Mathematics Engagement in Middle School: It's a Family Affair

Cheryl D. Pappy
Kennesaw State University

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Acknowledgements

*Never would have made it, Never could have made it without You
I would have lost it all, But now I see how You were there for me…*

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_I'm stronger, I'm wiser, I'm better, much better_  
_When I look back over all You brought me through_  
_I can see that You were the One I held on to_  
_Oh, I would have lost it all, but now I see how You were there for me._

(http://www.azlyrics.com/lyrics/marvinsapp/neverwouldhavemadeit.html)
ABSTRACT

MATHEMATICS ENGAGEMENT IN MIDDLE SCHOOL: IT’S A FAMILY AFFAIR

by

Cheryl Denise Jones Pappy

The purpose of this qualitative study was to explore ways African American families, with middle school students, view learning mathematics and engagement within a theme school environment. The participants in this study included nine parents and ten students at an urban Title I theme school. The data collection process included two focus group interviews, nineteen semi-structured individual interviews, journal entries from each participant and 15 documents disseminated to parents from the school and from the district. Three themes emerged from the data: (a) the parents’ understanding/confusion about the “new math” and the effects on parent engagement with mathematics, (b) the strong mathematical identities of the participants, and (c) the broader engagement from three major communities: the theme school community, the “village” community, and the home community which further promotes mathematical engagement.
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CHAPTER 1
INTRODUCTION

Citizens in the United States of America are focused on ways to improve their educational system, perhaps due to the recent lackluster performance on international tests, such as The Program of International Student Assessment (PISA) and The Trends in International Mathematics and Science Study (TIMMS). The National Center for Education Statistics reported that students in the United States scored below average in mathematics literacy and ranked approximately 27 out of the 34 member countries of the Organization for Economic Cooperation and Development (https://nces.ed.gov). It is evident that there is inequity in the educational system, and one glaring area is that of the achievement gap between Caucasians, Asians, African Americans and Latinos. In the search for ways to bridge the achievement gaps among these populations, some investigations have proven that engaging parents more in the educational process may be a key factor in achieving equity.

Specifically related to this research endeavor, mathematics literacy is a national problem, and there are serious disparities in mathematics achievement and equity which impact the future of this nation. The principal message from The Final Report of the National Mathematics Advisory Panel was “the system that translates mathematical knowledge into value and ability for the next generation is broken and must be fixed” (Department of Education, 2008, p. xiii). Some researchers believe parental engagement in mathematics education is one possible way to bridge the achievement gap over a
period of time because parental engagement does generally have a positive impact on academic achievement.

**Statement of Problem**

Since the adoption of Common Core State Standards for Mathematics (CCSS-M), there has been more of a pedagogical move from the memorization of algorithms to a greater emphasis on real world tasks and activities where students engage in productive struggle to develop solutions. The Common Core State Standards for Mathematics has been an earnest attempt at implementing standards that will provide students with the mathematics acumen that they will need for success in college courses and in workforce training programs, ultimately preparing students for the future job market. Schmidt and Burroughs (2013) postulated that the CCSS-M has the potential to provide more equitable learning opportunities for all students in the content of mathematics by exposing underserved students to a more rigorous curriculum in mathematics. These standards “resemble the standards of high-achieving countries and exhibit the key features of coherence, rigor, and focus” (p. 4). Analysis of standards from A+ countries—those that performed highly on international assessments, such as Trends in International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA), were closely examined and used as models for the Common Core State Standards (Schmidt & Houang, 2012). Technology advances in the 21st century have had major impacts on the skill set needed for the workforce. Realizing these advances, educators have been mandated to prepare students for the 21st Century workforce by using the 4C’s: critical thinking and problem solving, creativity and innovation, collaboration and communication. Because of the changes in curriculum and
the advances in technology, the typical mathematics classroom looks very different from what many parents and grandparents experienced in their middle school mathematics classes. One difference between the “old” and the “new” school classroom is the amount of interactions. For example, talking, discussing, listening, constructing viable arguments to justify answers and critiquing the reasoning of their peers during class are skills that students use on a daily basis, whereas “old” school students learned through traditional lecture methods. “New” school students must be able to arrive at the correct answer to the mathematical task, but they must also be able to justify their reasoning and explain the strategies used to arrive at their answer. Currently, students are asked to do, to understand, and to apply mathematical concepts through tasks, discourse and critical thinking skills which may be very different from the mathematics courses their parents and other family members experienced. These changes often make families uncomfortable and cause a sense of disconnect at home with parents as they try to support their children. The focus of this study was to examine ways parents view learning mathematics and engaging their middle school children in mathematics education.

**Research Question and Purpose of Study**

There has been an abundance of research on parent involvement in education, and more specifically, mathematics education (Carreón, Drake, & Barton, 2005; Fan & Chen, 2001; Henderson & Mapp, 2010; Hill & Tyson, 2009; Hoover-Dempsey & Sandler, 1997; Jeynes, 2011; Sheldon & Epstein, 2005). However, after an extensive review of the literature, very little qualitative research exists to explore how families are engaging their children and are adjusting their support at home since the shift to the Common Core State Standards for Mathematics (CCSSM)—a common set of mathematics standards for
kindergarten through twelfth grade students in the United States. Furthermore, there continues to be a paucity of research from the voices of urban African American families sharing their perceptions of how they engage their children in reinforcing mathematics concepts at home (Berry, 2008; Jeynes, 2005; Martin, 2006; Stinson, 2008). While there is significant literature available about parent involvement in schools, a qualitative research study that focused on exploring how middle school African American parents viewed their ways of engaging and supporting their children with mathematics since the introduction of Common Core State Standards for Mathematics could not be ascertained. Based on the aforementioned reasons, the understanding of how African American parents engage and support their children in mathematics education has been inadequately researched. The purpose of this study was to consider how African American parents are providing opportunities of engagement with their children in mathematics. The overarching question that guided the research study was: How do African American families, with middle school students, view learning mathematics and engagement within a theme school environment? Documentation of the successes and of the obstacles experienced by African American parents as important stakeholders in the mathematics education of their children will provide further illumination to this complicated area.

Middle school mathematics classes are often thought of as a gatekeeper to more advanced high school mathematics and job accessibility (Berry, 2008; Hennessey, Higley & Chesnut, 2012; Lubienski, 2002). Students who are not proficient in mathematics in middle school will not be able to take advanced high school mathematics classes and will become ineligible to enroll in higher level mathematics courses in college. This limits the
college courses that are needed for professional opportunities that require strong mathematics skills in the 21st century workforce. The lack of accessibility is especially true for African American students who do not have the mathematical knowledge to be able to enter into the lucrative fields of science, technology, and engineering (McGee & Spencer, 2015; Moses & Cobb, 2002).

Globally, students in the United States continue to lag behind other nations in their mathematics ability. The Program of International Student Assessment (PISA) gives an examination to students every three years in countries around the world. The key findings for the most recent test in 2012 revealed that of the 15-year-old students in the United States, only 9% scored at the proficiency level of 5 or above, and 26% performed below the baseline of proficiency. Even more disheartening was when the data was further disaggregated for students’ race/ethnicity, approximately 1% of African American students were identified as proficient (Level 5 and above), but the percentage of African Americans scoring below the baseline of proficiency was 53%.

Comparatively, the National Assessment of Educational Progress (NAEP) highlighted more disparities in the Nation’s Report Card 2015. In the first recorded NAEP assessment year, 1990, Caucasian students scored 270 and African American students scored 237, which represented a 33-point gap, and in 2015, Caucasians scored 292 and African Americans scored 260 which represented a 32-point gap. There was still a 32-point gap between 8th grade African American students and Caucasian students in mathematics scores, which represented only a one-point reduction in the gap since 1990. These comparisons are startling and egregious, pointing to major problems with our nation and our educational system. With the current educational reform efforts such as Common
Core State Standards for Mathematics, the funding cuts in education, the increased student classroom sizes, and the continuous learning gaps of African American students, all stakeholders—teachers, parents, and students—are needed in order to provide greater equity in mathematics education.

This research study is timely and is important because we live in a global society that is becoming more “flat” according to Linda Darling-Hammond (2010). Our students must be ready to compete for jobs with students from around the world. The aforementioned data provides a clear rationale for the focus of my study on African American middle school students and their parents. Understanding the need for African American students to be competitive in the United States and globally further reiterates the urgency to investigate all types of resources available to students. Opportunities for personal insights and personal experiences of African American parents regarding how they engage and how they view their children learning mathematics within the middle school environment were provided. Participants had an opportunity to have their voices heard and their stories told so that educators, administrators, students, families and communities can continue to come together and to support each other to reduce the communication and knowledge gap in mathematics education.

This research provided an opportunity to examine more closely the specific parents’ perspectives and practices. The study required looking below the surface of parent engagement to capture the details and the intricacies that can only be gleaned from qualitative research which provides opportunities for the researcher to describe the complexities of the participants’ narratives. The focus of mathematics education has adjusted to new 21st century demands and classrooms today “focus on central concepts
and help students learn how to think critically and learn for themselves, so that they can use knowledge, in new situations and manage the demands of changing information…” (Darling-Hammond, 2010, p.4). Documentation of the successes and of the obstacles experienced by African American middle school parents, as important stakeholders in the mathematics education of their children, will provide further illumination to this complicated area.

**Theoretical Frameworks**

The analogy presented by Mewborn (2005) guided the development of the theoretical frameworks for this study. Mewborn describes a picture frame, a bed frame, and the frame of a house, stating that each of these frames are used for different purposes, much like theoretical frameworks. A picture frame is designed to enclose and to separate and is used to bring attention to the picture inside. A bed frame is designed to hold the box springs and mattress in place, and the frame of a house is designed to be placed on the foundation and everything else goes on or around the house frame. To further delineate this concept Mewborn stated:

A theoretical framework can help “set off” ideas from other data to draw attention to them, giving them names and robust definitions. It can support the building up and deepening of an idea, or it can provide a structure on which to hang new ideas (p. 2).

This analogy provided a visual picture and assisted in the development of the theoretical frameworks for this study. It was important to constantly view all aspects of the research design and analysis through the lenses of the frameworks which guided the study.
The constructivist epistemology frames this research from the assertion that knowledge is constructed by individuals in different ways based on their personal experiences (Crotty, 1998; Yilmaz, 2008). The methodological framework for analysis was interpretive (Denzin & Lincoln, 2005) in this qualitative study because it focuses on everyday lives of the students and their families as it pertained to engaging in mathematics, and their narratives were used to help understand the complexities of their everyday interactions with mathematics. These were the frames of the “house” that gave the initial structure to the study, research design, and analysis. The research objective was to describe, to understand, and to interpret thoughts, actions, and reactions of parents as they navigated through the middle school mathematics experience with their children.

Given the importance of family and culture (Hill, 1999) and mathematics identity (Martin, 2000) in the African American community, theories that undergirded the relationship of these constructs were utilized. Through the theoretical lenses of Community Cultural Wealth Theory (Yosso, 2005) and Mathematics Socialization and Identity Theory (Martin, 2000), each family’s unique ideas and thoughts about the ways they view mathematics and engage their children outside of the mathematics classroom were used in the reconstruction of a narrative of strength, resilience and the “village” support in this African American middle school community. In keeping with the analogy, the Community of Cultural Wealth Theory was the sheet rock hung on the house frames used to support the study, and the use of the Mathematics Socialization and Identity Theory framework was the picture frame that focused the attention on better understanding the lived experiences of the participants. The relevancy of the frameworks
and how the application of these theoretical assumptions were appropriate in bringing structure and current knowledge to this research will be discussed.

**Community Cultural Wealth**

Yosso’s (2005) Community Cultural Wealth six-part framework was used in this research study. These are traits, abilities and views of thinking that provide different forms of capital to families of color that had previously gone “unacknowledged or unrecognized” (p. 70). Yosso (2005) identifies six types of capital in her Community Cultural Wealth theory:

1. **Aspirational capital** means the ability to see beyond the current realities of one’s situation. This type of capital is “evidenced in those who allow themselves and their children to dream of possibilities beyond their present circumstances, often without the objective means to attain those goals” (p. 78).

2. **Linguistic capital** emphasizes the ability to communicate in multiple languages or styles and gives significance to the rich oral, storytelling traditions in the home environment (p. 79).

3. **Familial capital** is similar to the “village” ideology and is based on “the communal bonds” within the African American community. This type of capital encourages the connectedness of families and communities through a variety of gatherings such as church, school and other settings. “This form of cultural wealth engages a commitment to community well-being and expands the concept of family to include a broader understanding of kinship” (p. 79).

4. **Social capital** is the different types of networking of people and peers to “provide both instrumental and emotional support to navigate through society’s
institutions” (p. 79). These networks could be the National Association for the Advancement of Colored People, Historically Black Colleges and Universities alumni, memberships in sororities and fraternities, or a theme school parent network.

5. **Navigational capital** is “the ability to maneuver through institutions not created with Communities of Color in mind” (p. 80). Navigational capital is closely connected to social capital because it may employ strategies obtained from social networks to effectively navigate through institutions such as the education system, the legal system, or the health care system.

6. **Resistant capital** directs attentions to “those knowledges and skills fostered through oppositional behavior that challenges inequality” (p. 80).

Yosso’s (2005) theory of Community Cultural Wealth provided a frame to consider the data through the lens of these types of capitals demonstrated by the parents and students. Aspirational, familial, social and navigational capitals were indicated in my data; therefore, only those four capitals were discussed to highlight the narratives in the specific findings.

**Mathematics Socialization and Identity**

Mathematics Socialization and Identity among African Americans (Martin, 2000) provided undergirding for this study. Martin’s research investigated junior high students’ successes and challenges in a predominately African American school in California. Based on his findings, Martin identified areas that promoted opportunities for students to succeed and divided his framework into four key areas: sociohistorical, community, school, and agency and mathematical success. Three of these four key areas and
subcategories which included the community, the school, and the agency and success of African American middle school students were used. Within the subcategory of community are themes of expectations for children and educational strategies, beliefs about the importance of mathematics knowledge, beliefs about mathematics abilities and motivation to learn mathematics, and relationships with school officials and teachers. Among the school category are areas of student culture and achievement norms, institutional agency and school-based support systems. Finally, bounded by mathematics success and agency are the themes of personal identities and goals, perceptions of school climate, peers, and teachers, beliefs about mathematics abilities and motivation to learn, beliefs about the importance of mathematics knowledge and beliefs about differential treatment from peers (p. 30). These perceptions and beliefs of Martin’s (2000) theory guided the methodology, the interview questions, and the analysis. Together these two frameworks, were suitable and appropriate to answer the research question.

**Definition of Relevant Terms**

Family: The United States Census Bureau (2013) defines family as “two or more people (one of whom is the householder) related by birth, marriage or adoption residing in the same housing unit” (p.1). Because of the unique components of members of families who may not reside in the same housing unit but are commonly considered a part of the family in this research, family means “two or more persons who share resources, share responsibility for decisions, share values and goals, and have a commitment to one another over time” as defined by Moore and Asay, (2008, p. 29). Thus, the words—families and parents—were used interchangeably in this study.
Parent Engagement: In this research study, parent engagement encompasses parent activities in the home, in the school, and in the community that promote critical thinking and learning mathematics during time parents spent with their children. These interactions included assisting with and monitoring homework, emphasizing family values, developing mathematical identities, promoting interests in mathematics, providing exposure to mathematical experiences, affording learning opportunities, and discussing expectations and aspirations for their children (Fan, Williams & Wolters, 2012; Hoover-Dempsey, et al., 2001; Martin, 2000; Noble & Morton, 2012; Yan & Lin, 2005).

Summary

Many parents were moderately comfortable with elementary school mathematics, but when their students reached middle school, parents felt less confident about their mathematics skills and how to relate to their adolescent children (Hill & Tyson, 2009). Parents also expressed an uneasiness with the “new math” and with the current heuristic approaches to mathematics education (Remillard & Jackson, 2006). Parents often felt left out of the mathematics educational process of their children in middle school. This study provided an opportunity for the researcher to explore parent engagement practices and to explore connections between what students did in the mathematics classroom and how parents view their mathematics engagement.
CHAPTER 2
REVIEW OF THE LITERATURE

In the field of mathematics education, there is a scarcity of research on successful African American middle school students, their families, and their school environments (Berry, 2008; Berry, Thunder & McClain, 2011; Jackson & Remillard, 2005; Martin, 2000; Stinson, 2008). Previously, scholars have not shared evidence of marginalized groups that have succeeded and have tended to focus more attention on the academic failure and underachievement of these groups. Middle school is a critical time in the mathematical identities and efficacies of students, and it is a time where decisions about mathematics courses could limit their future career paths.

The review of literature begins with a discussion of parent involvement and parent engagement. Often these terms are used interchangeably, and based on the literature, it was important to give some distinctions and connections between involvement and engagement. Next, studies were provided which connected the relationship between parent engagement and mathematics achievement, and finally, ending with a summary of recent literature on African American parent engagement in mathematics education.

Parent Involvement versus Parent Engagement

Over the last forty years, many researchers have developed certain norms or acceptable thoughts about the characteristics of parent involvement (Eccles & Harold, 1993; Epstein, 1995; Green, Walker, Hoover-Dempsey, & Sandler, 2007; Hill & Tyson, 2009; Sheldon & Epstein, 2005). According to 20 USCS § 7801(32), the term “parental involvement” legally meant:
the participation of parents in regular, two-way, and meaningful communication involving student academic learning and other school activities, including ensuring—(A) that parents play an integral role in assisting their child’s learning; (B) that parents are encouraged to be actively involved in their child’s education at school; (C) that parents are full partners in their child’s education and are included, as appropriate, in decision making and on advisory committees to assist in the education of their child; (D) the carrying out of other activities, such as those described in Section 111 (http://www2.ed.gov/policy/elsec/leg/esea02/pg107.html).

Many years ago, the common idea was that parental involvement meant joining the Parent Teacher Association (PTA), participating in fundraiser activities, and volunteering in the school. Sui-chu and Willms (1996) described the early studies of parenting by George Morrison (1978) “as involving parents in school activities” (p. 127). Early emphasis was placed on the role of parental involvement from the school’s perspective. This resulted in involvement correlating with how much time a parent spent in the classroom or in the school building interacting with the teachers and staff. Generally, Joyce Epstein is credited as being “one of the pioneers and leading scholars in parental involvement research” (Peressini, 1998, p. 558). Epstein’s Framework of Six Types of Involvement (1995) are:

1. Parenting responsibilities include providing the basic needs of food, shelter and emotional needs for their children.

2. Communicating is a two-way exchange between parents and school.
3. Volunteering involves parents coming to the school to participate or support school activities.

4. Learning at Home means providing ideas and information for parents to use to assist their children with homework and other curriculum-related activities, such as planning for a project.

5. Decision Making includes parents serving as leaders and representatives on school advisory councils, Parent Teacher Student Association (PTSA), or governance committees.

6. Collaborating with Community creates an awareness and a connection with the community to strengthen partnerships and provide additional resources for students.

Most of Epstein’s classifications of involvement stemmed from basic parenting responsibilities, such as providing food, clothing shelter, and a safe home environment. She also included parental involvement classifications in communication with the school and with the teachers, volunteering at the school, decision making, and collaborating with the community (Sheldon & Epstein, 2005). Conversely, Epstein’s model has been criticized for focusing more on school based involvement and viewing parent involvement based on the criteria or expectations of the school rather than on the families’ expectations (Bower & Griffin, 2011). Auerbach (2007) posits that Epstein’s model does not account for differences in race/ethnicity and socioeconomic status but stems from a middle class value structure of parental involvement.

More current research expands the role of parental involvement in the home setting to understand the various ways parents contribute to the educational success of
their students (Fan & Chen, 2001; Hill & Tyson, 2009). The role of parental involvement has moved beyond the basic detached, parent-initiated ways that researchers thought about the role earlier. While it is very helpful to have parents volunteering in the schools and working on various committees within the structure of the schools, it is equally important for parents to be involved at home in monitoring, in motivating and in being a resource to their children. Therefore, more recently parental involvement is referred to in the literature as home-based and school-based involvement (Hornby & Lafaele, 2011; Shumow & Miller, 2001). Some examples of home-based involvement are providing a place to study, checking children’s homework, helping them to study for a test, or checking assignments and reviewing grades on assignments. School-based involvement would be activities that take place mainly at the school, such as conferences, volunteer participation at school, and assisting with extracurricular activities (Green et al., 2007).

These definitions of parent involvement have more recently transformed throughout the years from an “exclusive focus on specific activities and roles played by caregivers to an inclusive emphasis on a wide range of parent activities that support children’s learning” (Fishel & Ramirez, 2005, p. 372). Realizing that a paradigm shift was needed to include families and family funds of knowledge (Civil & Bernier, 2006), the understanding of parental involvement has led researchers to further expand to a family/school partnership model (Allen, 2007; Carreón, Drake & Barton, 2005). The National Association for the Education of Young Children (NAEYC) (2009) developed a comprehensive definition for family engagement in early childhood education as having six main factors: family participation in decision making in their child’s education, two-way communication, collaboration and exchange of knowledge, creating sustaining
learning activities at home and in the community, supportive home environment, and a system that promotes family engagement by training (p. 4). This type of family engagement demands a “culture that supports and honors reciprocal relationships, commitment from program leadership, a vision shared by staff and families, opportunities to develop the skills needed to engage in reciprocal relationships, and practices and policies that support meaningful family engagement” (p. 4). NAEYC discussed the change from past definitions of family engagement which had emphasized parent initiated activities that included volunteering in the classroom, chaperoning field trips, fundraising activities and working in the parent teacher organizations. These tasks were referred to as “parent involvement” activities. Often these types of activities are thought of as superficial and lacking depth for meaningful interaction and exchanges (Zellman & Waterman, 1998). Based on the review of the literature, the meaning of parent engagement involves a greater commitment and ownership of interactions.

**Parent Engagement and Mathematics Achievement**

Significant research has been done on the effects of greater parental engagement and improved mathematics achievement in areas such as motivation, communication, homework, parent efficacy, and emphasis on educational values in the home (Civil & Bernier, 2006; Hong, Yoo, You & Wu, 2010; Martin, Anderson, Bobis, Way & Vellar, 2012; Sheldon & Epstein, 2005). Some of the research evidence of parental engagement and the relationship with student academic achievement reveal mixed findings. The literature supports the association of higher levels of parental engagement with fewer behavioral problems, fewer absences, higher mathematics and reading scores, less grade retention and higher graduation rates (Fan & Williams, 2010; Henderson & Mapp, 2002;
LaRocque, Kleiman, & Darling, 2011). Several studies conclude that parental expectations and aspirations have the strongest and most significant effect on the long term academic achievement of students (Fan & Chen, 2001; Fan & Williams, 2010; Yan & Lin, 2005). Jeynes (2011) discussed the subtler aspects of engagement, such as parental expectations, parental style and the communication between parents and children, as influential based on his meta-analysis of secondary school children outcomes. Moreover, because of the complex nature of parental engagement, there are numerous variables to consider with each study, and often it is difficult to isolate one or two dimensions to conclusively determine whether they specifically have measurable positive effects and to determine to what extent a specific role or an activity played in the results (Hong, Yoo, You & Wu, 2010; Shumow & Miller, 2001).

However, in A New Wave of Evidence, Henderson and Mapp (2002) reviewed 51 studies and the overwhelming conclusion was:

Taken as a whole, these studies found a positive and convincing relationship between family involvement and benefits for students, including improved academic achievement. This relationship holds across families of all economic, racial/ethnic, and educational backgrounds and for students at all ages (p. 24). This encompassing statement conclusively demonstrates that there continues to be positive benefits between parent engagement and improved academic achievement.

**African American Parents and Mathematics Education**

The Center on Education Policy (2010) documented that African American students continue to have lower achievement in mathematics and take fewer mathematics classes than Caucasian students (Sheldon & Epstein, 2005). Additionally, the
relationship between African American parents and mathematics has often been viewed from a deficit perspective (Berry, 2008; Jackson & Remillard, 2005; Jeynes, 2005; Martin, 2006; Stinson, 2008; Qi, 2006). Because cultural norms and practices may be different from the norms of majority researchers, Martin (2006) suggests that research “has failed to present sufficiently detailed characterizations of the mathematical beliefs, experiences, and advocacy practices of parents of color” (p. 199). For many parents, racism has played a major part in their negative mathematics experiences and history. Thus, parent involvement with mathematics often includes bringing parents’ personal attitudes in contact with their children’s experiences. Various negative experiences that African American parents lived while they were in school have been internalized and have left scars, which also contribute to a negative view of mathematics education. Parents remember how they may have been tracked into lower mathematics class, denied having access to a “gifted program” or lacked the exposure of seeing people in their community with jobs that used higher level mathematics. These experiences, according to Martin (2006), have left the African American community without a mathematics identity.

Prior to the last two decades, there was a scarcity of mathematics education research that investigated the thoughts and perspectives of African American families (Berry, 2008; Noble & Morton, 2013; Remillard & Jackson, 2006). Recently there has been a growing body of literature that chronicles the success of African American males in mathematics (Berry, 2008; Noble, 2011; Stinson, 2008; Thompson & Lewis, 2005). Closely related to my research was a study done by Berry (2008) that told the stories of eight mathematically successful middle school African American boys. His data revealed
five themes that were attributed to the success of these young men. The findings of his work suggests major influences were: (a) early educational experiences and availability of educational materials, (b) their exposure to positive mathematics experiences in elementary school, their own mathematics identities and recognizing their strengths in mathematics such as being placed in academically gifted classes, (c) their family and extended family as support systems and role models, (d) having a strong mathematical identity, and (e) their involvement in extra-curricular activities. Berry concluded by expressing the need for highlighting more success stories of African American males in mathematics and documenting the practices that support their success in mathematics. He strongly urged parents to be part of the discourse to share their advocacy and consider their views about educational practices and school policies for their children.

Stinson (2008) investigated four African American males in their 20’s about their high school mathematics experiences and what influenced them to persevere and be successful in their mathematics classes. He determined that these students: (a) observed family members that took advantage of educational opportunities and were financially reaping the benefits of their education, (b) families had high expectations for their education, (c) they had strong positive relationships with teachers who cared about their success, and (d) they had supportive peer relationships with other aspiring students. Both of these studies directly attribute the significant roles of their families and peer relationships to important aspects of their success with mathematics. Parents served as advocates, motivators, and successful examples for these students.

McGee and Spencer (2015) studied African American college students matriculating in the areas of science, technology, engineering and mathematics (STEM),
and their research explores the types of support they receive from their family members. The narrative of the STEM college students suggests that “…parents’ role of advocacy, which included fostering self-efficacy, serving as mentors, and being their first teachers, in addition to instilling emotional perseverance, providing reassurance, and being an ongoing source of inspirations” were important to their mathematical success (p. 485). The researchers also posit that despite previous studies that have framed parents in a deficit oriented way, these parents were able to successfully advocate and motivate their children to be at the college level and that perhaps researchers and schools could learn more from these parents about the ways they were able to navigate through the educational system.

Jackson and Remillard (2005) illustrated ways that ten African American mothers/grandmothers from low income communities were involved with their children’s education. They considered three types of broader concepts of parental involvement: (a) involvement in children’s learning, (b) involvement in children’s schooling and (c) involvement in children’s school. The first type of involvement was how parents engaged with their children’s learning through interactions in the home, the grocery store, or in the community through made up games which had a learning component. The second type of involvement included ways to assist with homework and monitoring progress in school and with school communications. The third type of involvement was represented as ways parents had a presence in the school either by attending meetings or volunteering. This third type of involvement was minimal but more visible to the public than the other two types of involvement. It was clear that all the women in the study were involved in the three different ways of involvement to various degrees. The women were
all intellectual resources for their children, and they supported “constructed roles for themselves in relation to their children’s learning that went beyond the offerings of the school” (p. 69). One particular challenge that these mothers faced was the implementation of the Standards-based mathematics instruction. According to Jackson and Remillard (2005), this process was new to most of the parents, and they were familiar with procedural methods but not the emphasis on the conceptual understandings, and they did not understand many of the conventions used in the curriculum. Subsequently, Remillard and Jackson (2006) wrote specifically about these same parents’ experiences with standards-based mathematics. Their participants were disconnected between the types of mathematics that their children did at school and the mathematics that they used in their everyday life experiences. “Many of them used the term new math to refer to the unfamiliar approaches and conventions used in Everyday Math” (p. 245). The parents felt that this “new math” was more arduous than the “old math” that they were familiar with and were taught. Authors Remillard and Jackson (2006) suggested that it is necessary for parents to be included in conversations about educational reforms so they are considered partners in mathematics education.

**Middle School Environment versus Elementary School**

Another perspective from the literature which needs consideration is the role of parental engagement is the change of environment from elementary school to middle school. Early adolescent development is characterized by the “rapid physical, social, and cognitive development” (Simons-Morton & Crump, 2003, p. 121). In middle school, most students must adjust to changing classes, anywhere from four to six different teachers, and to a larger population of peers. Parental roles also make a shift from
elementary school to middle school. “The middle school years coincide with key changes in adolescent development, including biological and cognitive growth, social development, and renegotiations of family relationships, especially the parent-adolescent relationship” (Hill & Tyson, 2009, p. 740). Generally, when students were in elementary school, they valued their parents coming into the classroom and having lunch with them in the cafeteria. When students are in the middle school years, parents tend to become less involved and there is greater peer influence on the students (Simons-Morton & Crump, 2003, Mo & Singh, 2008).

This shift from elementary to middle school is of critical importance because parental involvement and student achievement tend to drop off dramatically in the middle school years (Hoover-Dempsey et al., 2005; Mo & Singh, 2008; Shumow & Miller, 2001; Sirvani, 2007). One possible explanation to the decline of academic achievement in middle school has been attributed to puberty, where there are rapid shifts in relationships between their parents and their peers which happen to coincide with the move to middle school (Eccles & Harold, 1993). Alliman-Brissett and Turner (2010) claimed that African American middle school students start considering possible career fields and are making decisions about mathematics courses that will have long term consequences in terms of the mathematics classes that they will be able to take in high school. They also state that “parent support has significant direct effects on mathematics interests, self-efficacy, and outcome expectations” (p. 202). However, as mathematics becomes more advanced in middle school, some parents are not able to assist their children as well as they could in elementary school (Hill & Tyson, 2009). Again, this may be another factor that contributes to the transition to middle school.
Summary

In conclusion, based on the review of literature, there was a need to consider ways to improve the academic achievement of middle school African American students in the area of mathematics. Further complicating this topic was the complexity of middle school in the educational journey of adolescent students and the recent implementation of standards for mathematics have become more rigorous, focused and coherent. It was imperative to consider ways to strengthen connections between teachers, schools and parents in order to achieve maximum benefits for students in the middle school environment. Therefore, answering the question of how African American families with middle school students view learning mathematics and engaging with their children in a theme school environment was timely, manageable in scope, and further bridge the home-school partnership that is crucial for children’s academic success.
CHAPTER 3
METHODOLOGY

This study examined personal insights and personal experiences of a selected group of African American parents as to how they engage and how they assist their children in mathematics within and outside of the middle school environment. This chapter details the research methodology and provides elucidation for the following areas: (a) methodological orientation, (b) research settings and participants, (c) data collection and management, (d) analysis of data, (e) ethical considerations, (f) trustworthiness issues, and (g) limitations/delimitations of the study. The chapter concludes with a summary of the preceding sections.

Methodological Orientation, Purpose, and Research Question

The interpretive qualitative research approach was the appropriate methodological orientation for this study based on the following four reasons. First, interpretive qualitative research is used to understand, to illuminate, and to interpret the meanings that people give to experiences in their lives (Creswell, 2007; Denzin & Lincoln, 2005). Second, according to Merriam (2009), interpretivists believe that knowledge is constructed and “…there is no single, observable reality. Rather, there are multiple realities, or interpretations, of a single event” (p. 9). Next, the researcher is the primary instrument for data collection and data analysis in the interpretive framework (Guba & Lincoln, 1981; Patton, 2002), which means the researcher is an integral part of the research design, data collection, data analysis, and interpretation of the data. Last,
knowledge about the research question is constructed by the researcher and the participants. The intimacy with the participants and with the data requires continuous reflexivity from the researcher (Jones, Torres & Arminio, 2006) throughout the study. Reflexivity “involves critical reflection on how researcher, research participants, setting, and phenomenon of interest interact and influence each other” (Glesne, 2006, p.6). Based on the types of questions that this study was seeking to answer, the interpretive methodology was best suited for the research (Creswell, 2007).

This research documented the views of parents and their children regarding how they engage with each other in learning mathematics within and outside of school. In accordance with the interpretivist approach, a major focus of this research was to construct meanings and to share the various perspectives voiced by the participants in our “shared humanity” (Angen, 2000, p. 288). The research question that guided this study was: How do African American families, with middle school students, view learning mathematics and engagement within a theme school environment?

**Qualitative Interviewing**

Qualitative interviewing is central to providing opportunities in “which respondents can express their own understandings in their own terms” (Patton, p. 115, 1987). Rubin and Rubin (1995) used the metaphor of the design of a qualitative interview as being similar to planning an extended vacation—there is a destination, but the plans could change along the way. Using a semi-structured guided interview protocol, (Marshall & Rossman, 2011; Seidman, 2006), participants provided insight into their experiences. The semi-structured protocol allowed for flexibility in the interview process during reflections of the data. The participants understood and agreed to answer
follow-up questions for clarity, and they read their interview transcripts to check for accuracy of their words and meanings. Soliciting their review and input ensured the provision of an accurate account of their own words.

The design was iterative. The study began with a focus group with the parents and a separate focus group with the students. After transcribing and analyzing the focus group data, the interview protocol questions were revised (Creswell, 2007). For example, many parents and students introduced topics related to the theme school concept. Since the theme school concept had a dominant place in the focus group interview data, further investigation was warranted.

The iterative design stops when the information you are putting together supports a small number of integrated themes and each additional interview adds no more ideas or issues to the themes on which you are now questioning (Rubin & Rubin, 1995, p.47).

This ending process is called “theoretical sufficiency” (Marshall & Rossman, 2011, p.220) even though in a qualitative study, it is not possible to know everything because each participant continues to develop unique and different circumstances daily.

**Research Setting**

The traditional theme school program of the Destiny (pseudonym) County School District began in 1996 and serves as an educational alternative for parents and students in the district. The Destiny County School District has six elementary traditional theme schools and one middle traditional theme school—Success Middle School (pseudonym)—which was the site of this research study. Specific features of theme school programs include interdisciplinary instruction, exposure to a world language, 16
hours of parent involvement, a strict uniform dress code contract, a specific conduct contract, and an agenda planner. The theme school option provides families an interdisciplinary program in a structured setting.

Success Middle School is an urban Title I school nestled in a quiet residential neighborhood with the majestic Rock Mountain (pseudonym) only a few miles away. During the 2015-2016 school year, the enrollment was approximately 800 students in grades six through eight. African American, multi-racial, Hispanic, students with disabilities and economically disadvantaged students are included in the student population. Academically, this middle school has achieved Annual Yearly Progress (AYP) for each academic year since 2006, and in 2012, it ranked as the number one middle school out of twenty-two middle schools in Destiny County District (pseudonym), based on Criterion Referenced Competency Tests (CRCT) results. The College and Career Ready Performance Index (CCRPI) score for the 2015 school year was 72.4 points, while the average middle school score for Destiny County District was 66.3 points (http://ccrpi.gadoe.org/2015/). The demographic data revealed that the school is approximately 96% African American, 4% multi-racial, 6% students with disabilities and 70% economically disadvantaged.

**Negotiating Access**

The researcher has been a member of the faculty at Success Middle School since it opened in 2006 and has a positive relationship with the administration, with the parent center coordinator, and with the parents, thereby providing the researcher direct access to a population of students and parents as potential research participants. Approval from the county’s Research Review Board and from the principal to conduct research at the site
was obtained. Due to the longevity of employment at Success Middle School, connections and trust with members of the site as an “insider” had already evolved. In addition, a pre-existing relationship with the student participants had been established through classroom instruction in a previous year.

Researchers’ Role and Positionality

I cannot disassociate myself from my research participants or from my research setting because I am a faculty member at the school, and I know many of the parents and/or I have taught members of their families. As an African American parent and as a teacher, I have strong feelings about the daunting task of improving achievement in mathematics among African American children. I, specifically, chose to teach in a predominantly African American environment because I wanted to provide quality teaching in an underserved community. I am closely involved with the research setting, with the students at Success Middle School, and with their families. Because of this intimacy, my task (role) “is not to determine ‘the truth’ but to reveal the multiple truths apparent in others’ lives” (Emerson, Fretz & Shaw, 2011, p. 5).

During the research process my individuality and uniqueness affected the lens through which I viewed my data (Emerson, Fretz and Shaw, 2011). It was not enough to acknowledge that I had those subjectivities, but according to Peshkin (1988), it was imperative that I continued to consciously identify those personal traits throughout the research, and I did that through analytic memos. “These qualities have the capacity to filter, skew, shape, block transform, construe, and misconstrue what transpires from the outset of a research project. . .” (p. 17). My subjectivity was interwoven through the total duration of the study. Therefore, I kept analytic memos to explain my thinking and
questioning of interviews and data. This was “where self and subject became joined” (p. 17).

Seidman (2006) affirms the importance of sharing the researcher’s autobiographical positioning which has influenced interest in the study. My research is personal and at the core of my being because I grew up in a family that had two main priorities: God and education. Both of my parents viewed education as the key to improving the quality of the life for themselves and for their families. My grandparents emphasized that each successive generation had to achieve more than the preceding generation. I recall my mother always talking about how hard her mother and father worked because they did not have an education. My parents were the only ones among their siblings to complete college, and both of them earned terminal degrees. Getting a quality education was a dominant theme in my family.

Second, my heritage as an African American resonates as a strong influence to my positionality. I grew up in Tuskegee, Alabama, with its rich African American history. George Washington Carver, Booker T. Washington, and The Tuskegee Airmen were common topics in my childhood. My church was filled with many families that worked diligently in the Civil Rights Movement. Montgomery, Alabama, was just 30 miles away with Rosa Parks and Dr. Martin Luther King’s bus boycott. Selma, Alabama, was also very close to my town with its recent memories of Bloody Sunday on the Edmund Pettus Bridge. I developed a sense of great pride about my African American history and about Historically Black Colleges and Universities (HBCUs). I was always in the majority in my school, in my church, and in my town. It was an insulated and a supportive
environment with an extremely strong population of educated, cultured African Americans families.

Third, I am a single, working parent that has gone through the middle school experience with two children, and I know how difficult and how overwhelming it is to engage with children in mathematics. I decided to enter the teaching profession when my son was in high school, and my daughter was in elementary school. I owned a mathematics tutoring franchise before I taught at Success Middle School. During the time I owned the business, I further established my love for teaching children and for helping families who struggled with mathematics. Families paid for their children to get remedial assistance because they were struggling in mathematics and were faltering in their education. Parents actually cried over their frustrations with not being able to help support their children’s academic endeavors. On the other hand, some families whose children were excelling in mathematics paid for tutoring in order to augment their strengths by accelerating their learning. All of these parents found a way to support and to advocate for their children’s education. Many of the families were African American because the business was located in a predominately African American community. All of these experiences have shaped and have developed the educator that I am today.

At the beginning of this research study, I took the sum of these experiences into the project. Having come from family of educators, my DNA carries the genes of two parents who beat the odds to obtain terminal degrees in their academic fields. I can still hear my parents telling me to “get something in your head—nobody can take that away from you.” The strength of education molded me; understanding the power of knowledge and trying to improve the next generation of African-American children is the reason I
teach. Therefore, I am burdened when I see students struggle in a discipline that I love so much.

My background has shaped and has molded me, so I feel strongly about parents finding the time to work with their children, to support them, and to encourage them. My awareness of these personal subjectivities and connections with my participants on many different levels aided me in developing greater insights in the analysis of the data that were collected and were keenly controlled (Glesne, 2006; Marshall & Rossman, 2011; Peshkin, 1988). Therefore, my individual “thumbprint” was stamped on how I designed this study, how I interpreted the data, and how I selected and reported the findings.

**Participant Selection**

The selection of participants for this study was based on purposeful sampling of parents at Success Middle School, because the purpose of the study was to learn, specifically, about these middle school parents and their children without generalizing their experiences (Creswell, 2007; Patton, 2002). Specific criteria used in the selection of the participants were based on the following:

- All the parents must have children currently enrolled at Success Middle School
- At least one parent participant and one student participant must be a male
- At least one participant must be a single parent
- Participants could not be currently enrolled in my class
- At least one participant must be from a two parent household

The criteria were considered a “typical case sampling” (Glesne, 2006), which meant that participants were purposefully selected cases that represented the general population of a specific middle school site. The recruiting process began after approval
from the Institutional Review Board of the University and from the Destiny County Research Review Board was received. During the first week of school, a meeting with the Mathematics teachers of Success Middle School was held to explain the research and a request was made for the teachers to distribute the introductory letter during Open House for incoming seventh and eighth grade parents. Sixth grade parents were excluded from consideration as participants because at the time of the study—the first semester for incoming sixth grade parents—there would not be enough time and enough experiences in the middle school mathematics environment to answer the research question.

The Parent Center Coordinator also posted a letter in her office about the study for parents to view when they signed in to volunteer at the school. In addition, copies of the introductory letter and the letter of consent were available in the Parent Center. The information contained in these documents was reviewed again with the parents and with the students that returned the consent forms. Nine parents and ten students agreed to participate in the study. The number of participants (nineteen) was appropriate for the research because the intent of the study was to have a deeper understanding of a few families rather than a superficial look at many families (Merriam, 2009).

Participants

Smiley (student): Smiley was just as her name says a bubbly cheerleader with an effervescent personality. Her smile was contagious, and she was a kind, helpful student who was respected by her peers. She was a focused mathematics student and completed her work and her homework assignments early. She was a natural class leader who thrived on figuring out difficult mathematics problems. She was a member of Jr. Beta Club. Smiley was an only child, and she lived with her mother, CC (parent). Smiley was
in the eighth grade accelerated mathematics class. She was coded gifted and attended a theme elementary school.

**Joyce (student):** Joyce struggled with mathematics in sixth grade. Her basic skills were weak, and she lacked confidence in her work. She had struggled with mathematics in elementary school; thus, she had a weak foundation in mathematics. Occasionally, she would not complete assignments, or she would fail to turn in her homework. She was sociable and was eager to assist the teachers, but her grades were not stellar in most of her classes. Joyce lived with **Racquelle (parent)**, her father and an older male sibling. Joyce was in the eighth grade; she was not coded gifted and did not attend a theme elementary school.

**Nia (student):** Nia was a naturally gifted mathematics student. She would rapidly complete assignments in 6th grade mathematics class and was rarely seen without a book in her hand or on her desk. She was an avid reader, inhaling books as oxygen. When she was not reading, she was writing vivid fairytales about castles, princesses, and evil kings. She rarely enjoyed working in groups or with a partner, but she would comply when it was a requirement. She provided detailed work with explanations, and her work was extremely neat. **LaToya (parent)** was reluctant to participate in the research because of long work hours, but Nia coerced her to join the study. Nia was an only child and lived with her mother. She was in the seventh grade accelerated mathematics class. She was coded gifted and did not attend a theme elementary school.

**Athena (student):** In Greek Mythology, Athena was the favorite daughter of Zeus that was not born in the typical fashion because she did not have a mother. She was born as a grown woman, dressed in a full set of amour, from out of her father’s forehead! She is
the Greek goddess of “reason, intelligent activity, arts and literature” (D’Aulaire, 1962).

The participant **Athena**, was an only child and was clearly a “daddy’s girl.” She came to Success Middle School about six weeks after school had started, just in time to run for a Jr. Beta Club office, and she was elected President during her second week of school! Her father, **Zeus (parent)**, went on the first field trip to Camp Wobegon (pseudonym) after she had only been in school for four weeks! **Athena lived with both parents and was in the seventh grade accelerated mathematics class.** She was not coded gifted and attended a theme elementary school.

**Trina (student):** Trina was a cheerleader. Her parents were instrumental in the formation of Success Middle School. Trina’s grandmother was a retired mathematics educator, and her dad always talked about the great respect that he had for teachers. He had been a PTSA President and was on the School Advisory Council—parents, teachers and administrators were represented on this committee. Trina had always been very quiet and reserved. She was a confident and a competent mathematics student in the sixth grade. Trina lived with both parents. Her mom, **Ann (parent)**, had been substitute teaching this year. Trina is in the seventh grade accelerated mathematics class. She was coded gifted and attended a theme elementary school.

**Elise (student):** Elise was legally blind and had an Individualized Education Program (IEP). **Sherri (parent)** provided information about her eye disorder and explained the necessary accommodations. Elise was approximately two grade levels behind in mathematics when she started at Success. She also had an intense dislike for mathematics, mainly because she did not have a strong foundation in fundamental mathematics topics. She attended tutoring where she could get individual assistance, and
her family worked with her at home. She was a fervent reader and was self-conscious about her vision. Elise was an only child and lived with her mother. She was in the seventh grade, was not coded gifted, and did not attend a theme school.

**Mark (student):** Mark was focused, determined, no-nonsense, and oblivious to distractions around him. In sixth grade, he came in class, sat close to the front and never took his eyes off the task ahead of him. Mark was prepared daily; he asked intelligent, relevant questions, and he did not have time for any foolishness. His mom, **Joi (parent)** and his grandmother were young and vibrant, always on every field trip and at every parent meeting. His mother was jovial, energetic, and current on all the latest dances. Mark’s grandmother commanded respect and reverence on the field trips; she did not tolerate rude and insolent students. Mark knew there were strong expectations for him to achieve. Mark lived with his mother and was in the eighth grade accelerated mathematics class. He was coded gifted and attended a theme elementary school.

**Gavin (student):** Gavin was autistic; therefore, explicit directions were necessary. Gavin was quick to become overwhelmed and did not have much tolerance for noise. In sixth grade if Gavin did not understand a concept or thought there was too much work, he would cry. However, by the end of 6th grade, he had much better control of his emotions and could articulate his needs more accurately. Gavin was a very spiritual student and was quick to display his faith. On a Jr. Beta Club trip, he offered the prayer before dinner. Gavin, an only child, was in the seventh grade and lived with his mother, **Marci (parent).** He was not coded gifted and did attend a theme elementary school.

**Deion (student):** Perhaps it was not a good idea to put twins together in the same mathematics class, especially when one twin excelled in mathematics, and the other twin
experienced difficulty in mathematics. That was the error made with Deion and Keion. Towards the end of the school year, Shay (parent), the twins’ mother had their schedules changed so they would be in different classes because of their “love-hate” relationship. They would not share their school supplies; they would not share their notes, and occasionally, they would try to fight each other! Eventually, they were able to find common ground to work together. Teachers tried to explain to them that they had built in study buddies, and if one twin forgot something, the other twin might have what was needed or would be able to remember the homework assignments. Deion had a greater understanding of concepts, and he could dissect key words to understand the questions and how he should approach answering the questions. Deion lived with his mother and was in the seventh grade mathematics class. He did not attend a theme elementary school.

Keion (student): Keion struggled throughout the entire year with mathematics, and because of this, he was reluctant to try. He felt defeated before he even started a problem. His mother, Shay (parent), helped devise a good strategy for him which included breaking his assignments into smaller, more manageable steps. He became overwhelmed when he saw the entire task or assignment, but he could focus better when the work was broken into smaller steps. Keion had difficulty keeping up with his homework assignments and with his notebooks, and many assignments were turned in late or incomplete. He was slow and rarely finished a class assignment, even when he worked in groups. However, his mother communicated often with the teacher, and he came to tutorials for extra help. He managed to persevere and to see some benefits for his efforts. Keion was in the seventh grade mathematics class and did not attend a theme
elementary school. He, lived with his mother, Shay (parent) and she was an elementary school teacher.

Table 1 Participants

<table>
<thead>
<tr>
<th>PARENT</th>
<th>CHILD</th>
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<tbody>
<tr>
<td>CC</td>
<td>Smiley</td>
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<tr>
<td>Racquelle</td>
<td>Joyce</td>
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<tr>
<td>LaToya</td>
<td>Nia</td>
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<td>Zeus</td>
<td>Athena</td>
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<tr>
<td>Ann</td>
<td>Trina</td>
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<td>Sherri</td>
<td>Elise</td>
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<td>Joi</td>
<td>Mark</td>
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<tr>
<td>Marci</td>
<td>Gavin</td>
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<tr>
<td>Shay</td>
<td>Deion and Keion</td>
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</table>

**Data Collection Plan**

Data collection consisted of focus groups and individual interviews with parents and students, document analysis of journal entries by parents and students, document analysis of documents given to the parents during the first semester by the Parent Center, end-of-test scores provided by the parents, and analytic memos that were written during the study. Initially, one focus group for parents and one separate focus group for students were conducted. The purpose of the focus groups was exploratory in nature (Vaughn, Schumm & Sinagub, 1996), and general, open-ended questions from the interview protocol were asked (Appendix C), which provided the opportunity to see the topics
parents and students revealed as sources for further development in their individual interviews. The focus groups also allowed gathering more data to guide and to direct the questions during the one-on-one interviews. Focus groups’ interviews have certain unique dynamics which required advanced preparation. According to Krueger (1994),

>A focus group is a carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive nonthreatening environment. It is conducted with approximately 7-10 people by a skilled interviewer… . Group members influence each other by responding to ideas and comments in the discussion (p. 6).

At the beginning of the focus group meeting, the researcher explained that everyone’s participation and comments were valued and were respected, that all views were equally valid, and that there were no correct or incorrect answers. The norms were established for how each person would be selected to speak, such as asking the participants to state their pseudonym before speaking, being mindful that only one person could talk at a time and requesting balanced sharing among the group members (Schensul, LeCompte, Nastasi & Borgatti, 1999; Vaughn, Schumm & Sinagub, 1996). The parents and the students selected their own pseudonyms in advance as a way of showing respect for their individuality. The focus groups were conducted in the researcher’s classroom in the afternoons. The parent focus group was conducted first, and the student focus group was scheduled for one week after the parent focus group. There was 100% participation for the student focus group and 78% participation for the parent focus group.

While the focus groups provided valuable dialogue and insights, Krueger (1994) also expounded on the limitations of focus groups, such as less control of the direction of
the interview and how the ideas of members might influence other members in the interaction. The direction and scope of the focus group conversation stayed on the topic of mathematical engagement in the home environment, but specific areas were further developed in the individual interviews. For example, based on the data provided from the focus group interviews, the individual interview protocol was adjusted to include questions pertaining to the theme school environment. The emergent research design (Creswell, 2007) permits the adjustment of the interview protocol as additional topics are revealed during the interviews.

At the conclusion of each focus group, spiral notebooks were given to each adult participant, and composition notebooks were given to each student participant. They were asked to document any thoughts, feelings, or interactions involving mathematics for one month. For example, if the parents reviewed a mathematics assignment for the students or discussed any mathematical concepts with them, they were requested to write the scenario in the notebook. Additionally, journal prompts were provided for the students if they could not think of anything to write about in their notebooks. Each student was requested to bring their journals to school each week so that the pages could be scanned and returned to them the same day.

After the completion of each focus group, the recordings were transcribed verbatim and were analyzed (Vaughn, Schumm & Sinagub, 1996). The researcher then began scheduling individual interviews. The interviewing process provided a lens to gather narratives from the perspectives of the participants in their own words, and the interviews allowed for immediate follow-up questions for clarifying or extending an idea or a topic (Fontana & Frey, 2005). The interview process offered the flexibility to probe
further on a new thought or idea, and it was familiar and personal because the researcher had previously taught the students (Marshall & Rossman, 2011). One interview was conducted with the parents and one interview was conducted with the students. These interviews were approximately one hour in length for the adults and approximately 30-45 minutes for the students. The two parents that were not at the focus group meeting were scheduled for individual interviews first to ensure the researcher had their perspectives on key topics discussed at the focus group meeting. An interview protocol was used to ensure that each participant was given the same opportunity to comment on general topics that were addressed. Three types of questions were used: main questions, probing questions, and follow-up questions (Rubin & Rubin, 1995). Telephone follow-up interviews were conducted for clarification on points after the interviews were analyzed so that additional questions that emerged from the data could be answered (Creswell, 2007; Glesne, 2006; Kvale & Brinkmann, 2009).

A separate interview protocol was created for the student participants. Interviews with student participants were prearranged with the parents for either before school, after school, or during the after school program. The purpose of interviewing students was to explore the students’ perceptions of how their parents supported and engaged them with mathematics and whether they viewed their parents’ support in the way the parents described. Neither the parents nor the students were informed of what the other member shared in their interview. This process was a form of triangulation in the validation process.

In accordance with the information on the consent letters (Appendix A and B) signed by the participants, the focus group interviews and the individual interviews were
audio-taped and were transcribed. Even though there were inherent concerns about capturing in written form what is spoken (Marshall & Rossman, 2011), the participants were asked to read the transcripts to confirm that the transcription had captured their meaning from the interviews.

It was important for the researcher to stay intimately involved as each new interview took place. As a result, thoughts, reflections, and possible threads of reoccurring data for further exploration were recorded using analytic memos. Analytic notes/memos are used to “write down feelings, work out problems, jot down ideas and impressions, clarify earlier interpretations, speculate about what is going on, and make flexible short and long-term plans” (Glense, 2006, p.59). Marshall and Rossman (2011) emphasized the idea of writing “early and often” during the research study to stimulate ideas and to aid in the formulation of initial codings after each interview. Therefore, the analytic notes/memos provided and assisted in developing a clearer understanding or a clearer picture of the dynamics from each interview and provided valuable insight about the data as it was collected throughout the study.

Finally, the contents of the journal writings from the students and from the parents were analyzed. Many of the scenarios shared in the journals had already been discussed in the individual interviews or in the focus groups. Seeing examples in written form contributed to the triangulation of the findings. Analyzing the documents that parents received during the research period—such as uniform contracts, parent volunteer hour contracts, and academic contracts—provided a closer examination of the uniqueness of the site location and of the commitment of the families at Success Middle School.
In keeping with the interpretive research approach, interviews and document analysis were appropriate data collection methods (Silverman, 2004) to share the multiple perspectives of what occurred outside of the classroom with middle school children and parents as they interfaced with mathematics and further developed their mathematical thinking.

**Data Management Plan**

Two digital recorders were used during the interviews, one digital recorder for the interviews and another digital recorder as a backup and for recording the researcher’s initial impressions immediately after the interviews. A password protected iPad was used to scan the journal pages. All transcribed interviews were saved on a computer in a password protected file, and the recording devices were stored in a locked file cabinet at the researcher’s home.

**Data Analysis**

At the conclusion of each focus group and all the interviews, the audiotapes were listened to numerous times while transcribing each interaction. After the transcriptions were completed, the files were uploaded to a computer-aided qualitative data analysis program, Atlas.ti 7, for data organization and management (Friese, 2014). Analytic memos and scanned documents from the iPad were also uploaded to Atlas.ti 7. Atlas.ti 7 is a qualitative data analysis software that equips the researcher with a variety of tools to manage, to organize, and to analyze all of the data collectively. The query tool made it possible to search for quotations that were associated with the assigned codes. Codes are “most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and /or evocative attribute for a portion of language-based or visual
They are the bridge between collected data and the explanation of that data. According to Saldaña, a theme is “an outcome of coding, categorization, or analytic reflection” (p. 14). The co-occurrence tool made it possible to connect codes that co-occurred in the primary documents sources. The program also kept track of the number of times that a code was used throughout all the data. The software did not analyze the data or make decisions regarding coding, but the researcher used the information that the software provided to assist in further collapsing codes and developing themes.

The process of data analysis in qualitative research is used to “categorize, synthesize, search for patterns, and interpret the data you have collected” (Glesne, 2006, p.147). This process made it possible to organize and to make sense of a significant amount of collected data. Throughout the entire data collection period, the analyzation of the data was continuous, using the constant comparative method (Strauss & Corbin, 1990). As each transcript was read and was reread, new codes were continuously compared to existing codes to identify whether they were connected and/or to determine whether there were any similarities or patterns. As the data were sorted from the initial open coding, the “families” option in Atlas.ti 7 was used to assist in moving from the open codes to the axial codes in grouping the data into common or similar connections and sub-themes (Strauss & Corbin, 1990). The network view provided by the Atlas.ti 7 software gave a visual representation of all of the coding from interviews, documents, and memos. The data collection and the data analysis continued to occur simultaneously throughout the span of the study.
Confidentiality and Ethics

Parents signed a letter of consent which explained the details of the research study and provided an explanation of the right to refuse participation at any time (Kvale & Brinkmann, 2009). The students and the parents also signed an assent form. The researcher reviewed the overall purpose of the study and reviewed each point of the consent letter before the participants signed. Before each interview the researcher reminded each person that the interviews were being recorded and would be transcribed. All of the participants had pseudonyms which they personally selected to maintain their anonymity. The data stored electronically was pass code protected. All of the recording devices were kept in a locked and secure area in the researcher’s home. After the completion of the dissertation, all voice recordings will be erased, and the data will be deleted after seven years.

Trustworthiness

The data for this study were collected through focus groups, personal interviews, reviews of school-issued documents, and reviews of the journal writings. In this qualitative research study, data were presented through the crystallization process as described by Denzin and Lincoln (2005), “In the crystallization process, the writer tells the same tale from different points of view” (p. 6). It was clearly not the expectation that all the participants in this study had the same experiences, but their different individual experiences were explored to determine if there were any similarities or connections. Several strategies, such as triangulation, member checking, and an audit trail, strengthen the trustworthiness of the study (Glesne, 2006; Marshall & Rossman, 2011; Merriam, 2009).
Multiple sources of data were used to confirm emerging findings to ensure internal validity (Creswell, 2007; Glesne, 2006; Merriam, 2009; Silverman, 2004). To further enhance the study’s credibility, transcripts of the interviews were sent to each participant to read. Participants had an opportunity to provide additional details to statements and to share any questions about the interpretation of the interviews, as well as, to determine the accuracy. The data were “saturated” through extensive interviews and through having a variety of participants, as was described in the data collection plan. The purposeful selection of participants allowed for more variation in the “lived” experiences that the participants shared. The researcher’s positionality was shared in the study, and the researcher continuously reflected upon the possible biases in the interpretations and assumptions as decisions were made as to what aspects of the data were most salient in answering the research question.

An audit trail was provided by carefully dating all data sources, including the time and the location for each piece of data. All procedures, thoughts about coding decisions, and all significant decisions made in the study were carefully mapped out and were documented to provide the rationale for the decisions made. Finally, “rich, thick descriptions” (Geertz, 1973) of the perspectives of the participants in the study were shared in their own words, and the writing was inundated with the “lived experiences” of the participants.

**Limitations/Delimitations**

Creswell (1994) states that limitations and delimitations “establish the boundaries, exceptions, reservations, and qualifications inherent in every study” (p. 110). A limitation is a component of the study that could potentially or certainly affect the study in an
important way, since the researcher has no control over it. A delimitation is something that can be controlled by the researcher as explained by Creswell (1994).

One limitation of this study is that it was conducted in one specific research site. Another limitation is that the researcher is currently a teacher at the research site and has taught each of the student participants in previous years. Therefore, the researcher’s role as their previous teacher may have influenced their comments, their honesty, and their participation. Additionally, the study was not actually conducted in the home environment of the participants, so reliance was on the participants’ personal accounts; therefore, no direct observations of parent engagement in the home were recorded. However, the design of the study addressed these limitations by providing other data sources to illuminate the research question, such as the journal writings analysis and other document analysis.

A delimitation in the study was a certain number of parents were specifically selected based on the established criteria. Nine parents consented to participate in the study. The impact of this delimitation was data could not be collected from all middle school parents in Success Middle School and from divergent personal experiences of other families currently enrolled.

**Summary**

In this qualitative study, the perceptions and experiences of African American families with middle school students about how they engage and view learning the subject of mathematics were documented. An interpretive qualitative study approach to view the confluence of experiences between middle school African American parents and their children in a theme school environment was used. The data were triangulated by
using focus groups, individual interviews, document analysis, and member checking. In deference to the confidentiality of the participants, meticulous attention to protecting their identity and to keeping all records securely locked was maintained. Atlas.ti 7 software was used to aid in organizing and in sorting the vast amounts of data collected. Input from multiple sources was solicited and was carefully checked for agreement on the interpretations. This methodological process served as the guide to the following chapters of the findings and implications of the study.
CHAPTER 4

FINDINGS

It has been documented that parent engagement enhances student learning (Fan & Williams, 2010; Henderson & Mapp, 2002; Jeynes, 2005). Some parents may attend school functions and may volunteer in the schools while other parents may work diligently with their children at home. Parents have substantial knowledge about their children and how they learn, but often this information is not utilized by educators to develop meaningful partnerships. It is important for educators to consider the ways parents are providing support to their children and to determine whether there is more that can be done to assist in the partnership of the school and families. This study examined how African American parents are providing opportunities of engagement, as defined in Chapter 1 with their children in mathematics. This examination required forming an aggregation of ways parents are presently supporting and engaging their children.

Three major themes evolved out of the analysis of the data. “Old School vs. New School Funk” details the parents’ understanding/confusion about the “new math” versus their children’s understanding/confusion about mathematics and the effect that this dichotomistic view has on parent engagement with mathematics. “Happy Feelings” focuses on mathematics socialization and mathematics identity (Martin, 2000) of the participants. “It’s A Family Affair” addresses engagement from three major communities: the school community, the “village” community and the home community.
The participants were given the opportunity to speak honestly and freely, and they gave compelling narratives from which extensive quotes capture and portray their perspectives of these three major themes and how these themes intertwined in the complexities of mathematical engagement within the middle school family environment.

“Old School vs. New School Funk”

Old School represents the way many parents learned mathematics by memorizing a set of rules and by repeating the example given by teachers or given in a textbook for a set of problems with the answers in the back of the textbook. One assumption of the Old School was the simple acquisition of mathematics facts and procedures in isolation. New School represents the use of a deeper conceptual knowledge by students to solve real world problems and to explain and justify their answers. New School encompasses students working with their peers—predicting, developing, and discovering solutions. Students are able to formulate a plan about how to solve a problem and about the appropriate operations to use while developing their mathematical vocabulary as they discuss options with their peers. Often technology is used for tedious calculations and for seeking information, using the teacher as a facilitator of learning.

A student came to morning tutorial and said, “My parents were arguing over the answer to a mathematics problem. Finally, my dad said, this new math is messed up! It’s time to go back to the old school ways.” Similar statements were expressed throughout the interviews—the idea that this “new math” is confusing, and the parents solve mathematics one way, and their children solve mathematics another way. What does this “new math” mean? What does the “old school” mathematics mean?
Consistently, parents discussed how different mathematics instruction is presently in middle school compared to mathematics instruction during their junior high or middle school years. For example, Zeus (parent of Athena) expressed his apprehension about showing his solutions a different way.

**Zeus:** The other difference is the way they go about working the problem or figuring out the problem—the way you show the work. I’m like yeah. The answer is right. But that’s not the way I would have done it or the way I would remember doing it. I might get the same answer, but I go about it in a different way. That’s one of the big tell signs for me. Well, I’m not going to try to instill my math habits on her, she’s getting it, so just let her stick with it…don’t muddy the waters because I might show my way and she’ll get totally mixed up between the two ways (personal interview, October 20, 2015).

Zeus does not want to confuse his daughter based on the way he remembered how to solve a problem, but he does want to understand the different methods she has been taught. However, he was reluctant to offer another alternative to the solution and resorted to a “hands-off” approach because his daughter understood it another way. “The emphasis on conceptual understanding is new to most parents who are products of a school system that previously emphasized rules and procedures” (Jackson & Remillard, 2005, p. 69). More conceptual understandings and less procedural understandings in mathematics have been confusing to parents, and they do not want to confuse their children by introducing an “old school” method.

Another parent voiced her opinion about her mathematical experiences in relation to current practices:

**Shay:** In my years in school, it was like do it this way, and if you do it this way, it’s right. I was never told, ‘Let me see if you can come up with another way.” I was never told to be creative, you know. I think it hurts the parents now, especially those who thought they were great at math (personal interview, October 7, 2015).
Additionally, some parents are confused about the Common Core State Standards and performance tasks that require higher order thinking skills in the middle school mathematics classroom. For example, in one journal entry (Appendix D), Joi discussed how the Common Core Curriculum differed from the “old school” curriculum.

**Joi:** When first introduced to common core I had to grasp it myself. In order to help with homework, I had to boost up my learning. I learned math in a traditional way. I learned common core along with my son with the different patterns and connections needed to look at the common core math to gain the answer. I attended all the math night forums offered by the county for parents and in the end it paid off (Journal Entry, October, 2016).

Joi made a concerted effort to understand the contents of the Common Core Standards and learned with her child in an effort to bridge the traditional “old school” with “new school.”

Moreover, students commented about their parents’ frustrations with the “new math” and differences between how their parents learned mathematics and the way they are learning mathematics. Nia provided her definition of “old school” and how her mother did not have the benefit of the types of technology that are available to students in classrooms today.

**Nia:** Because I mean like now there’s new technology so you’re learning new ways to do things—like back then, they learned, they had to do it ‘old school’ so they had to experiment with things to find out stuff and here we are with new technology finding out stuff in an easier way.

**Cheryl:** What does ‘old school’ mean?

**Nia:** It means no laptops, no iPhones, no Galaxies, no Samsungs, it means textbooks. (personal interview, November 16, 2015).

Nia described “old school” as textbooks. Often in the current mathematics classrooms, students are engaged in technology, not traditional textbooks. She provided a list of
technology that was not available for her mother but is used now as resources for exploring and clarifying mathematics topics.

Alternatively, Smiley recognized that she and her mother may have different solution methods, but they learn from each other, which is beneficial to both of them.

**Smiley:** When she (mother) says she didn’t learn it that way, I say I learned it this way, but maybe we can find another way to do it or we end up switching methods, and I learn her way and she learns my way. So that kind of helps both of us (personal interview, November 30, 2015).

Like Smiley, Joyce accepted the “old math” and “new math” as different routes to the same destination. She did not see a conflict between the “old math” and the “new math” as long as the final answer was the same.

**Joyce:** I think that math has changed and there are many ways to do math. Your teacher may do one thing and your mom and dad may do another way but the answer should always be the same at the end (focus group, September 16, 2015).

**“Happy Feelings”**

Hájek & Mäkinen (2010) stated, “Happiness is generally believed to be determined in part by one’s unique personality, set point, general situation and is especially influenced by frequent, small positive events” (p. 169). Having frequent positive experiences in learning mathematics promotes confidence and a sense of achievement. Further, students’ emotional dispositions may be influenced by knowing the importance of learning mathematics and the usefulness of mathematics in their daily lives (Froiland & Davison, 2016; Hannula, 2002). The majority of the participants in this study had a strong sense of mathematical identity and positive self-concept. Martin (2012) describes a mathematics identity as:
…the dispositions and deeply held beliefs that individuals develop about their ability to participate and perform effectively in mathematical contexts and to use mathematics to change the conditions of their lives. It is a negotiated identity that encompasses a person’s self-understanding and how others see them in the context of doing mathematics (p.57-58).

In interviews with the students, seven students (70%) were confident of their mathematical skills and abilities, and three students (30%) recognized that the subject matter was more difficult to grasp conceptually, but they continued to work at improving their understanding of the material. The 2015 school year end-of-grade test scores provided by the parents corroborated this by scoring one student as distinguished, five students as proficient, and four students as developing learners. The test scores of six of the seven students who believed they were competent in mathematics placed in the proficient or distinguished levels. The three students who realized they struggled with mathematics were in the developing category. All of the students were able to articulate the utility and value of mathematics in their lives and the purpose of mathematics in helping them to achieve future goals. Martin (2000) in his framework on the “Agency and Mathematics Success Among African American Students” discussed the importance of African American students viewing themselves as learners of mathematics, knowing the importance of mathematics, understanding their motivation for learning mathematics, and the steps they take to sustain their academic success. Below are examples of the ways that students described their mathematical identity and how they perceived themselves as doers of mathematics:

**Smiley:** Well, I feel like I am really good in math because, like earlier today, my math teacher kept saying how I would be the first one
to finish a test, so that made me happy. Then I was invited to a math competition club, and that also made me happy. So, I feel like I am stronger in math than any of my other educational classes. I study for all of my tests, and I do good in my class work and do all my homework. I pay attention in class, like I’m not talking or anything. I take good notes and I study (personal interview, November 30, 2015).

Smiley listed the skills that she identified as necessary to do well in mathematics and how doing well in mathematics makes her feel “happy.” Being invited to an elite mathematics competition reinforced her mathematical identity and beliefs about her mathematics ability (Martin, 2000).

At the middle school level, Mark had selected engineering as his chosen career, and achieving that goal motivated him to be successful. He knew which subjects were important in this career; he had a positive attitude, and he also had the desire to assist his peers with mathematics.

**Mark:** Well, math is my favorite subject, and I like to deal with numbers and work out problems and then help others who need assistance.

**Cheryl:** Why is math your favorite subject?

**Mark:** Well, it’s just because I want to be an engineer when I grow up. So since I want to be an engineer, I have to deal with science and math, but more math.

**Cheryl:** If you were to come up with some adjectives to describe yourself as a math student, what would some words be?

**Mark:** Smart, like responsible when it comes to math. Like doing my homework, helpful, helping others who need the help (personal interview, December 15, 2015).

Athena connected the importance of learning mathematics to a real world example. She was realistic with her self-evaluation of her mathematics ability by recognizing there were areas to which she needed practice and attention (Appendix E).

**Athena:** Math is to me a good way to challenge yourself and introduce you to new things.

**Cheryl:** Can you tell me a little bit more about that?
Athena: It helps you relate to the real world. For an example, how to use discounts without, you know, always having to carry a calculator.

Cheryl: So how do you view yourself as a math student?
Athena: I think I’m above average, but not quite there yet. There’s still some things I can work on (personal interview, December 3, 2015).

Athena and Trina showed had great enthusiasm for mathematics and appreciated the challenging aspects of the subject. It was evident that they accepted the challenge and were willing to persevere to meet the demands that come with the subject matter.

Trina: I would say that math is my favorite subject and my strong suit. I’ve grown to like math more than most of my other subjects over the past couple of years.
Cheryl: Why do you think you like it so much?
Trina: I don’t know, I think it’s just calming, even though sometimes it can be a challenge and I like challenges (personal interview, December 3, 2015).

When asked about the usefulness of mathematics and how mathematics is seen in their everyday lives, the students used a variety of experiences—such as banking, paying bills, taxes, getting the “best deal” on purchases, cell phone data plans, and not being cheated when paying for items. Athena said that she needed mathematics because of her position as her club treasurer at school, and Elise said that the church used mathematics when the tithes and offerings are counted. The students also discussed the usefulness of knowing mathematics in specific aspects of their parents’ occupations. The majority of the students had clear ideas about their future occupations and affirmed the importance of mathematics in these careers.

Gavin: When I grow up, I plan to be a videogame entrepreneur but to do that I have to learn coding which I think involves using math in a way (focus group, September 16, 2015).

Deion: Just like Gavin said, with the technology, I figure I will be learning coding and working with computers in that profession. You really have to know math and coding (focus group, September 16, 2015).
Conversely, some of the participants had other thoughts and doubts about the usefulness of mathematics:

**Nia:** I don’t think I’m going to be using half the stuff that they teach me unless I choose to be a mathematician in life, but other things like using integers, adding, subtracting, and multiplying for my bills, I know I will have to use that for sure (focus group, September 16, 2015).

**Elise:** I think for some things in math, I don’t see it. But like for other things, like when we’re dealing with integers, I can definitely see it. But like when we’re doing those long equations like $2x + \text{whatever, whatever times whatever}$, I don’t see that. I don’t see how that will ever work in my life (focus group, September 16, 2015).

Elise described herself as a “right-brained” student, and one entry in her journal was a poem she wrote to creatively express her state of being perplexed about mathematics. In the poem, she repeatedly referred to mathematics as a “different world.” (Appendix F)

Finally, all the participants described ways they were exposed to mathematics. Trina and Joyce said that over the years listening to older siblings exposed them to mathematical concepts. Parents and family members—such as Mark’s uncle who is an engineer, Elise’s grandfather who is a physician, and Nia’s cousin who required her to do work with mathematics every day after school—all had a direct impact on their mathematics socialization and identity.

The parent focus group conversation introduced the topic of right brained versus left brained individuals and how sometimes the parents were wired differently from their children. The following conversations indicated how parents talked about their mathematics identity and how their love of mathematics may or may not have been passed down to their children.
**Sherri:** Looovedddd math because the answers were always going to be the same. You couldn’t change it. 2 + 2 was always going to be 4. Yeah! So I loved math; never had any problems with it. I do have some problems with my child because she’s right-brained, right-brained, waaaayyy right-brained! I’m like, ‘This makes sense. The answer’s just shouting at you! Why don’t you get it? Why don’t you understand the answer you got doesn’t make sense!’ (focus group interview, September 10, 2015).

**Joi:** My dad minored in math, so I had nooooo problems with math! If I ever had a problem with math, I would always go to him. He was my guru, he was my hero with math, and I think that’s what made me love math, which also makes my son love math, because my dad was that good in math (focus group interview, September 10, 2015).

**CC:** I enjoyed it! I was the scientific math person; you know literature is not my forte, but you give me some science or you give me some math, I’m good… I was able to understand and did not have any issues and actually took accelerated math when I was in high school. Fortunately, my daughter has picked up, I guess, that talent which I am grateful for because trying to remember some of that stuff, whooo. So that has been my experience; I guess I have always been in love with math (focus group interview, September 10, 2015).

These three parents were full of joy, excitement, and enthusiasm about their experiences with mathematics. In several instances, parents expressed belief in their children acquiring positive mathematical identities from their parental influences in and out of the home over the years.

In contrast, for other parents, a positive mathematics identity, confidence, and enjoyment did not emerge until adulthood. Their early mathematical struggles motivated them to persevere and to move from failure to success. For instance, two parents shared:

**Racquelle:** I can recall being in seventh grade struggling with math. I remember my parents, you know, paying for different tutors and I really, really struggled with math, and it was not until I got older and went to school, to college and struggled then, but a tutor at my college, she took me on because I had a lot of determination, and that’s one thing with math, you have to keep
working at it. And from there on, I went from struggling to being student of the semester twice in math, and I went on to do really well in math and I’m not fearful of math like I was before (focus group interview, September 10, 2015).

Marci: I struggled with math. I did not have the support at home, so I just basically winged it. It was very difficult for me, but it wasn’t until I started working in the banking industry that I developed a love for numbers, and that’s when it all started. Right now, I’m still working in the accounting industry as an account receivables person, and math and numbers just clicked for me (focus group interview, September 10, 2015).

In reflections from parents, the majority have developed an agency and appreciation for mathematics. They have made the subject a priority for their children by supporting them and by providing the encouragement and by exemplifying tenacity. The mathematical experiences of the parents had residual effects on some children. As a result, those children developed a strong mathematics identity and efficacy, supported and encouraged by their parents.

“It’s A Family Affair”

As previously defined in Chapter 1, family means “two or more persons who share resources, share responsibility for decisions, share values and goals, and have a commitment to one another over time” (Moore & Asay, 2008, p. 29). There are no physical walls or boundaries, and members of families may or may not share the same gene pool. The participants have been supported and encouraged with mathematics engagement on three familial levels: school, community and home.

The theme school concept of Success Middle School created a unique educational environment which nurtured and fostered stronger familial, social and navigational capital (Yosso, 2005) among parents, students, educators, and administrators. The theme school concept was prevalent throughout the data, and several characteristics of theme
school programs were reiterated by the participants, explaining the unique benefits of the program. The participants indicated that parents and students in theme schools are like-minded:

**Racquelle:** I think the main thing that attracted me was the idea of rigor and a school that was going to challenge my children and that you would have like-minded parents and like-minded students. I don’t expect my children to be like every student, but the hope is there are other students that are on the same or higher levels that would cause my children to step up even more, to be even more challenged because, I guess, the worst thing that could happen is for them is just to stay average, status quo (personal interview, November 7, 2015).

Merriam-Webster defined like-minded as having “a like disposition or purpose: of the same mind or habit of thought” (http://www.merriam-webster.com/dictionary/like-minded). Rachelle is a parent that looked for a school that would challenge her children because she did not want them to be content with being average. She wanted her children to see their peers aspiring for higher levels of achievement.

Document analysis revealed many opportunities at Success Middle School where parents were offered engaging and informative ways to share their voices. For example, the flyer highlighting Parent Engagement Week 2015 offered the following workshops: “Expanding College Opportunity,” “APPY HOUR: The ‘Apps’ to Make Your Child a Success in School,” “Farm to School Focus on the Science of Nutrition,” and “Popcorn, Pamphlets, and Parenting Tips” as well as opportunities to take a parent survey and sign up for the parent portal which allows parent to connect with the teachers and view their children’s grades. These opportunities allowed Success Middle School to build the capacity of participants, which means that the school provided various trainings throughout the year to advance the knowledge and skills of parents. When families have
similar expectations and similar goals for their children, there is a commonality among the members of the school community.

Parents also advised their children to connect with like-minded students. Joi admonished her son to:

**Joi:** …find you some friends that have the same track of mind, and then all of you all will be all right. So, that’s what he’s taken from elementary to middle school; find friends who all they think about is focus—A’s, B’s—no distractions and that’s what he’s done (personal interview, October 19, 2015).

As a result, the parent concluded that this advice helped her son to stay focused and become a “straight A” student. Zeus also shared that sentiment and added another benefit of like minds working together:

**Zeus:** …we’ve always encouraged her to get with that smart kid. Pick your circle. You’ve got people that want to be high achievers; you want to hang out with those people, all that will do is push you and make you better (personal interview, October 20, 2015).

Thus, the like-mindedness suggested that peer associations with similar students with a desire to learn and to be successful are beneficial to their children. Each day at Success Middle School, in school uniforms, with tucked in shirts and belts, students began each morning with an outward demonstration and affirmation of their character and leadership qualities as they recite the school creed:

Who Am I?
I am a [redacted].
I am a leader among leaders.
I lead positively by example daily.
I have impeccable character.
I work to improve myself and others around me.
I am your future leader of tomorrow.
Who am I? I am a [redacted].
As students repeated this creed every morning, their aspirational capital (Yosso, 2005) was building within giving them hope to see beyond their current circumstances and propelling them to a greater future.

Families who choose to come to Success Middle School must apply through the lottery system. The application process corroborated that attending Success Middle School was not a haphazard decision but was a deliberate act. A parent who lobbied the District to open a theme middle school in 2006 pointed out:

**Ann:** ...it’s very simply, the lottery process, because not everybody can get in and because you do have to take the steps, the extra steps, to want your child in this environment. It doesn’t guarantee that we’re going to be like-minded, and like-minded for me really boils down to having the same moral conduct—we can disagree—but we basically come back to the same standing of this is where I feel right and wrong is and assuming that family structure, whatever that looks like is being guided and directed through the best interest of the kids. (personal interview, September 29, 2015).

Conversely, other participants viewed the lottery system as an explanation of why parents participated less once their children had been accepted. Sherri’s position was that the lottery system gave parents an excuse to not be as involved or as accountable once they were able to secure their child a place in the school. She speculated:

**Sherri:** …I think you’ve got a fair number of kids here who the parent did whatever they needed to do to get the child in the lottery, to get the child in the school, and they did what they needed to do; then they say ‘I’m done’...The parents have gotten them a nice daycare with a good reputation (focus group interview, September 10, 2015).

While Sherri points out that there may be disagreement among parents’ motives, her perception was that parents had succeeded by using their navigational capital (Yosso, 2005) and by going through the arduous lottery process to secure a seat for their child at
an elite public school. Success Middle School has consistently ranked in the top five middle schools in the district, and several of the participants referenced the school as if it were not a public school; they viewed it as a private-public school because of the academic rigor and high standards. A comment about the perception of theme schools was:

**Marci:** …theme schools have a higher standard, I believe. Even though it’s the same curriculum, it’s like the theme school is at a higher level. They have more options of advanced classes, and I think there’s more parent involvement which, at the end of the day, it does help (personal interview, October 15, 2015).

The unique parent volunteer requirement can be fulfilled during school hours or during activities after school and on weekends. This provided families the opportunity to advance their social capital and familial capital by spending time with the faculty and with other families of children currently enrolled in the school. Joi considered interacting with other parents a major benefit for the theme school concept:

**Joi:** I love my peers. I love to see them in the hallway because some of us come from the same background, the same schools. …‘Hey did you hear about the opportunity to do some volunteer hours?’ We keep each other abreast about what’s going on at the school. So we work together. If you’re not getting the information, let’s figure out why didn’t you know about this resource. If not, let me give you a hands-on personal contact to help get you what you need so you can stay focused with your child (personal interview, October 19, 2015).

When parents and children were provided opportunities to come together in many different ways, there was increased communication, collaboration, and a substantial exchange of knowledge. The navigational capital was expanded through these myriad connections.
The theme school parents appear to exude the influence of the Nigerian proverb that “It takes a whole village to raise a child,” meaning that it is the responsibility of the immediate family, the extended family, the neighbors and friends—the whole community—to provide nurturing and support. The parents expressed that Success Middle School was a part of their village community, and the participants lived the village concept because they considered helping others as a core value. The strength of the familial capital is evidenced in the participants’ narratives. Not only did the parents have a commitment and an obligation to the well-being of their own children, but they felt that responsibility towards others. For example, Ann shared her philosophy about the village concept with another parent:

**Ann:** …the parent said to me, ‘You’re always worried about other people’s kids’ and I thought about it and I said ‘Well, I think it’s because my philosophy is if I help the masses, my child will get what she should get and then it’s bigger than just my child and then that’s how we build a solid community and everybody is lifted up.’ And she said, ‘Not everybody got time to do that,’ and I said ‘Yep, that’s true, but if each one picks one and does something with that ONE, that’s not yours, that’s not yours, ‘cause you’re going to make it happen for yours, then we all get better’ (personal interview, September 29, 2015).

Ann was not contented to be only concerned about her children. She understood that for her village to thrive, she had to reach out and assist others, so the collective group would improve.

Poignantly describing her philosophy of responsibility to the greater community based on some of her childhood experiences Sherri revealed what she saw from her family and from her community.

**Sherri:** Those who get more, more is expected of you. But that’s how I was raised; that’s how my parents raised me. That’s what the people that they (parents) hung out with did—you take care—it
looks different because when my dad was growing up there were, in the house he grew up in there were three generations. He was raised by his grandmother and he was raised with his aunts and uncles. We don’t necessarily always bring our old folks into our house, but we do take care of community. It’s not quite the same now—it used to be you would walk down the street and you got in trouble at one house, you got beat at each house as you walked down the street by the time you got home. But that’s still in me—wherever in West Africa we originated from—it takes a village, and I may have things that I know that I need to share with you for your child and there may be some things that you know that you need to share with me for my child (personal interview, October 22, 2015).

Expressions of caring and advocacy for their community—whether it was the school community, the village community or the family community—were articulated by parents and students. Many students expressed their desire to help other students and to offer assistance when their peers could not understand a concept in class, again demonstrating the village concept modeled by their families. Students appeared to have complete confidence that there would be assistance in developing a clearer understanding of mathematical concepts. Peers and family, including fictive kin, were documented as resources available to aid with mathematics. Students expressed their efficacious systems of support:

**Athena:** I would use YouTube or call my relatives who are really good at math.

**Cheryl:** So you have some relatives that are good in math. Who do you usually call?

**Athena:** My aunt or my grandma or my aunt’s friend because she is a math teacher (focus group interview, September 16, 2015).

**Trina:** When I don’t understand something in math that I learned in class, I either call my grandma, ‘cause she used to be a math teacher or I use YouTube (focus group interview, September 16, 2015).

Athena and Trina both expressed that they would call grandparents or would use technology to assist them. Both students considered their relatives stronger in
mathematics than their parents as resources in explaining mathematics. They also had access to people who were mathematics educators, thereby feeling confident in their mathematics abilities.

**Nia:** Well, the first thing I would do is to go to my mom or my aunt. Well, they know how to do it (math), but they do it in a different way than what teachers teach now, so I wouldn’t understand it. So I would go into my room, and I would call my friends from my class, and we would all work together (focus group interview, September 16, 2015).

**Smiley:** First, I will ask my mom, and if she doesn’t know how to do it (math), then I ask my friends, and if they don’t know how to do it, I will go on the Internet and if it doesn’t really help me then, like all of my teachers have a reference where I can contact them, so I would ask them for help (focus group interview, September 16, 2015).

**Elise:** My grandfather, he’s really good in math, so if I’m over at his house, I’ll ask him for help, but sometimes our parents don’t know like the new technique that our teachers taught us, so I probably would go to tutorial, have my tutor help me, or go on the Internet (focus group interview, September 16, 2015).

**Gavin:** Ok, so when I don’t get something, first I ask my mom, and she helps the best way she can, but if that doesn’t work, then I try to look online and look for tips that can help me. They don’t necessarily have to be videos; they just have to be like tips and like my mom may sometimes use a calculator to help me (focus group interview, September 16, 2015).

Based on this initial dialogue, students relied on parents, textbooks, electronic resources, aunts, grandparents, tutors, peers, and their teachers. The varied responses reflected use of technology along with a community of people to be responsive and engaged with their questions about mathematics. The students were clear about their ability to access the needed support when they were unable to do the work on their own. Therefore, they did not feel at a loss for ways to get their questions answered.
Further, the students and parents saw a shift from parent support to peer support. Wentzel (2002) documented that peer goals influence and play a positive role in students’ academic goals and motivation. As parents become less comfortable with middle school mathematics content (Hill & Tyson, 2009), peers reach out to support and to be supported by their peers. Specific situations were described where students felt a greater sense of comradery and support from their fellow classmates for problem solving and for dialogue about mathematics:

**Joyce:** Like now days, I used to go to my brother all the time and I still do, but I also call my friend because she’s very intelligent in math and stuff like that and she knows it very well (personal interview, December 10, 2015).

**Mark:** I think it’s good for people to help each other out, so they can learn what they’re being taught without having to ask the teacher all the time. And then they don’t have to go to tutorial all the time; they can just ask their peers (personal interview, December 15, 2015).

**Cheryl:** Do you ever help some of your classmates who struggle with math?

**Smiley:** A lot of them! Like, usually I understand it faster, so they will be like, ‘What? I don’t get this, will you please help me?’ So, like let’s say, I’ll be passing like a paper or a calculator out and someone will say, ‘Smiley come here, please help me with this?’ So, I will help them, and all of a sudden they will get it just like that! Because, like I put it in a certain way. Some teachers put it in a difficult way to understand, but I gain ALL that information, rearrange it, and put it in another way for them to understand (personal interview, November 30, 2015).

When Smiley said she gained the information, rearranged it and put it in another way to help peers understand, she demonstrated an active and a reflective process of learning. Martin (2000) explained those opportunities as being important to mathematics socialization, and identity strengthened through those types of peer to peer interactions and support.
Central to “It’s A Family Affair,” literature suggests that there are important aspects of the home environment that support student achievement. Tang and Davis-Kean (2015) stated that “parent engagement in children’s learning, a warm emotional climate, and a cognitively stimulating home environment” (p. 873) are key factors in a students’ academic achievement. Furthermore, Jeynes (2005) asserts that the time spent communicating with children and explicit family expectations are more influential on student achievement than other factors. Clearly, throughout the data, students articulated their own expectations and their family’s expectations for them. The shared stories of a caring, stimulating, warm emotional climate are palpable. Students delineated some of their families’ expectations:

**Mark:** My family wants me to have good grades, not to get in any trouble, and they expect the best out of me.

**Cheryl:** What does the best out of you look like?

**Mark:** Like to keep trying and not giving up and showing integrity.

**Cheryl:** Integrity? So what does that mean to you?

**Mark:** Honor, showing ownership, and being trustworthy and being responsible (personal interview, December 15, 2015).

Mark expanded his family’s expectations to include character traits such as integrity and honor. To him, it was more than just making all A’s, he also wanted to be an honorable person and one who was willing and able to help other students. Mark understood that his family wanted the best for him, not just academically but strong character traits—such as integrity, honor, trustworthiness, and responsibility.

**Cheryl:** What are your mom’s expectations about how you do in school?

**Gavin:** Well, my mom really wants me to do well because I’ve been getting a perfect ‘A’ streak since first grade, and my mom wants me to do really well. She knows that the streak might end someday, but she still wants me to do well, even after that happens because like she doesn’t want me to give up and slack off.
Cheryl: So how do you feel about having this perfect ‘A’ streak? If it ever comes to an end, how are you going to handle it?

Gavin: I would weep for the rest of the day. I don’t know what I would do because I don’t want to think about it. And my mom said if I cry, she said she’d be there with me (personal interview, December 9, 2015).

Gavin’s comments were striking because due to his autism diagnosis, he is emotionally sensitive. He knows that if something is especially difficult for him, he has the emotional support from his mother, knowing that he would not have to bear the burden alone. The students continued with family expectations:

Cheryl: What are your family’s expectations about you with school?

Elise: No ‘C’s.’ If I come home with a ‘C’, it’s all over for me! My family just wants me to do my best in school. Have fun, but also remember that you’re here for one reason. You can have all the friends, but just one reason in general, you just need to get that schoolwork done so you can be successful in life (personal interview, November 17, 2015).

Nia: My mom expects me to be the best I can be because she’s really big on college. She’s really big on me making it, letting me get up higher and higher. She says you have to do this and you have to do that. And now here I am talking like my mother to my little cousin. I’m just like, ‘What is wrong with you? You don’t know this? You have to know this or else you’re not going to end up in college; you’re not going to have a good job.’ I’m like, ‘Oh my God, I’m sounding just like my mom!’ (personal interview, November 16, 2015).

Every student had a similar message of high expectations and support from their parents. The students had connected doing well in school with being successful in life.

Most of the students had a record of success, and they wanted to continue on that path. Students had internalized messages of high expectations, so when Nia described herself as sounding like her mother, she is passed similar expectations down to her younger cousin. Family values and expectations were at the forefront of the student participants’ thoughts. A persistent, driving motivation expressed by the parents was the desire for
their children to go beyond the parents’ current level of attainment. These parents were committed to ensuring that their children live a better life than they lived. They wanted to pass their baton to a generation of children who would be better equipped to race even faster to the finish line. They shared this commitment:

**Marci:** And I did because I know what I didn’t have and what I would like to have had, because as parents, we always want our kids to do better and just have a better life than we did—no matter how great our life is; we want our kids to have a better life (personal interview, October 15, 2015).

**Joi:** So I’ve instilled that with Mark. You have more to do. I want you to be better than me. I want you to be better than me, better than your dad. So I think he’s taken that seriously and he always tells me, ‘I’m smarter than you!’ Okay, well if you feel like you’re smarter than me, then guess what, you’re smarter than me…(personal interview, October 19, 2015).

**Sherri:** Do most people think my ceiling is my child’s floor? I do. It is important for children to rise above where they were raised. My parents grew up in the country picking cotton. Dad became a doctor and worked for someone. I became a doctor, but I own my practice. I was in my 40’s and Elise was under 10 the first time we went to Africa. We move up because it is expected that we will move up (Appendix G, Journal Entry, October 2015).

**LaToya:** Because, like, I’m the only one in my family to go to college and she said to me, ‘Mommy, I’m going to be just like you. I’m going to go to college too!’ I said, ‘No baby, you’re going to do better than me!’ She’s going to get her Masters or her Ph.D. (personal interview, October 28, 2015).

More than anything else, parents provided their children with aspirational capital (Yosso, 2005) to move beyond where they are in life; they wanted a better life for their children and that was a strong motivation to be engaged on various levels with their children’s educational goals.
Summary

Changes in the mathematics classroom environment, such as the use of current technology, have impacted the ways parents and students engage with mathematics. Parent engagement with students in teaching and learning mathematics enhances students’ learning and helps students to understand the need for mathematics in their daily lives. Parent engagement can occur in a variety of forms and on many different levels.

Success Middle School is a theme school which encourages parents to be engaged in the learning process in and out of school. Overall, the parent participants in this study wanted to learn more about the new techniques being implemented in the teaching of mathematics in order to effectively engage with their children in providing support at home.

Three major communities impacted the formation of mathematical identities of the student participants: the family, the school and the village. More than two thirds of the students expressed a high degree of competency in their mathematical abilities. All students had internalized knowledge of their expectations and of their family’s expectations.

Parents wanted to provide their children with the best opportunities for success in the home and school environment and looked to partner with other families and students who shared the same commitment to a quality education. The families felt connected by like-mindedness of both the students and the parents. The partnership among the families, the school and the peers was strengthened, based on a strong sense of community.
CHAPTER 5
DISCUSSION, IMPLICATIONS, AND CONCLUSIONS

It has been established that educators and policy makers are concerned about our country lagging behind other countries in mathematics, and African Americans continue to have the widest gap with little movement towards narrowing that gap (National Center for Education Statistics, 2015). With the recent reform effort of Common Core State Standards, students are being prepared to be college and career ready for the 21st century, which includes proficiency in mathematics. This study explored the following research question: How do African American families, with middle school students, view learning mathematics and engagement within a theme school environment? The researcher examined the substantive dialogue of parents and of children about their experiences with middle school mathematics. The participants shared experiences, past and present, about their relationship with mathematics and how they were engaging with the subject.

The findings revealed consistencies with existing research and theories about the impact of parental engagement and added to the research literature by concentrating on the voices of the African American middle school parents and students. The meager body of research about middle school African American parents and students in a unique school setting underscored the urgent need for this research.

During the period of data collection, a parent volunteer distributed a document entitled “It’s a Family Affair.” While perusing the document, the familiar lyrics of a song with that same title by Sly and the Family Stones emanated in my consciousness, and
meaningful lyrics from different songs continued to permeate in the interpretation of the data. Hence, discussions of major findings have been introduced with related lyrics from the soulful music of the 1960s and the 1970s.

**Discussion**

*Wake up everybody, no more sleepin’ in bed,*  
*No more backward thinkin’ time for thinkin’ ahead*  
*…Wake up all the teachers, time to teach a new way*  
*Maybe then they’ll listen to whatcha have to say….*  
([http://www.azlyrics.com/lyrics/teddypendergrass/wakeupeverybody.html](http://www.azlyrics.com/lyrics/teddypendergrass/wakeupeverybody.html))

Just as the above lyrics infer, parents acknowledged that they saw teachers teaching a new way. The data showed the stark contrast between the “old school” parents and the “new school” students in their varied approaches to mathematics. For many parents, mathematical competencies and skills presented in a different format appeared “foreign” or “new” (Jackson & Remillard, 2005). The parents perceived that mathematical topics were introduced much earlier than when they learned the material, and the content is a different format in the way students are taught. Parents shared they did not learn to think about mathematics in the ways their children were exploring and were developing their mathematical knowledge. Shay, who taught first grade in an elementary school, identified that she was never encouraged to find a variety of strategies for solving problems. She was given one way, and that was the way she was expected to process the information. In the “old school,” students were given one algorithm to solve a problem, and they were not encouraged to consider other solution methods, whereas in the “new school,” students worked with technology and engaged with their peers to discuss and to find multiple ways to arrive at solutions. Parents repeatedly expressed how the emphasis is now for students to be able to write their thoughts and justify how
they arrived at their answers. “Old school” meant remaining at lower level thinking skills and rote memorization while “new school” meant having strong mathematical literacy, which is the “capacity to formulate, employ, and interpret mathematics in a variety of contexts” (PISA, 2015). Students were using their conceptual thinking and reasoning skills to predict and to explain real-world mathematical problems, not a problem set using the same algorithm.

The major area of agreement among the parents was that mathematics education had more flexibility now than when parents were in school. Students had technology resources such as the Internet, YouTube, online tutorials, and smart phones, and both agreed that they could take different routes to solving a problem but still arrive at the same destination. The parents felt equipped to review their children’s homework but were often reluctant to offer assistance, because they did not want to add to their children’s confusion about a topic. Therefore, they were hesitant to directly engage by showing a different problem solving method.

However, even though parents thought that the “new math” was challenging and was more difficult than when they were in school, they had confidence that most of the time, their children were not having the same difficulties. The parents were challenged but felt comfortable learning new strategies from their children. The children also learned from their parents, but they felt competent to teach their parents new techniques. There was an exchange of ideas between the parents and the students, and their mathematics identities were strengthened in this process of engagement. These opportunities for exchanging ideas and knowledge continued to further develop the parents’ and the students’ socialization of mathematics and overall knowledge of
mathematics. Currently, students have to be active problem solvers, meaning they are required to use higher level cognitive skills while processing mathematics on a deeper conceptual level than used in the “old school.” As a result, it is more difficult for “old school” parents to understand how to engage and how to support their “new school” children with discourse about mathematics.

Happy feelings in the air, touching people everywhere
Plenty love and everything, listen to the people sing
…Tell all I see that these happy feelings
I spread them all over the world, from deep in my soul…. .

Happy feelings, which mean possessing a positive mathematics identity and recognizing the utility of mathematics were the sentiments shared by the majority of the participants. Throughout the narratives, parents and students had been exposed to a lifetime of identity messages and emotions about mathematics (Martin, 2000). Although the participants came from varying family backgrounds— some were professionally employed, and others were manual laborers—all of them had deep connections with using mathematics in their everyday lives, and they expressed the complex nature in their daily interactions with the subject. Parents and students expressed varying emotional levels about mathematics, from the “happy feelings” that Smiley experienced to enjoying the challenging aspects of mathematics that Athena experienced. Often, it appeared that the parents’ strong mathematics identity and love of mathematics were inherited by their children. As demonstrated in Martin’s (2000) framework, the students’ beliefs about their mathematics abilities were influenced by the positive school and family dynamics surrounding them. Participants realized the importance of being mathematically competent and mathematically literate in their daily lives. Most important, the students
felt nurtured and supported in various ways by their family, by their peers, and by the greater community.

When I think of home
I think of a place where there’s love overflowing
...Suddenly my world has changed its face
But I still know where I’m going....
(http://www.azlyrics.com/lyrics/dianaross/home.html)

Home is the foundation and the root of families’ collective identity, purpose and expectations. The results of this study demonstrated that the aspects of aspirational capital, familial capital, navigational capital and social capital from Yosso’s (2005) Community Cultural Wealth framework are strong in the African American home and community. Parents recounted examples of how they set high expectations and how they encouraged their children in mathematics by demonstrating aspirational capital. The students knew and could articulate what was expected, for example, going beyond and doing better in life than their parents had done.

Parental expectations about higher education, opportunities for real world mathematical connections, and exposure to careers in areas of mathematics were consistent with extant research as important areas to promote academic achievement. Using opportunities to connect African American children as “doers” and “learners” of mathematics at an early age also encouraged them to stay connected to the subject matter and to acquire strong mathematics identities.

Figure 1 below illustrates the engagement relationships presented in the data—with the student as the center or nucleus. While the initial research question focused on perceptions of parent engagement with their children, the data revealed a wider community of engagement between the students, the family and extended family, the
theme school and peers, and the village community. Surrounding the student are these various layers of support—closest to the students are the family and the extended family. Moving outward is the enveloping of the school and the peers, and the outermost layer enfolding everything is the village community, which includes business and organizations invested in student learning. These circles are more like porous membranes because all three areas contribute to the mathematical competency of the middle school students. Students are surrounded by several layers of support that provided aspirational, familial, social and navigational capital to undergird a positive cultural climate for nurturing and supporting opportunities to learn mathematics. This representation gives a visual picture of how the students, the parents and the greater community drew strength from each other and describes how the school and community environment impacted student and parent engagement.

![Figure 1: Illustration of Engagement Community](image.png)
Significance of the Study

This research study is significant because it will add to the sparse pool of existing research that refutes the deficit view that African American families and communities are not engaged with their children in learning mathematics. The study provided significant data about how African American families, with middle school students, viewed learning mathematics and engagement within a theme school environment. While families at this Title I school lacked significant financial wealth, the school was rich in the types of Community Cultural Wealth (Yosso, 2005) that families brought to the school, and the students were further enriched through interactions and relationships with others in the theme school environment.

Further, since the adoption of the Common Core State Standards, parents are sharing their confusion about how mathematics is taught and are asking for more information about practices in mathematics classrooms. According to Jeynes (2012), there is not an abundance of research in the area of parent engagement with mathematics. Significantly, this study further explored the hesitancy of parents to be more involved in engaging with their children outside of school, but they expressed their desire to better understand the current mathematics educational practices. Moreover, illustrating that engagement encompasses more sagacious forms—such as support, encouragement, upholding high expectations, family values, academic assistance, teaching, and demonstrating resourcefulness for children—may enhance the understanding of the importance of strengthening mathematics competencies for parents, students and teachers.
Implications for Education

Compelling thoughts from Danny Martin (2000) included “In many ways, African American parents and community members are the conduits for change in helping reverse problematic achievement and persistence trends among African American students. They must stress more forcefully the importance of mathematics knowledge for their children” (p. 187). This statement implies that encouraging and supporting parental and community engagement may be the catalyst for positive change in mathematics education. There is a need for educators to help empower parents to be able to assist students at home, for example, explaining how to use technology as an existing tutoring site and how to incorporate mathematics in everyday conversations. Based on parents’ descriptions of their confusion about the “new math,” this is an area where more attention should be focused in order for parents and children to have a better understanding about why they need to collaborate and approach mathematics from a deeper conceptual level. As explained in my positionality statement, my life experiences as a mother, as an educator, and as the daughter of educators shaped the reason this research was important to me and the reason it has also reshaped practices in my mathematics classroom. I am more sensitive to strengthening areas of partnership between my mathematics classroom practices and the families of my students. As a result of my research findings, I electronically send out messages to families each week about the topics that will be covered in class. I also offer suggestions of conversations that they can begin with their children, and I provide real-world examples of the concepts. The response has been overwhelmingly positive. Parents are sending examples they have created at home, demonstrating the applications of the concepts. In addition, I have been sharing my
research with other mathematics educators, and as a department, we are now committed to providing a Family Math Night each semester where parents will be learning concepts similar to their children in a mathematics classroom setting. The Family Math Night was a tangible result of suggestions from the parents in this study.

Other specific suggestions were made by the parents:

- **Parent Buddy System**

  Incoming sixth graders would be paired with rising eighth grade parents. These parents would be able to give helpful suggestions, answer basic questions and provide similar “peer” support as observed with the students.

- **Semester Preview Party**

  Parents would be invited each semester to preview the topics that their children will study during the semester in mathematics. Parents would complete a task that students will be assigned and learn about the Standards of Mathematical Practice, for example, and work in groups to solve the task. The mathematics department could provide parents with a resource “toolkit” where they have some general helpful hints for the topics being discussed, and websites to readily assist them.

- **Parent University District Workshops**

  Parents would learn the mathematics course sequences and participate in hands-on mathematics enrichment sessions similar to Helping Ourselves Mold Education (Cousins & Mickelson, 2011, p. 3). These meetings could be located at various community areas, such as churches, libraries, community centers or at schools to provide convenient times and locations for parents.
Educators will need to continue providing a welcoming, inviting partnership with parents and solicit community support, for instance, developing a speaker series with different local businesses that will share how their daily work involves mathematics.

Burke and Sass (2013) and Hart and Figlio (2015) both researched and gave policy decision insights when considering the implications about school choice and peer effects on academic achievement. Accordingly, using caution in the interpretation, there is evidence for a connection between achievement with composition and stratification which occur in the school systems that allow families to choose their schools. This research substantiated that the strengths and resiliency of the participants may be related to the choice of the theme school program. Consideration should be given by district administrators to expand the theme middle school concept model to larger student populations.

**Reflections and Limitations**

There were four areas in which this study was limited. First, according to the United States Census Bureau, 23% of families have one child. It was important to discuss the makeup of the lives of the families that I described in my research and the impact it may have had on the findings. Most notably, 67% (6) were families with only children; 22% (2) had two children, and 11% (1) had three children. There are certain inherent, unique factors within families with one child. In the research conducted by Roberts and Blanton (2001), only children have an advantage intellectually. They also have an advantage of not having to share parental resources—emotional and financial with other siblings. Their findings also indicated that there was a close bond between only children and their parents, characterized as having the undivided attention of their
parents. Some of the only children indicated that they felt pressure and believed that they were “their parents ‘only chance’ and thus believed that their life failures and/or successes impacted greatly upon their parents” (p. 132). Since the majority of the participants were in the “only child” category, I had to consider the impact that had on my research. I did sense that a reason these families agreed to participate was because of their family make-up. They had more time to invest in this study because they only had one child at home with which to be involved. Their schedules did not have to be compartmentalized with multiple children. All of their attention could be devoted to one child when it came to homework, checking websites, and managing day-to-day activities. Therefore, my findings may have offered more challenging scenarios if participants had four or five children in school. The only family in my study that had three children was an older family with a daughter in college, a daughter in high school, and a daughter in middle school. Thus, to offer balance to the findings, the issue of “only” children was an important aspect to my study.

The second area of consideration was my involvement with my participants. I taught all the student participants and some of their siblings at Success Middle School; however, during the participant recruitment phase, efforts were made to provide all seventh and eighth grade families an opportunity to participate in the study. Because of my relationship with the participants prior to this research study, I viewed my role as a “collaborative partner” (Merriam 2009, p. 125). Some of these families have known me for more than five years, and they knew I was enrolled in a doctoral program. On some emotional level, by agreeing to participate in this study, they were also showing their admiration and respect for me as their children’s former teacher. I do not consider this as
pernicious to the study; in fact, it aided my participants in feeling comfortable with sharing their lives with me in more detail as an ally to their plight.

The third limitation was that I did not seek students that were successful with mathematics, but for the majority of my participants, this was their story. My research was about how all types of middle school families were engaging with mathematics. Naturally, there would be an inclination to be interested in topics that one had displayed success, passion, and for which they had perseverance and tenacity. Although families shared this interest, there were still varying abilities and levels of success within my participant group.

Finally, every participant was asked to journal and to bring the journal back weekly for me to scan their pages. I did not get consistent compliance after the first week of this process. The participants did turn in their final journals, after several reminders, emails and tracking them down at school. Most of the information put in the journals had also been discussed during the interviews. Therefore, I did not obtain significant amounts of pertinent new data from the journals. In reviewing this limitation, I considered that this may have been attributed to African American linguistic capital (Yosso, 2005) which embraces the rich heritage of the oral tradition of storytelling, rather than journaling.

**Future Research**

There are implications that more research needs to be conducted with African American parents, students, and community members in teaching and learning mathematics in middle school. Additional ideas for future research are:
• Conducting a follow-up study of the students during their 4th year of high school to explore further development of mathematical identities.

• Conducting a similar study and including the practices of mathematic teachers as to how they view and how they support parent engagement and the implications in the classroom.

• Conducting a similar study but interviewing parents that entered 6th grade with an assigned parent buddy and interviewing parents that did not have an assigned buddy in the 6th grade.

**Conclusion**

*We who believe in freedom cannot rest*
*We who believe in freedom cannot rest until it comes….*
(http://www.bernicejohnsonreagon.com/ella.shtml)

These lyrics were composed by Bernice Johnson Reagon who organized and sang in an African American women’s a cappella group called Sweet Honey in the Rock. In 1983, she composed Ella’s Song to pay tribute to Ella Baker, a civil and human rights activist. Ella Baker was a teacher, an intellectual, and a behind the scenes grassroots organizer who worked with over three dozen organizations and touched countless lives (Ransby, 2005). Staying true to my musical journey in this research, this song made its way into my spirit. Ella Baker made a powerful statement almost fifty years ago which I discern as true today in regards to our educational system:

> In order for us a poor and oppressed people to become a part of a society that is meaningful, the system under which we now exist has to be radically changed. This means that we are going to have to learn to think in radical terms. I use the term radical in its original meaning—getting down to and understanding the root
cause. It means facing a system that does not lend itself to your needs and
devising means by which you change that system (Ransby, 2005, p. 1).

It is apparent that the educational system must be radically changed, and in order to change the system, we must understand the root causes and effects and take the responsibility to change that system. There are countless theories about solutions to mathematics education. However, research indicates that more scholarly work needs to be done with successful African American families in educating their children. At Success Middle School, there was a strong sense of mathematics identity and camaraderie in the school and family community. This study provided a glimpse inside the web of mathematics connections between school and families, showing connections and/or commonalities. There may be practices and information to be extracted from interactions with parents, their children, and their children’s schools. Stinson (2006), Berry (2005), and Martin (2000) have made a plea to give more attention to success stories of African American males. I argue that we must not only give more attention to success stories of African American males, but we must also give more attention to scholarly research on successful African American families and their practices. It would be beneficial to know and to incorporate some of the habits, history, attitudes and experiences that promote fortitude, perseverance, and strong mathematics identities to aid African American families navigate through the educational system.
References


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Epstein, J. L. (2010). School/family/community partnerships: Caring for the children we share: When schools form partnerships with families and the community, the children benefit. These guidelines for building partnerships can make it happen. *Phi Delta Kappan, (3),* 81.


February, 2014  
Letter of Informed Consent

I agree to participate in the dissertation research, entitled Families in the Middle: Mathematical Engagement in the Home Environment which is being conducted by Cheryl Pappy, (6th Grade Mathematics Teacher). I understand that this participation is voluntary and that I may withdraw my consent at any time without penalty.

The following points have been explained to me:

1. The reason for the research is to better understand how families assist with mathematics at home and how our school can better assist in the partnership between home and school. I understand that I will receive volunteer time hours, if approved by the Principal. Although there will be no direct benefit to me for taking part in this study, the valuable information that is shared will further the research of parent/family engagement and mathematics education.

2. The procedures are as follows: I will participate in a focus group with other parents in the study. I will be contacted to schedule an interview and will be asked a series of prepared questions, either at The Success School or by telephone. Extensive notes will be taken during the interview. I give approval to the researcher to take notes and audiotape all interactions. I understand that I may be asked to answer additional questions. At this time, I may decline to participate if a follow up interview is needed to clarify previous answers. The time involved will be between 45 minutes to one hour per session, depending upon the depth of the conversation. I will also be provided a notebook to write down math interactions with my child for a period of one month. The journal will be collected every week for one month.

3. I understand that my child will participate in a focus group with other students and be interviewed by the researcher to discuss how they study mathematics at home. This interview will take place at the school. The researcher will contact me in advance to schedule the interview either before school, during connections or after school in the media center. My child will also be provided a notebook to write down any thoughts about mathematics. My child will also be given journal prompts to use with their journal. The journal will be collected every week for one month.

4. The discomforts or stresses that may be faced during this research are: There will be times when I will be asked personal questions about my experiences and support of my children regarding mathematics. I understand that I may choose not to answer any
questions that I am asked. I also understand that I may withdraw from this study at any time without any consequences.

5. Participation entails the following risks: I understand that I will be sharing personal information with the researcher who will be using this information to write a dissertation. I also understand that this personal information will not reveal my name or any identifying characteristics and all audiotapes and transcriptions will be destroyed after one year. There are no other known risks in this study.

6. The results of this participation may be used for future research, publications and conference presentations. Pseudonyms will be used to protect the privacy of the research participants.

7. Inclusion criteria for participation: All participants receiving this consent document must be 25+ years of age and must be the parent or guardian of a child at The Success School.

Signature of Investigator, Date

__________________________________________________
Signature of Participant or authorized representative, Date

PLEASE SIGN BOTH COPIES, KEEP ONE AND RETURN THE OTHER TO THE INVESTIGATOR

Research at Kennesaw State University that involves human participants is carried out under the oversight of an Institutional Review Board. Questions or problems regarding these activities should be addressed to the Institutional Review Board, Kennesaw State University, 1000 Chastain Road, #0112, Kennesaw, GA 30144-5591, (678) 797-2268.
Appendix B

Research Study Assent Form (11-14 Year Age Range)

Study Title: Families in the Middle

Researchers:

Cheryl Pappy
Cheryl_D_Pappy@fc.dekalb.k12.ga.us

My name is Cheryl Pappy and I am a 6th grade teacher at your school. I am also a student at Kennesaw State University.

I am inviting you to be in a research study about how you study math at home.

1. Your parent knows that I am asking you to be in this research study, but you get to make the final choice. It is up to you. If you decide to be in the study, I will ask you to talk with other students about how you work on mathematics at home. A few weeks after the first meeting with other students, I will also ask you to talk with me for about 30 minutes to answer some questions about your experiences working on math at home. I might record our conversations, but I will always let you know when I am recording. I will also give you a journal and ask that you write your thoughts about mathematics. If you cannot think of anything to write, I will provide you with journal prompts. I will ask you to write in the journal for one month.

2. If you take part in this research study, you might be able to help other middle school students understand how you study math.

3. I don’t think anything bad would happen if you decide to take part in this research study, but some kids might get tired of sitting still while they answer questions. We will take a break if you need to.

4. If anything in the study worries you or makes you uncomfortable, let us know and you can stop. There are no right or wrong answers to any of our questions. You don’t have to answer any question you don’t want to answer.

5. Everything you say and do will be private. I won’t tell your parents or anyone else what you say or do while you are taking part in the study. When I write about what I learned in the study, I won’t tell them your name or the name of anyone else who took part in the research study.

6. You don’t have to be in this study. It is up to you. You can say no now or you can change your mind later. No one will be upset if you change your mind.
7. You can ask me questions at any time and you can talk to your parent any time you want. I will give you a copy of this form that you can keep. Here is the name and phone number of someone you can talk to if you have questions about the study:

Name: Dr. Desha Williams  Phone number: 

Do you have any questions now that I can answer for you?

IF YOU WANT TO BE IN THE STUDY, SIGN OR PRINT YOUR NAME ON THE LINE BELOW:

___________________________________
Child name and signature  Date

Check which of the following applies (completed by person administering the assent.)

1. Child is capable of reading and understanding the assent form and has signed above as documentation of assent to take part in this study.
2. Child is not capable of reading the assent form, but the information was verbally explained to him/her. The child signed above as documentation of assent to take part in this study.

_______________________________________
Name of parent who gave consent for child to participate

________________________________________
Signature of person obtaining assent  Date:
Appendix C

Interview Protocol Questions

Time of interview: __________________________
Date of interview: __________________________
Location: __________________________________
Interviewer: ________________________________
Interviewee: ________________________________

Title: Families in the Middle: Mathematical Engagement in the Home Environment

Research Purpose: The purpose of my research is to explore how parents engage their children in learning mathematics outside of school.

Sample Interview Questions Parents:

1. Tell me about your family structure, how many children, ages and grades.
2. Tell me about your experiences with math.
3. Tell me about your child’s experiences with math.
4. How do you talk with your child about their math homework or their math class at school?
5. How do you assist with mathematics homework/studying math at your home?
6. How is the homework your child brings home similar or different to what you had in school? What are your thoughts about these changes?
7. Has middle school brought any challenges to your family in the area of mathematics?

8. What are some of the ways you support your child with their mathematics homework? What kinds of things do you do?

9. How is the way your child is learning mathematics similar or different from how you remember learning mathematics?

10. How do you find out about what your child is learning in mathematics?

Sample Interview Questions for Students:

1. How do you feel about math? Why?

2. How do you think your family feels about math? Why?

3. What are your family’s expectations about school?

4. How do you view yourself as a math student?

5. Do you think math is important for you to learn? Why?

6. Tell me about how you do your math work at home?

7. How do you get help when you don’t understand something in mathematics at home?

8. What do you do when you get frustrated at home with mathematics?

9. Where do you see anyone in your home or community using math? Can you give me some examples?
Appendix D

When I first introduced to Common Core, I had to grasp it myself. In order to help with homework I had to boost up my learning. I began math in a traditional way. I learned Common Core tools along with my son with the different patterns and connections needed to look at the Common Core math to gain the answers. I attend all the Math Night forums offered by the County for parents and I try to help it build off.

Appendix E

Last year we had big 20’s like this year. They are more advanced and I ask my aunt’s friend for help. The big 20’s really help you understand the concept. So far I only had one but it really helps to understand multi-step equations. This really put a relief off my shoulder to know that these practice problems really help.
Appendix F

Day 10
Math a Poem

A different world
No end or beginning
A world with only one answer
But different routes to get to it
A world, a different world

A world with numbers
Signs take you all over the place
The land is bland
Colors of fall
And the people
They are smart as ever
A world, a different world

The world is advanced
The people only need their minds
Something that most people can’t find
The smartest live here
Without any type of fear

But their minds are captivated
Locked away
No place of freedom
The land is very seldom visited
But the people outside of the world think this
Because it’s a different world.

Appendix G

Do most parents think my ceiling is my child’s floor?

I went to Africa for the first time in my 40s. Jordan was under age 10.