students position themselves with the achievement goals (Hulleman et al., 2010).

Figure 2 displays the impact these factors have on African American female motivation. This emphasizes that all the themes work together to create the place from
which students are motivated, as well as their level of motivation toward math achievement. Relationships are critical to African American female student motivation. These relationships can be cultivated and exist within the classroom goal structures facilitated by teachers. Their academic motivation is conducted through interest. Interest is linked to the participant’s individual needs and identities. The themes converge as they relate to their motivation toward math achievement.

Figure 2: Factors related to African American female motivation toward math achievement

More importantly, this raises implications for educators about how to approach math instruction for African American female students. First, it is important the students’ paths toward their achievement goal orientations are not ignored or trivialized. The research questions that guided this study did not address how students arrived at their achievement goal orientations. However, the data garnered by self-reports dictated that attention was given to why the students were enacting their achievement goals. Secondly, the data revealed a hierarchy of importance in motivating African American female students. Although some theories suggest that relationships are important, this study has shown that relationships have a strong tie to student motivation, which is essential to learning. Lastly, the data revealed the importance of using qualitative data in
gaining an understanding of African American female motivation when considering their achievement goal orientations.

Chapter 5 presents a discussion of these implications as they relate to instructional practice in math classrooms per each research question, followed by a description of the limitations of this study and future directions for research. Lastly, Chapter 5 provides a summary of the implications of the findings related to classroom instruction and research on student motivation. This includes a reflection on the findings and an exploration of topics related African American female motivation.
CHAPTER 5

SUMMARY AND REFLECTION

“Do your best. But like it. Like what you’re doing. Then, you will do your best.”
– Katherine Johnson (NASA, 2017)

Katherine Johnson was a NASA (National Aeronautics and Space Administration) mathematician whose contributions has left an indelible mark. Her simple words illuminate the need to complete work with purpose and maintaining interest with the intent to strive toward achievement. For African American female students, her words summarize several findings related to this study. It is important to understand that African American female students must develop enough interest to extend their academic motivation to aiming for positive math achievement within the classroom. This chapter is a discussion of the findings and the extent to which the study addresses each research question. Additionally, an explanation of the limitations to this study and recommendations for further avenues of research will be addressed. Lastly, this chapter will provide a summary of the implications for informing instructional practice and research on achievement goal theory and math education.

This purpose of this study was to investigate the factors related to African American female motivation toward math achievement. African American females are underrepresented in math-intensive STEM fields (ACS, 2009; Alexander & Hermann, 2016). Researchers have explored this topic with respect to the experience of college
female students juxtaposed against the topic of stereotype threat (Ceci & Williams, 2010; Kiefer & Sekaquaptewa, 2007) and surmised that female college students internalize stereotypes that males are better suited for math-intensive fields and that this is a result, rather than a symptom, of a bigger problem. The internalization of stereotypes by African American females is the result of decreased motivation from their experiences as high school students (Ceci & Williams, 2010; Norman & Aron, 2002). Therefore, it is important to investigate what happens to African American female motivation at the high school level.

Specifically, an investigation into African American female motivation at the high school level addresses the issues that affect this group with respect to race and culture (Alexander & Hermann, 2016; Ceci & Williams, 2010). Researchers who have investigated African American female high school students have expressed the need for research that focuses on their motivation using their voice (Adelabu, 2007; Ford, Jones, & Alexander, 2015; Freeman, Gutman, & Midgley, 2002; Norman & Aron, 2002; Urdan & Mestas, 2006). This study fills in the gap of qualitative research that focuses on motivation across gender and race as it relates to the content of math using self-reports (D’Lima, Winsler, & Kitsantas, 2014; Jones & Ford, 2014; Urdan & Mestas, 2006).

The theoretical framework of this case study, achievement goal theory, considers the place from which students are motivated to pursue goals. This framework served as a vehicle to learn about the factors related to African American female motivation toward
math achievement (Ames, 1992; Dweck, 1986; Nicholls, 1984). The following questions guided this investigation of participants in their school environment:

1. What are the perceptions of African American female students about their high school math classes?
2. How do African American female achievement goal orientations affect their ability to persevere in math?
3. What factors affect African American female motivation toward math achievement?

Each participant was interviewed individually with semistructured interviews adopted from PALS (Midgley, 2002). Following this, I conducted a focus group session, which allowed for a combination of qualitative methodologies that ensured a thorough exploration of the factors that motivated the African American female participants toward being successful in math (Tesch, 2013; Viscek, 2010). Consistent with qualitative research, secondary resources, which included their math scores from their eighth-grade end of grade achievement test and their end of semester report card grades, provided data. From the data analysis, five themes arose to describe factors related to African American female motivation toward math achievement: (1) relationships, (2) classroom goal structures, (3) interest in math, (4) academic motivation, and (5) disparate themes.

Theme 1 shows that relationships are important to African American female students and influence the other factors related to academic motivation. Theme 2 describe the responses related to classroom goal structures. They reflect the way in which learning targets are created by teachers which should reflect the student’s
achievement goal orientations (Hulleman et al., 2010; Senko et al., 2013). Theme 3 refers to the students’ interest in math related to their motivation toward math achievement. Theme 4 is academic motivation which was shown to be related to the goals that students make in the classroom. Theme 5 refers to disparate themes. This was an unexpected theme in the study that shows the importance of individual needs of the student.

Findings

The five themes provided language to address the research questions of this study. By using the themes to answer the research questions, connections between the themes surfaced that served as findings for this study. The four main findings for this study regarding African American female students were as follows:

1. The relationships of African American female students with adults and peers are important and a part of their cultural identities, serving as mediators between motivational processes and their learning.

2. Classroom environments that support the motivation of African American female students toward math achievement should include learning targets reflective of mastery goal structures and high expectations.

3. The interest of African American female students is a conductor between academic motivation and motivation toward math achievement.

4. Achievement goal theory is a suitable framework for researching different aspects of African American female motivation and learning.
The first three findings from this study are significant because they describe a convergence of current research on supporting African American female students in classrooms and honoring their cultural needs. They also add to the research based on motivation in a math classroom. The last finding explains how this study adds to research on motivation across race, culture, and gender. The next section provides a discussion of each finding and its significance to understanding African American female motivation toward math achievement.

Finding 1: The relationships of African American female students with adults and peers are important and a part of their cultural identities, serving as mediators between motivational processes and their learning.

The relationships of African American female students are a factor in their motivation. These relationships included peer relationships and relationships with adults. Research about peer relationships and African American students has often received some negative connotation to mean that it can deflate their motivation toward achievement and lead to underperformance (Fordham & Ogbu, 1986; Ogbu, 2014). However, the self-reports of the African American female student participants revealed that these peer relationships can offer support. For example, Dalia articulated that her peers encourage her to achieve, which helps to create a positive self-concept. Although Zola reported that she did not prefer the peers in her classroom at the time of the study, she suggested an environment that would best suit her would have contain a homogeneous group of students in terms of their interest in math.
The relationships that African American female students have serve as a funnel of the factors that motivate them toward math achievement. The participants described their math classrooms with respect to the size of the class and the impact of their peer relationships. Kali reported, “My math class is small; it has nine students” and added a description of how her peers performed in the class. The other seven participants answered the questions with similar content. This was independent of their achievement goal orientations, which is in concert with previous research that peer relationships are a significant part of the learning experience (Ford et al., 2015; Jones & Ford, 2014; Ogbu, 2014). Thus, it is important for teachers to not underestimate the importance of these relationships and how they can be used to encourage students to be more engaged in their learning, as they are an extension of their cultural affects (Adelabu, 2007; Thomas & Columbus, 2010).

This study provided evidence that to maintain motivation within African American female students, teachers should enlist instructional strategies that utilize peer interactions in structured ways, particularly in smaller classrooms. As with qualitative research, the participants’ views of their environment allow for a complete investigation into how they are motivated within the environment (Stake, 2003; Woodside, 2010). Their perceptions of their math classrooms were shown to be addressed through their relationships and classroom goal structures. This further explains why these two factors showed a larger impact for motivating them toward math achievement.

Adult relationships had the same impact on the participants’ motivation toward math achievement. Oni described that her teacher motivates them as she said, “She tells
us things that no other teacher will tell us. And she’s really understanding too.” Bisa explained that her parents had high expectations of her performance and that this motivated her to continue to complete the work. Zola also made a point to express that the teacher motivated them and expected them to do well. Thus, the relationships that African American female students have with adults are as important as their peer relationships.

It is important to note that all seven participants, independent of their achievement goals, described seeking help as a common occurrence in their math classes. Although those students with mastery goal orientations had more detailed answers regarding the actions they took when they failed to understand a concept, all the students reported they were not apprehensive when asking the teacher questions. Kali, who showed a performance avoidance goal orientation, also reported this. She explained that she tried to appear to the teacher as though she was not experiencing problems with understanding, but that she asked questions. The effect that adult relationships had on their learning experience explains this phenomenon.

To maintain healthy relationships with students so that they are motivated toward math achievement, teachers should maintain high expectations while providing opportunities for seeking help. Per the participants’ responses, African American females interpreted these actions to mean the adult believes in their math ability and cares about their academic well-being. Together, their adult and peer relationships helped African American females to create their self-concept of their math ability, which improved their self-efficacy.
Finding 2: Classroom environments that support the motivation of African American female students toward math achievement should include learning targets reflective of mastery goal structures and high expectations.

African American students require instruction that is relevant to their sociocultural needs (Eccleston, Smyth, & Lopoo, 2010; Thomas & Columbus, 2010). Several characteristics impede learning environments from being positive and supportive of their learning (Adelabu, 2007; Alexander & Hermann, 2016; Bonner, 2014). Ineffective classrooms that serve African American students have attributes such as discriminatory microaggressions that exist within the curriculum and transfer during instruction; low expectations for student learning; and lack opportunities for cooperative learning (Bonner, 2014; Butler-Barnes, Chavous, Hurd, & Varner, 2013; Honora, 2002; Thomas & Columbus, 2010). These attributes will not only enlist surface learning strategies, but also have the potential to cause students to be maladjusted to school and encourage the internalization of stereotypes, which can be harmful to their self-concept (Adelabu, 2007; Evans, Copping, Rowley, & Kurtz-Costes, 2010). In this environment, African American students are not motivated toward successful academic achievement.

Consequently, educators must find ways to create classroom environments that encourage African American female students to create future goals, provide high expectations, and offer opportunities for constructive collaboration (Adelabu, 2007; Bonner, 2014; Honora, 2002). One way to accomplish this is by understanding the position from which they are motivated to creating goals. These goals guide their actions toward learning and dictate the learning strategies they enlist to gain competency and
understanding (Ames, 1992; Senko, Hama, & Belmonte, 2013). By understanding their position of motivation, the teacher can gain predetermine the effective of instructional strategies, ways to give and verbalize feedback, and how to best retain motivation within African American students. For African American female students, this extends to their aspects of their self-esteem and subsequently their self-efficacy and self-concept (Diseth, 2011; Evans et al., 2010; Federici, Skaalvik, & Tangen, 2015; Huang, 2016). This study provides some insight into the factors educators should consider when creating productive and positive learning spaces for African American female students.

Research has also highlighted characteristics of African American female students that would be affected by the environment in which they must learn math. These studies contend they have higher levels of self-esteem than other groups (Bachman, O’Mailey, Freedman-Doan, Tizesniewski, & Donnellan, 2011; Strandell, 2016). Research on self-esteem describes that people with higher levels of self-esteem compartmentalize their self-concept to protect their self-esteem (Bachman et al., 2011; Peixoto & Almeida, 2010). This means that academic success in one subject may not translate to another. Therefore, the way African American female students view themselves in a math classroom and the way they perceive their math classrooms will occur independently of their experiences in other subjects.

While some of the responses of the participants appeared that a factor related to their motivation is class size, their consistent referrals to their peers reflect that the class size impacts them due to the amount of opportunities they receive to engage with their peers. An example of this can be seen in Zola’s comments, which suggested that a
different class size would encourage opportunities for constructive engagement with peers during class. More importantly, participants who were of performance goal orientations were motivated through normative references, which means they remained acutely aware of their peers and how their peers were learning in the classroom (Ames, 1997; Dweck, 1986; Hulleman, Schrager, Bodmann, & Harackiewicz, 2010). The participant, Kali, detailed her level of difficulty to navigate around the dynamics of her peer relationships while in class. She related, “I am one to talk and laugh and play” and explained that she would move her seat to avoid peer interactions. She reported that the size of the class made it difficult for her to choose other partners with whom she could collaborate to remain academic successful in class. Thus, it was difficult for her focus on conceptual improvement.

However, the participant, Ada, showed that perspectives of math classes can be influenced by other factors, such as adult relationships. Achievement goals can change over time as students mature (Ames, 1992; Bong, 2009; Dweck, 1986). Ada explained that her teachers and parents convinced her that she could do well in math, although she reported that she struggled in math during middle school. Through her adult relationships, Ada began to reconsider math success as a threat to her self-concept (Diemer, Marchand, McKellar, & Malanchuk, 2016; Weiser & Riggio, 2010). Dalai described the same change as she related that her adult relationships influenced her perspective of her hope for success in math (Honora, 2002; Weiser & Riggio, 2010). Thus, their motivation toward math achievement was described positively in relation to their overall academic motivation.
Through various responses to other interview questions about their goals and their motivation, the participants reported information about the classroom goal structure. Zola mentioned, “She really just wants us to pass her math class not just let us fail because that’s not her motivation. It’s to make us pass.” This was echoed by Bisa, who said, “She believes we could do better than what we are now”. They described teachers who were intentional about motivating the students. These responses also reflect that the participants viewed their math classrooms as having some positive attributes toward providing an environment that allowed them to perceive their teachers believed in their potential to improve their math ability.

Research asserts that African American female students must navigate through reconciling stereotypes to receive feedback appropriately (Eccleston et al., 2010). However, the participants’ accounts did not describe this reality. Thus, by interpreting the absence of such responses, their accounts are examples of a classroom environment where teachers intentionally seek to form relationships with students and aim to motivate them. This is indicative of positive mastery goal and performance approach classroom structures (Lau & Nie, 2008; Senko et al., 2013). Since this study focused on the students’ accounts, it cannot be determined if the teachers motivated students using mastery goals or performance goals. In considering the commentary about the teachers’ classroom management styles, a conclusion drawn from the data indicates the teachers could successfully provide feedback given in a way to create a positive learning environment, which removed some hindrances toward motivation.
Finding 3: The interest of African American female students is a conductor between academic motivation and motivation toward math achievement.

Motivation is also described by the students’ willingness to persevere through challenges and engage in metacognitive processes needed for critical thinking (Ericksen, 1974; Ryan & Deci, 2000). Interest in learning is reflective of this willingness to persevere and one of the factors toward their motivation in math achievement, for it determines goals students create toward learning (Bandura, 1989, Ryan & Deci, 2006). Thus, this study addressed the students’ ability to persevere in math, since it is indicative of their motivation toward math achievement. The students answered these questions according to the level of interest, which was determined if they discussed the applicability of math to their postsecondary lives or if they stated that they liked it.

Students who showed performance goal orientations persevered through their difficulties with math if their interest in math matched what they perceived they needed to achieve their postsecondary goals. In cases where they lacked interest, their peer relationships acted as barriers to their motivation toward math achievement. For example, Bisa expressed that she liked math but did not perceive that it was important for her postsecondary goals. During her individual interview, she revealed that while she believed math was “way easy to remember than any other subjects”, her goal was to pass, since she didn’t “plan on majoring in anything with math”. Therefore, although she considered math to be easy, her interest in math was low. She reported that she had a low level of motivation toward math achievement. Her grades supported this self-analysis, since math was her lowest grade out of eight courses. Contrarily, Oni expressed a similar
interest in math, but she felt that it was applicable to her future goals. Thus, she persevered through her challenges and earned an 83 in the course.

Commonalities within the participants’ responses were evident. One example was the role that academic motivation had on their motivation toward math achievement. For participants who described their level of motivation as low, their goals toward being academically successful influenced how they persevered through a lack of interest and distractions. While academic motivation was a key factor to their motivation toward math achievement, interest was a bridge from one type of motivation to another.

Academic motivation, relationships, and classroom goal structures do not supersede the impact of student interest in math. While six out of the seven participants reported that they liked math, their actions about persevering in math and the extent to which peer distractions affected them varied. Interest is a factor in the adoption of intrinsic motivation and self-determined motivation (Ryan & Deci 2000; 2006), for, as the students become more interested in the learning topic, they create goals to persevere through any challenges they encounter as they gain an understanding. Bisa and Amina are examples of this explanation of motivation. Although both expressed a level of interest in math by reporting that they liked it, Amina’s interest exceeded Bisa’s. Thus, Amina described that she was more motivated than Bisa was toward math achievement.

Finding 4: Achievement goal theory is a suitable framework for researching different aspects of African American female motivation and learning.

Achievement goal orientations consider the students’ position of how they become motivated (Ames, 1992; Dweck, 1986; Nicholls, 1984). There are controversies
within achievement goal theory research about the definition of key terms and ideas, as well as the evidence of significant links across multiple studies to achievement (Huang, 2012; Hulleman et al., 2010; Senko, Hulleman, & Harackiewicz, 2011; Senko & Tropiano, 2016). Despite these discrepancies within the research, achievement goal theory provides a framework to discuss the motivational process as it relates to each student while accounting for her goals when learning (Ames, 1992; Elliot & Church, 1997). Gender differences within student motivation exist, leading to the need of investigation of cultural differences as well. These studies have included research on African American adolescents and demonstrated the usefulness of achievement goal theory in describing the complexities of their classroom experiences across culture and gender (Freeman et al., 2002, Jones & Ford, 2014; Ford et al., 2015; Zusho & Clayton, 2011). This theory expresses the connection between motivation and factors that influence how they are motivated (Freeman et al., 2002).

Students who were mastery goal-oriented showed a level of intrinsic motivation that allowed them to persevere through their challenges (Legault & Inzlicht, 2013; O’Keefe, Ben-Eliyahu, & Linnenbrink-Garcia, 2013). Since they devalued normative references to determining their level of achievement, they were able to navigate through what they described as peer distractions (McGoewn et al., 2014; Murayama, Pekrun, & Litchenfeld, 2013). Zola explained that there were some distractions from her peers. However, she would seek opportunities to receive personalized instruction from her teacher and developed strategies to seek help outside of the classroom. Amina and Ada described similar tactics of enlisting study habits to aid them when they did not
understand the concepts. Achievement goal theorists describe their actions in terms of help seeking and striving for their personal best (Collie, Martin, Papworth, & Ginns, 2016; Martin & Liem, 2010).

These factors work together to form a condition in which African American female students can overcome the vulnerability of their high self-esteem (Bachman et al., 2011; Strandell, 2016). Their self-concept is pushed toward positive views of their math ability and reinforced by positive academic outcomes, such as a higher level of self-efficacy (Al-Baddareen, Ghaith, & Akour, 2015; Diseth, 2011; Huang, 2016). Moreover, as seen in the case of Ada, achievement goal orientation can shift and perspectives about math ability can change (Diemer et al., 2016; Dinger, Dickhäuser, Spinath, & Steinmayr, 2013). This is encouraging to educators because they can improve their instructional practice by focusing on giving motivational feedback, while honoring students’ cultural identities.

It is important for teachers to be intentional about motivating students. First, motivation has been linked to the metacognitive skills needed to engage in critical thinking, persevere through challenges, increase self-efficacy, and cultivate a positive self-concept (Alivernini & Lucidi, 2011; Ames, 1992; Dishon-Berkovits, 2014; Ryan & Deci, 2006). Secondly, motivation determines the effectiveness and utility of instruction (Bonner, 2014; Çetin, 2015; Crouzévialle & Butera, 2016; Ericksen, 1974). Moreover, the place from which students are motivated characterizes how they react to certain instructional strategies that can improve their use of deep learning strategies and determine their extent of self-handicapping (Akin, 2014; Koopman, Bakx, & Beijard,
motivation is critical to the learning process, and the students’ achievement goal orientations help to understand their path toward motivation (Ames, 1992; Dweck, 1986).

Reflection

The data collected in this study were analyzed and collected through qualitative methods. This included randomly selecting participants within certain bounds as consistent with case study research (Yin, 2014). While some of the factors may not be generalizable to other groups, the factors that arose from this study reinforce what research has shown can support positive academic outcomes. Relationships in the classroom are the vehicle through which African American female students receive and process feedback (Honora, 2002; Jones & Ford, 2014). Classroom goal structures can create environments that stress mastery, set high expectations of students, and require the intentional practice of focusing on motivating students during the learning process (Lam, Ruzek, Schenke, Conley, & Karabenick, 2015). In the case of math, the applicability of math to the students’ future goals influences their interest in math, and it has the potential to lead to intrinsic motivation (Cerasoli & Ford, 2014; Ryan & Deci, 2006). The possession of academic motivation toward being successful is instrumental in the desire to persevere through problems (Diemer et al., 2016; Nicholls, 1984). Lastly, the disparate theme found in this study demonstrates how necessary it is to attend to the individual needs of students for building their self-concept and securing their academic adjustment (Eccleston et al., 2010; Komarraju & Dial, 2014).
Limitations and Recommendations

Within this case, the participating students had relationships with each other prior to the study, attended the same school, and they were taught by one of two math teachers. The data from this case may have been reflective of the two teachers. The students may have expressed different descriptions of their math classes with different teachers. It is important to note that the two math teachers had common lesson planning and participated in professional learning communities with teachers who had over 15 years of experience. Therefore, they implemented similar strategies, required students to engage in the same online programs, and taught the math content on similar timelines. Both teachers also had less than three years of experience. However, this posed another limitation of the study in that the teachers’ self-reports of the students were not a part of this study. Thus, future studies should juxtapose the self-reports of students to the self-reports of their teachers. Senko et al. (2013) explained that classroom goal structures and learning objectives can enact certain academic outcomes when they are aligned with the goal orientations of students. In addition, while the seven participants showed a range of math achievement levels by their test scores and self-reports, the participants were all accelerated or advanced math students. Subsequent research would benefit from purposeful sampling in which the participants represent a variety of classroom experiences.

Due to the cancellation of school and after school activities, the focus group was conducted a month after the initial interviews began. Because of this, the focus group occurred after the students completed their first semester of high school and received
their final grades. Thus, the way in which they reported during the focus group could have been reflective of their development over time. Despite this gap, their responses in the focus group were like those responses given in their individual interviews. The focus group also consisted of six out of the seven participants, which affected the data during triangulation.

Qualitative researchers agree that the researcher’s epistemological views and affects are both a part of the case and possible limitations of the study (Stake, 2003; Woodside, 2010). I am an African American female who teaches math. The subject of this study derived from a critical view of the actions of my female students in my math classroom. I have an egalitarian view and believe strongly that there are benefits from the students’ critical examination of the world around them. This belief encouraged the choice of choosing case study methodology through a collection of semistructured interviews. It also takes form in my dedication to implementing culturally relevant practices, such as creating relationships with students to create a communal environment for students. Due to this, it was difficult to maintain a distant relationship with the participants. By the time of the first focus group, it was clear that personal bonds were made. To remain unbiased, I adhered to a semistructured interview protocol during the focus groups.

Lastly, this study was conducted in an area that has undergone a transition within the last three years. At the time of the study, the participants’ school was removed from the state’s failing schools list. However, the students who were a part of this cluster of schools struggled in previous years. This included low teacher retention and some
unsuccessful experimental programs. Thus, future studies should be longitudinal to gain an understanding about the evolution of student motivation.

Conclusion

To provide a learning environment that supports learning, teachers should understand the factors related to their students’ motivation. Peklaj, Podlesck, and Pečjak (2015) suggested that teachers consider the personality traits of students when choosing instructional practice. Their findings lead to an understanding that it is important for teachers to be attentive to the individual needs of their students. The findings from this study uncovered a similar understanding for African American female students. Teachers should choose instructional strategies that are attentive to the individual needs of African American female students. To accomplish this, teachers must prioritize cultivating relationships with their African American female students that give the teacher insight into their interests and post-secondary aspirations. This focus also allows the teacher to gain an understanding into their cultural identities as well as satisfy their cultural needs for inclusive relationships.

Similarly, Thomas and Columbus (2010) findings contend that instructional design should incorporate the applicability of the content to the cultural identity of the student. This makes the content relatable to students which can fuel their interest in math. Their interest connects their academic motivation to the motivation toward math achievement.

Notwithstanding, studies presented by Fordham and Ogbu (1986) and Ogbu (2014) presented an analysis of how the cultural identities of African American students
extend into their learning experience through their relationship with others. These studies and research like them often allude to and mention the presence of motivational processes that exist between the cultural identities of students and learning. The findings from this study illuminate the need for the consideration of the students’ cultural affects while focusing on those motivational processes that are essential for learning. Instruction must compliment their cultural identities so they can interpret the teacher’s efforts as positives moves toward an inclusive and supportive environment.

Achievement goal theory is a viable framework in which to discuss these motivational processes for African American female students (Freeman et al., 2002; Midgley, 2002). This theory discusses the position from which students are motivated to provide a framework to address the nuances historically referenced in the African American classroom experience. It allows for a discussion about African American female motivation that explores how relationships, motivational dispositions, and interest affect their motivation inside of the classroom. Although some may disagree with the findings of this study and its prescribed implications, this study provides evidence that much can be learned about motivation in a math classroom by applying a cultural context to achievement goal theory (Zusho & Clayton, 2011).

It also supports the perspective that student motivational processes should be studied past the broader context of behavioral psychology. Instead, student motivation should be considered as a primary focus in understanding how to choose appropriate instructional strategies to encourage engagement. This focus can close existing gaps that have led to the underrepresentation of groups within certain fields. The participant’s
responses reveal that African American female students are sensitive to the teacher’s focus on motivation specifically for students with performance goal orientations. As they interpret that the teacher wants to motivate them, the students can extend their academic motivation to include attaining math achievement. An intentional focus on motivating students can allow students with low interest to maintain motivation toward math achievement.

For African American female students, this type of focus is critical to their development in math classrooms. Research has shown direct links between self-concept of the ability to succeed in math and the self-efficacy of female students (Huang, 2016; Schunk & Miller, 2002). It further links self-efficacy to math grades and success in math. As the students reported in this study, what happens in the classroom can influence the narrative from which the students create and strive toward goals. It is important that educators endeavor to create classroom goal structures that focus on student motivation to create environments where students can form positive relationships, as well as provide a space for students to explore their interests. Students should feel comfortable seeking help; working collaboratively with their peers; and expressing their ideas. Per the perspective of the participants in this study, this space does not refer to an unstructured environment. Instead, this space should be characterized by high expectations and an undeniable belief in the students’ ability to be successful in math. In their own words, educators must create classrooms such that they understand that we see “the bright” in them.
“Intellect is the only super power I need.”

-Moon girl (Montclare, ReederBustos, & Bonvillian, 2016)
REFERENCES


APPENDICES
APPENDIX A

IRB APPROVAL
Wednesday, October 18, 2017

Ms. Roxanne Comegys
Mercer University
Tift College of Education - Atlanta
3001 Mercer University Dr.
Atlanta, GA 30341

RE: Factors Related to African American Female Motivation Toward Math Achievement: A Case Study (H1710264)

Dear Ms. Comegys:

On behalf of Mercer University’s Instructional Review Board for Human Subjects Research, your application submitted on 02-Oct-2017 for the above referenced protocol was reviewed in accordance with Federal Regulations 21 CFR 56.110(b) and 45 CFR 46.110(b) (for expedited review) and was approved under category(ies) 6, 7 per 63 FR 60364.

Your application was approved for one year of study on 18-Oct-2017. The protocol expires on 17-Oct-2018. If the study continues beyond one year, it must be re-evaluated by the IRB Committee. **Item(s) Approved:**

I will interview the students individually as well as conduct 2 focus groups to collect data. I will use their current grades and eighth grade Milestone math scores to gain an understanding of their level of math achievement. The interviews and focus groups will occur over a 6-week period.

**NOTE:** Please 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 Chambliss-Richardson, Ph.D., CIP, CIM.
Associate Director of Human Research Protec on Programs (HRPP)
Member
Instructional 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."

Mercer University IRB & Office of Research Compliance Phone: 478-301-4101 | Email: ORC_Mercer@Mercer.Edu | Fax: 478-301-2329 1501 Mercer University Drive, Macon, Georgia 31207-0001
APPENDIX B

STUDENT INFORMED ASSENT
Factors Related to Motivating African American Female Students toward Math Achievement: A Case Study

Informed Assent for Participants Ages 14-18

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 at Mercer University are doing a research study where we are trying to learn about ways that African American female students are motivated to do well in math.

Procedures

You will be asked to participate in a case study. You will be asked questions about how you are motivated to do well in your math class. You are being asked to participate in two interviews that will be 20—30 minutes long and to participate in 2 focus groups. Snacks will be provided for the interview sessions and the focus group sessions. In the focus groups, you will answer questions in a group. You are not allowed to discuss the answers given from other members of the focus groups. All members of the focus groups must respect everyone’s privacy and responses. Each person will be given a fake name to protect everyone’s identity on the audio recording. The focus groups will last from 30 minutes to an hour. You have the right to refuse to have your information included in the research. Refusing to include your information will not jeopardize you receiving any services related to your class work, grades, or participation in any extra-curricular activities. You will also be asked to provide their progress grade in their math class at the time of your interview and your eighth-grade Milestone scores for math will be requested. All identifiable information will be removed from the reports.

Audio Recording

The interviews and the focus group sessions will be audio recorded. This means only your voice will be recorded. You will not be video recorded to protect your identity. Only the investigators of this study and faculty from Mercer University will hear any recordings. This information will not be disseminated or used for any reason other than for this research study. The audio recordings will not be given to your teachers or other students. Everything you say will be typed so you can read your responses and view how
your responses were analyzed. You will be able to refuse to participate or request to change your responses at any time during the study as well as during the second interview.

Any questions regarding the purpose of the audio recording should be directed to Ms. Comegys via email at comegysr@fultonschools.org.

**Interviews**

You will have two individual interviews which will be held in a classroom. The first interview will ask questions about how you are motivated in a math class to do well. It will last about 20 to 30 minutes. It will be audio recorded to protect your privacy and identity. Your name and other identifiable information about you will not be used in the study. The second interview will allow you to read your responses and how your responses were analyzed. At any time during the interviews, you can request to not participate in the study or answer questions. You will not be penalized academically in any way for your responses.

**Potential Risk and Discomforts**

It may be uncomfortable for you to answer questions about your math class since it is a graduation requirement. The audio recordings in the interviews will be not shared with other teachers or students. Your responses will never be recorded with your name or other identifiable information. It may also be uncomfortable for you to express your ideas with others in the focus groups. You may have met or have classes with students in the focus groups. Only female students will be allowed to participate in the focus groups. Only students who have had the same interview process you have had will participate in the focus group. If any conflicts arise due to your participation in the focus groups, you feel threatened in person, or experience cyberbullying, please contact and notify Ms. Comegys as soon as possible. The problem will be investigated immediately. All students are subject to the Fulton County student code of conduct at all times. If you would like to be removed from the study or change your mind about participating in the focus group, you may do so without any academic penalty or punishment.

**Potential Benefits of the Research**

The benefits of participation in the research may not directly assist you in your math class. This research will help teachers learn about how students like yourself are motivated. It will allow teachers to give better instruction so students like yourself can learn better. Your participation would help both adults and students. However, it may be helpful to explore what motivates you to do well. It may also help hearing how other people are motivated and manage their experiences in math. You may also discover that
you have aspects in common with other members in the focus group which may provide you with a positive academic relationship in school.

**Confidentiality and Data Storage**

You will be assigned a coded number to label your recordings. In the interviews, I will use a fake name to address you to protect your identity. Your name and other identifiable information will never be used at any time in this study other than on the forms of consent from you and your parent. Once the interviews have been recorded, each recording will be stored and labelled using an assigned coded number. Your name will not be associated with your responses and will be identified only by an assigned coded number. At no time will your name be associated with the results of the research. However, any identifying information you provide while being audiotaped will never be used as part of the research or associated with the results of the study.

Your responses will be stored in a locked location and will only be used for research purposes by Mercer University School. If you request that your audio recording be deleted, then your responses will no longer be used in the study. Your parent(s) have said that it is okay for you to be in this research study. You do not have to be in this study if you do not want to be. You can change your mind at any time by telling your mom, your dad, or your therapist.

**NO**, I do not want to be in this study.  **YES**, I want to be in this study.

__________________________  _______________________
Signature of Participant      Date

__________________________  _______________________
Signature of Person Obtaining Assent      Date
APPENDIX C

PARENTAL INFORMED CONSENT FORM
Factors related to African American female motivation toward math achievement: A case study

Parent or Guardian Informed Consent Form

Your child is being asked to participate in a research study entitled Factors related to African American female motivation toward math achievement: A case study. The study is being conducted by Ms. Comegys who can be contacted at comegysr@fultonschools.org. The advisor of this study is Dr. M. Jones who can be contacted at jones_mw@mercer.edu. The results will be used to further my understanding about factors related to motivating African American female students toward math achievement. Your child’s participation is voluntary. A decision to participate in the research will not affect her relationship with Banneker High School, her relationship with other teachers, or her academic standing.

I. The purpose of my study:

This research study is designed to gain an understanding about factors related to motivating African American female students toward math achievement.

The data from this research will be used to gain an understanding about African American female motivation, achievement goals, and math achievement. The data will become a part of a dissertation to complete a doctoral program in curriculum and instruction.

II. Procedures

If you allow your child to volunteer for this study, your child will be asked to answer questions in a 20 to 30 minute interview and participate in 2 focus groups with students who have also participated in individual interviews. The interviews and the focus groups will be audio recorded. Your child will be referred to during the interview with a pseudonym to protect their identity and will be assigned a number code to label their audio recordings. Your child’s name and other identifiable information will not be attributed to your child’s recording. Every measure will be used to make sure your child’s name and other identifiable information is not released or attributed to their response at
any time. Your child’s participation will take approximately 30 minutes for the interviews and an hour for the focus group after school.

Your child will be asked to assent to participate in this research (Assent means that your child will be asked to voluntarily participate in this research). Your child will tell the teacher they want to participate by answering YES or NO after the teacher verbally reads to your child what the research is about and what he or she will be asked to do. Your child will be asked to participate in two interviews. The first interview will consist of questions related to how they are motivated to do well in their math class. Students will be referred to in the interviews given pseudonym to guard your child’s identity. Each interview and focus group will be audio recorded. The recordings will not be shared with any other student or teacher. The recordings will be transcribed. After the first interview, your child will participate in a focus group with students who have also been interviewed. Students will be referred to by pseudonyms to protect their identities. All students will be held to the Fulton County Schools student code of conduct during the focus group. There will be a second follow-up interview where your child can read their responses and the interpretations of their responses that will be used in a data analysis. You or your student may request to stop their participation at any time. Your student may request that their answers are changed or omitted after their review. Snacks will be provided for the interview sessions and the focus group. Your child will also be asked to provide their progress report grade in her math class at the time of her interview and her eighth grade Milestone scores for math will be requested. All identifiable information will be removed from her reports.

**Parent/Guardians who allow students to participate must:**
Please provide students with transportation home or communicate to your child that she may ride the sweep bus home that is provided by the school. The sweep bus leaves the school at 5:15. Also indicate if your child has any food allergies since I will provide snacks during the sessions.

**III. Potential Benefits to Students and/or Society**

Some potential benefits for students and society consist of helping teachers learn about how students like your child are motivated. It will allow teachers to give better instruction so students like your child can learn better. Your child’s participation would help both adults and students. However, it may be helpful for your child to explore factors that help maintain motivation. It may also help her to hear how other students are motivated and manage their experiences in math. Your child may also discover that they have aspects in common with other members in the focus group which may provide your child with a positive academic relationship in school.
IV. Potential Risk and Discomforts

It may be uncomfortable for your child to answer questions about their math class since it is a graduation requirement. The audio recordings in the interviews will be not shared with other teachers or students. Your child’s responses will never be recorded with their name or other identifiable information. It may also be uncomfortable for your child to express their ideas with others in the focus groups. Your child may have met or have classes with students in the focus groups. Only female students will be allowed to participate in the focus groups. Only students who have had the same interview process as your child have had will participate in the focus groups. If any conflicts arise due to your child’s participation in the focus groups, they feel threatened in person, or experience cyberbullying, please contact and notify Ms. Comegys as soon as possible. The problem will be investigated immediately. All students are subject to the Fulton County student code of conduct at all times. If you would like your child to be removed from the study or change your mind concerning their participation in the focus groups, you may do so without your child experiencing any academic penalty or punishment.

V. Withdrawal of Participation

Your child's participation is voluntary. Your child will not be penalized or lose any benefits that she would otherwise entitled to if you decide that your child will not participate in this research project.

If your child decides to participate in this project, she may discontinue participation at any time without penalty or loss of benefits. You have the right to inspect any instrument or materials related to the proposal. Your request will be honored within a reasonable period after the request is received.

VI. Payment for Participation

Students will not be paid for their participation. There is no financial obligation for participants. Participants will be provided with snacks.

VII. Confidentiality and Data Storage

Confidentiality will be maintained throughout the study. The audio recording will be kept on a password protected device. After the recordings have been typed, the transcriptions and recordings will be sent to Mercer University and will be maintained there for three years for research purposes only. All other files will be permanently deleted from the device. The recordings will not be stored on a digital cloud or storage program. Your child will be assigned a coded number to label your recordings. In the interviews, I will use a pseudonym name to address your child to protect their identity.
Your responses will be stored in a locked location and will only be used for research purposes by Mercer University School. If you request that your audio recording be deleted, then your responses will no longer be used in the study. Your parent(s) have said that it is okay for you to be in this research study. You do not have to be in this study if you do not want to be. You can change your mind at any time by telling your mom, your dad, or your therapist.

At no time will your child’s name be associated with the results of the research. However, any identifying information your child provide while being audiotaped will never be used as part of the research or associated with the results of the study.

Once the interviews have been recorded, each recording will be stored and labelled using an assigned coded number. The interviews recordings will be stored with Mercer University for up to three years. Your child’s name will not be associated with his or her individual responses and will be identified only by an assigned coded number. At no time will your child’s name be associated with the results of the research or shared with other parents or others. Any identifying information provided by your child will never be used as part of the research or associated with the results of the study.

Your child’s responses will be stored in a locked location and will only be used for research purposes by Mercer University School. A number will identify the information that I collect from the interviews and focus group from your child. There will be a list connecting their pseudonyms to their numeral codes. After these codes have been assigned and their scores have been recorded, their names will be redacted from all forms.

Questions about the Research

If you have any questions about the research, please speak with Ms. Comegys at comegysr@fultonschools.org. If you have questions later, you may contact Dr. M. Jones at jones_mw@mercer.edu.

You have been given the opportunity to ask questions and these have been answered to your satisfaction. If you agree to allow your child to participate in this research, please complete the information below:

I, , grant my child, ,

Name of Parent or Legal Guardian

Name of Child Participating in Study
permission to participate in this research study.

<table>
<thead>
<tr>
<th>Parent/Guardian Name (Print)</th>
<th>Name of Person Obtaining Consent (Print)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent/Guardian Signature</td>
<td>Person Obtaining Consent Signature</td>
</tr>
<tr>
<td>Date</td>
<td>Date</td>
</tr>
</tbody>
</table>

Please return to Ms. Comegys as soon as possible.

In order to conduct this research, this project has been reviewed and approved by Mercer University’s Institutional Review Board (IRB). If you believe there is any infringement upon your child’s rights as a research subject, please contact the IRB Chair at (478) 301-4101. The IRBs are the governing bodies that are set in place to ensure responsible and safe conduct of research investigations.
APPENDIX D

INTERVIEW QUESTIONS
Interview Questions

Research questions

1. Please describe your math class.

2. Describe your level of motivation to achieve in math.

Mastery goal orientations

1. Please describe how important it is to learn new concepts in math.

2. What are your goals in your math class?

3. Are there skills that you want to improve on? What are those skills and why is improving these skills important to you?

Performance approach goal

1. What are your thoughts about showing others your progress in your math class?

2. What actions do you take to look smart in comparison to other students in math?

Performance avoidance goal

1. What goals do you make so you don’t look like you know less than other students?

2. Describe the goals you make when you have trouble understanding or doing the work.

3. What actions do you take so the teacher does not know you are having more trouble than others?
APPENDIX E

LETTER TO PARTICIPANTS
Factors Related to African American Female Motivation toward Math Achievement: A Case Study

Would you like to help others with your words and experience?
Would you like to be a part in helping others in math education understand students like you?

Your participation in this case study would help others.

This research study will include one-on-one interviews and two focus groups to gain an understanding on factors that affect African American female student motivation toward math achievement. The interviews will be no more than 30 minutes long after school. The focus groups will be no longer than 1 hour long after school.

It doesn’t matter how you are doing in math or your feelings about math. Your identity will be hidden!

All levels of interests are welcome. There are no G.P.A. or grade requirements. You will not receive any academic consequences for participating. You must receive parental consent before participation.

Snacks will be served for all interviews and focus groups.