

The Mediating Influence of a Young Black Girls' Social Network  
in their Mathematics Learning

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THESIS

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This thesis is dedicated to my sweet boy, Anthony.

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MLG

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## SUMMARY

My dissertation examines the mediating role of a young Black girls' social network in mathematics learning and participation in a third grade classroom. Using a variety of analytical methods, including portraiture, social network, ethnographic, and identity analysis, I explore how periods of change within the social network created or foreclosed opportunities for engaging in the mathematics classroom community. I also explore how mathematics is constructed and used socially, as the girls simultaneously negotiate positions within their social groups and the learning community.

This dissertation contributes to the mathematics education research community in several ways. First, I introduce the art and science of portraiture to the field as a mean to synthesize analytical techniques that are suited for micro-, meso-, and macro-levels. An on-going challenge in studying the mathematics learning and participation of Black children, as an example, has been the difficulty in considering macro-level social forces that shape those learning experiences, as well as consider the complexity of micro-level interactions. My dissertation attempts to address this challenge through the use of portraiture as an analytical tool for recreating a whole from its parts. By embracing a methodological eclecticism, I provide several portraits of young Black girls engaged in both their classroom community and social groups.

The dissertation also expands our collective understanding of the community of practice, which has relied solely on aspects of the practice itself (in this case school mathematics) as the primary mechanism for different forms of participation. I argue through the girls' portraits that participation is a negotiation of social structures and

relationships, as well as engagement in community practices. Therefore, mathematics is not only constructed through classroom discourse, but also enabled and made meaningful through particular relationships between children. Implicating social networks into mathematics learning is a step towards providing an account of “doing mathematics while Black” and a girl. In other words, in order to understand the unfolding of a scene of mathematics learning, the values and meanings of Black girlhood must also be considered simultaneously. That is, what drives mathematical participation is bound not only to the objects of mathematics as a body of knowledge, but also bound to the norms, values, and relational structures between Black girls. This dissertation reveals at least some of the inner workings of Black girls’ social structures and their relationship to mathematics participation and learning.



## **I. INTRODUCTION**

### **A Portrait**

In 2012, I worked as a graduate research assistant for the Content Learning Identity Construction (CLIC) research project. The objective of the CLIC study was to focus on the “learning and development in math and science among Black children in Chicago public elementary schools” (Project proposal 4/10/2012). My responsibility, as a doctoral student who was a mathematics education concentrator and a former high school mathematics teacher, was to gather data from the mathematics classrooms. I was embedded in a third grade classroom of a predominantly Black school located on the west-side of Chicago. Over the course of the year, the experiences of the girls in this classroom captured my interest. Of all the images I was able to capture, Figure 1 provides a portrait, if you will, of the mathematics learning and participation for the girls in this classroom. This may not be an image typically conjured when discussing a mathematics classroom, but this is a real image from the study that motivates this work. In this image, Shawna was sitting away from her class with her hooded sweatshirt (or “hoodie”) pulled up, while she is staring at the wall. When I took the photograph, the rest of the class was positioned directly behind me and engaged in a mathematics lesson. Ms. Patterson, Shawna’s teacher, didn’t ask her to sit away from the group. Whether you want to call it agency or consider the structural forces that pushed her, Shawna was sitting there—away from the class. This was not an isolated image nor was it an image that was exclusive to Shawna. However, it is an image of the continual struggle for friendship and group membership in this mathematics classroom community. These friendship struggles pushed girls in and out of social cliques



within the mathematics classroom. This observation—from an educational vantage—could be chalked up to “kid’s stuff” or “girls being girls” if it was not also consequential to the construction of learning experiences. Conflicts and disputes did not stay on the playground or in the lunchroom, these disputes reemerged on the classroom rug, during small group work, and during other learning activities.



Figure 1- A photo taken on 02/05/13.

The girls were engaged in struggles for recognition, relevance, and fair treatment and those struggles, which were visceral and real to them. I took a deep interest in the social relationships and worlds that the girls were building. These worlds were constructed and

enacted according to the girls' own rational set of rules, which included aspects of race, gender, and class. Simultaneous to the construction of the girls' social world was a mathematical world constructed around the discipline of mathematics, as well as a dynamic Black teacher and a reform-based curriculum. The present study examines this particular phenomenon, i.e., when children's social and mathematical worlds collide. That is, the present study describes how the values, meanings, and negotiations of Black girlhood organize a variety of interactions and activities, including mathematics learning. The central question being: *how did a third grade Black girls' social network influence patterns of participation within the mathematics classroom community?* Fundamentally, this study considers Black girls' figured worlds as an important ecological space for understanding mathematics participation.

### **Questions Guiding the Research**

Again, it is my thesis that the girls' social world structured their opportunities to participate and, consequently, learn mathematics in the classroom community. To complement my central question, I pose the following questions to deepen my analysis:

- (1) How does individual status within the girls' social world mediate membership in the *mathematical world*?
- (2) How does individual membership in the *mathematical world* mediate status in the social world?
- (3) How does the intersection of status and membership within social and mathematical worlds mediate interactions in classroom activities, such as group work or whole class activities?

(4) How do an individual girl's interactions over time construct trajectories in the social and mathematical world?

Questions (1) and (2) seek to understand respectively: *What does it mean to be a young Black girl in the contexts of learning and doing mathematics, and What does it mean to be a learner and doer of mathematics in the context of being a young Black girl* (cf. Martin, 2012)?

Further, I am purposeful in centering mathematics (see italics in the original question) as a discipline with unique characteristics that poses particular constraints and affordances in organizing children's interactions. So, just as the social world is not *any* world, but a constructed world of Black girlhood, it is worth understanding that the classroom community is specifically a *mathematics community*, which is known to inhabit particular ways of knowing and doing (cf. Seeger, Voigt & Waschescio, 1998).

Question (3) acknowledges that the girls' social status and their membership within the social and mathematical worlds, while studied as analytically separate, must be reconciled during the course interaction. Therefore, I investigate the sorts of strategies that different girls implement to simultaneously preserve their social status or well-being within the social world while participating in classroom activities that are a part of the mathematical world.

Question (4) takes a long view. Here I am interested in how the girls' interpersonal strategies construct trajectories with the social and mathematical worlds. For example, Black girls are often characterized as employing two vastly different strategies in classroom contexts—loudness or silence— as an expression of Black femininity (Fordham, 1993; Morris, 2007). The question seeks to understand how trajectories are connected to modes or strategies during social interaction.

These questions serve as guideposts in analysis, but not constraints. My main task is to better understand the phenomena of girls' interpersonal relationships mediating influence on their participation in the mathematics classroom.

### **My Position in the Research**

While I certainly am a Black woman and formerly a Black girl, I spent my time at this all-Black elementary school "passing." I grew up with economic privilege, so in any real sense I am an outsider to the travails of inner city, Black life—the context of the school. My Black racial identity allowed me to pass in many ways as a community member. My racial identity provided the cover of belonging that made my observation less intrusive and obvious. However, as an outsider to the community, the school culture, playground life, and styles of interaction between students were unfamiliar enough for me to pose questions about everyday life at the school. During interviews, most of the children seemed to feel completely at ease with me. I was able to raise questions about race and culture that would likely have been interpreted defensively or at least strange if I had not been considered a community member. For example, when the children were explaining whether they were Black or not, I was able to trouble their answers by asking whether they considered me to be Black. I was shocked to find that I was, in fact, not Black in their eyes, as a light-skinned person. However, for some of the children, (thankfully) I could possibly be African American. My point here is that my racial identity proved to be a useful research tool in understanding the children's perspectives and lives.

My position to the research was also influenced by the amicable relationship I shared with the classroom teacher, Ms. Patterson. This was in part a function of the class schedule,

which required me to spend at least three hours in her classroom per observation. The amount of time that I was spending in the classroom became an issue to some on the project—the suggestion was that I was getting “too close” to the children and Ms. Patterson, as research subjects. It was suggested that I spend less time, initiate less teacher reflection and dialogue, and make myself generally less available to the teacher and students during the observation. This immediately *felt* wrong to me—foreign, disingenuous, and cold. I didn’t agree with this epistemology. The authentic relationships that I had cultivated with Ms. Patterson and the children were the reason I had penetrating access her classroom. Although I didn’t have a language for it, I know now that my *ethics of relationships* in research differed from my colleagues. During these project meetings, I was experiencing what until then I had only read about, i.e., I was experiencing an epistemological crisis. My ethics of relationships was colliding with what I felt was an ethics of expedience and objectivity privileged by the project. However, uncomfortable at the time, I am thankful for this tension because it was educative. It helped me develop my epistemological outlook and clarified my relationship to the participants and the work generally.

As a final word, I come to this work from a position of middle-class privilege and as a Black woman. I also come to this work having experienced social isolation, as well as social centrality and support. Additionally, I come to this work as a person who has enjoyed and excelled at mathematics, but also sought its elusive face and felt its unyielding scorn. So, this work is personal, not insofar as the girls’ story is my story—far from it. It is personal because it has awakened in me a realization of my journey, my own Black girlhood and womanhood. It has enabled a feminist and Afrocentric sensibility, which has influenced my

approach to the data collection and the analytical work. It is personal because I feel a responsibility to represent the very real pain and joy of the young girls as they learn *how to become friends with one another* and *doers of mathematics*. I believe that these processes are linked. It is through the proposed study that I hope to explore this contention and help another Black girl understand that she is not *learning* and *becoming* a mathematics doer alone. She has more than her individual pride, strength, and resilience. Whether she sees, feels, or knows it, she is surrounded, supported, and loved.

### **Organization of the Dissertation**

Through the present study I endeavor to contemplate mathematics learning in the context of Black girlhood. In doing so, I recognize the challenges that this poses with respect to conceptualizing Black girlhood as a space for intellectual inquiry in mathematics education. More importantly, I recognize the challenges experienced by Black girls in living through and enacting images of Black girlhood that provide them access to relationships and social support, which facilitate their mathematics learning and development. In the following chapters, I share how a particular group of Black girls caused me to question how processes of learning respond to various forms of social and relational power in a mathematics context.

In Chapter 2, I provide a review of the relevant literature relating to young Black girls in mathematics contexts. I begin with a seminal study on young Black girls in classrooms broadly, before sharing examples from two studies in which young Black girls, Nikki and Patti, negotiated their positions in mathematics classroom communities. These examples describe two girls, whose participation patterns within their respective mathematics classroom communities were affected by children's social relations and status. I use these

examples as an opening to discuss the relational nature of mathematics learning. The chapter ends with a review of what is known about young Black girls' social relations in school contexts at various levels of social complexity, including dyads, groups, and social networks.

In Chapter 3, I provide a conceptual framework for understanding young Black girls' participation patterns as a negotiation between the classroom community and their social network. Through the literature, I theorize that the negotiation of these two social structures—the classroom community and the social network—is a reconciliation of multiple membership statuses and identities. I also posit that this negotiation occurs in the context of instructional activities, which often pit a goal-directed mathematics activity against a social goal that the girls are trying to achieve. The academic or mathematical work is negotiated with the girls' social work and becomes the resources through which the girls reconcile their statuses and identities (and make themselves coherent and whole). Over time these processes of negotiation and reconciliation construct trajectories within the classroom. Within this chapter, I also label the classroom community and social network as *figured worlds* to unify the language and abstraction of these social structures.

In Chapter 4, I outline the research design, the context of the study, the recruitment strategy and selection of participants, and methods of data collection. In my discussion of the participants, I provide detailed descriptions of the girls, including the focal girls of the study.

In Chapter 5, before discussing the methods of analysis, I use Martin's (2012) integrated framework to describe the analytical challenges of studying Black girls in mathematics learning. The challenges are a product of the multi-level complexity in “melding

perspectives” between Black girls’ phenomenal realities (at the macro-level), socialization practices (at the meso-level), as well as skills, beliefs, and heuristics (at the micro-level). Leaning on Black feminist theories and methods, I embrace methodological eclecticism that incorporates elements of ethnographic analysis, social network analysis, and identity analysis into coherent portraits of Black girls’ experiences doing mathematics. That is, I adapt portraiture as a solution to the methodological challenges of multi-level analysis.

In Chapter 6, I describe the girls’ social world structurally through quantitative analysis, as well as the girls’ phenomenal realities through ethnographic analysis. I begin with a quantitative rendering of the girls’ social relations by examining network-level measures, as well as ego-centric measures of the focal girls. After establishing the relational structure, I discuss the unspoken rules and experiences of Black girlhood in this third grade classroom. While the quantitative data provides the general framework for how the girls were situated, the ethnographic analysis contextualizes the girls’ social relations and animates their relational dynamics.

In Chapter 7, I describe the girls’ mathematical world through ethnographic analysis. I provide details about the features of the community of practice, including the physical set up of the room, the accepted ways of doing and being, the roles and academic groups, the tools, purposes and goals, as well as the activities and participation structures. This detailed account of the mathematics classroom is coupled with an analysis of the possibilities of participation for students in the class to help contextualize the classroom performance of different girls.

In Chapter 8, I provide a storied account of how the girls’ worlds socially and mathematically unfolded over the course of the year. I begin this chapter with a co-



constructed narrative about the social relations between the girls. This narrative account, coupled with the quantitative account in Chapter 6 reveal the different trajectories within the mathematics classroom of the focal girls. In particular, I describe the girls as social climbers, fallers, or maintainers within the social network. However, the girls take up their trajectories within the social network in very different ways, i.e., through different interactional strategies or modes. Two of the girls, Heaven and Shana, were social campaigners. For these girls, their statuses within the social network held high salience in terms of visibility and desirability, as well as high dominance in controlling their actions within the classroom community. Two of the other girls, Mia and Lamaresha, were social resisters. For resisters, the social network and the girls' status within the network held a high salience, but low dominance in terms of controlling their actions. That is, Mia and Lamaresha took a studied perspective to the social dynamics between the girls, but resisted the interpersonal drama. Brittany was a social free rider. Being a free rider meant that the social network held low salience for Brittany, but high dominance in terms of controlling her actions. In other words, issues of status did not motivate Brittany. She was more interested in belonging. Lastly, Jenique was similar to the campaigners, insofar as the social status within the network held high salience and dominance for her. Yet, Jenique's trajectory within the social network was stable. This allowed her to serve as a social enforcer of sorts. I conclude Chapter 8 with a discussion of how the different girls experienced liminality (or in-betweenness) within the social network. Some of the girls experienced liminality with respect to time, as their status shifted from high status to low status or low status to high. The experience of liminality mapped onto the reformation periods within the social network. Some of the girls also experienced liminality structurally

within the social network, as these girls were situated between both high and low status groups within the class. The period of liminality in space-time, as well as liminality with respect to position, provide key aspects to consider when understanding the processes of learning and participation.

In Chapter 9, I use the girls' modes or strategies of traversing the social network—campaigning, free-riding, resisting, and enforcing—as the frames for the portraits of each focal girl. Through the telling of several episodes, I construct portraits of the girls' trajectories within their mathematics classroom. The collection of portraits spans the academic year and provides insights into the dynamics of one mathematics classroom on the west of Chicago.

In Chapter 10, I summarize the key findings from the girls' portraits, discuss the significance of the study and the implications that this work has for future research and teaching, as well as the limitations of the study.

## **II. REVIEW OF THE RELEVANT LITERATURE**

The review of the relevant literature starts with an overview of the academic and mathematical lives of young Black girls. Specifically, I discuss Grant's (1984) seminal study in which we learn about the interactions of Black girls in integrated classrooms. I then turn to two sociocultural studies that describe the experiences in mathematics classroom communities, particularly. I use this discussion as an opening to discuss the relational nature of learning mathematics. Given that mathematics learning is relational, i.e., marked by social relationships and status, I conclude the literature review with an overview of Black girls' social lives. Here, I describe the experiences of Black girls at three levels of relational complexity—friendship, groups, and networks—and then, provide a pointed commentary as to why Black girls' social relations in education are a novel place of scholarly inquiry.

### **The Academic and Mathematical Lives of Young Black Girls**

In describing the academic and mathematical lives of young Black girls, I rely on a relatively small number of studies that are located at the intersection of age, race, and gender in academic and mathematics contexts. These studies include Black girls, who are no more than eleven years of age, who identify or identified as Black or African American girls. These studies reveal that issues of academic and mathematical competence are less consequential to their participation than the performative space that they occupy as Black girls in the classroom. To manage these performances, Black girls use strategic forms of participation that are protective in their navigation of classroom communities.

## **Young Black Girls In(ter)action**

Grant's (1984) seminal work of six first-grade, racially integrated classrooms reveals that young Black girls are often perceived as average or slightly below average by their teachers and positioned as benevolent interlopers in classroom activities. Teachers in the study were more concerned with Black girls' nonacademic performance and behavior. Young Black girls were characterized as self-sufficient, helpful, mature, but often this maturity was interpreted as an unhealthy preoccupation with adult-like roles. While many of the young Black girls were characterized as mature socially, Grant highlights that they were not considered cognitively mature, like some of their White counterparts. According to Grant, teachers pursued social contracts with the Black girls in the class versus high academic achievement. In terms of interactions, young Black girls' contact with teachers was brief and perfunctory. They received praise for behavior and fewer reprimands. With respect to feedback, young Black girls never received special academic assignments, such as tutoring, which was typically the purview of White girls. However, generally teachers seem to look favorably upon Black girls' social independence and classroom involvement, but this may have also resulted in Black girls receiving less nurturance and care than their more socially needy classmates.

As for young Black girls' relationships with their peers, Grant found that they maintained the most extensive and egalitarian ties of any demographic group. Young Black girls seem to cross race and gender lines frequently and were unabated by aggressive threats. They also seem to receive as much help as they offered to their classmates. At the same time Black girls were particularly attuned to the classroom rules and were willing to promote compliance among their peers. Young Black girls' willingness to work with their

classmates and compel their classmates to follow the rules often positioned them as “go-betweens” and “rule enforcers.” Grant suggests that young Black girls were more powerful and less exploited than the White girls in the classroom. For example, young Black girls were only slightly more likely to be involved in physical or verbal aggression than White girls; however, their responses in such instances differed insofar as young Blacks would often “fight back” half of the time compared to White girls, who would “fight back” between 14%-25% of the time. Grant also notes that in the course of her observation Black girls were the sole victims of racist remarks from White boys, which occurred on five different occasions after the teacher praised the girls. Grant suggests that these racist remarks functioned as a punishment for threatening White male’s privileged status. For example, a White boy responded to his Black girl peer, “When are you going to fatten up, like most Black ladies?” (p. 109). Grant notes that Black girls were also slightly overrepresented in terms of sexist remarks, as well.

Over time as gender norms harden, Black girls’ enactments of independence and involvement, as described by Grant, are viewed less favorably in the classroom as “loud” or “unladylike” (Morris, 2007). To combat these negative images, some Black girls develop personas of silence and, according to Fordham (1993), and become complicit in their own exclusion. However, there are several ways to think about silence beyond acquiescence to exclusion. For example, silence may be strategic (Yosso, 2006) and serve as a form of resistance. Further, silence can be less about a Black girls’ individual agency and choice, but a response to coercive forces in which the null response is the only viable response.

## Positioning of Young Black Girls in Communities of Practice

Learning studies that situate and track children within classroom communities, described as *communities of practice*, are perhaps the closest example of simultaneously considering social relationships and subject matter content, because issues of identity and membership are central to this theory (cf. Wenger, 1998). However, studies of *community of practice* generally investigate a child or adolescent's relationship to a practice within the community. Specific interpersonal relationships that are not germane to the practice are generally of less concern. Nevertheless, community of practice studies can be useful in our examination of Black girls' lives, because they offer a deeper look into how Black girls' identity shapes learning. I will highlight two studies that describe distinct experiences of Black girls, who I label as silent (or silenced) and androgynous. Through these examples, I am particularly interested in how the focal Black girl is recognized by her peers—favorably or unfavorably, how she engages (or disengages) from the content learning, and what protective strategies she enlists to maintain her sense of self.

### *Silent/Silenced Nikki*

Jackson's (2009) ethnography of a majority-Black fifth-grade mathematics classroom provides an illustrative example of the silencing of young Black girls. Everyday, for 25 out of 90 minutes, the class that Jackson observed would complete five mathematics problems. The student to first complete all five problems correctly was deemed Math Royalty, where they would receive a crown or tiara. This student would stand in the front of the classroom and yell, "I RULE," to which the other students would respond in kind, "YOU RULE." Jackson notes in the class that she observed the same three students came to be considered math royalty, including a 10 year old, Black girl named, Nikki.

Her teacher characterized Nikki as a model student. She received all As and was awarded the Fifth Grade Female Student of the Year. Nikki worked very hard to receive her status as Math Royalty, averaging between fifth to tenth place to consistent coronations. Jackson describes Nikki's first coronation this way:

Ms. Ridley announced that Nikki had won. She approached the front of the room. With a grin and her head tilted slightly to the right, she shouted, "I RULE." The class screamed back, "YOU RULE." Nikki placed the pink tiara on her head and returned to her seat. (p. 187)

Over time (September to December), Nikki's sustained success was deeply resented by the boys in the class, who eventually refused to say "YOU RULE." The boys began accusing her of cheating and making hissing sounds during her coronation, but the other girls continued to support Nikki's success. Yet, Nikki became less boastful and would only mumble, "I rule," when she won. By February, the other girls were also less enthusiastic about Nikki's finishing first.

Exercising her agency, Nikki intentionally finished second, so as to let her classmate, Angela, become Math Royalty. When Angela was crowned the entire class clapped and declared, "YOU RULE," reinvigorating the practice. When the teacher learned that Nikki intentionally lost the contest, Nikki was ridiculed in front of the class. In an interview, Jackson later found that Nikki had previously informed the teacher that the boys were teasing her and she did not want to be the object of ridicule any longer. After this event, Nikki's participation changed—she volunteered answers less and only occasionally won Math Royalty status. Jackson notes, "When she did win, she continued to mumble, 'I rule,' and look away from the class" (p. 190).

Like the girls in Fordham's (1993) study, Nikki found silence preferable and a rational alternative to social ridicule and isolation. By her own volition, Nikki abdicated the throne of Math Royalty. In fifth grade, she learned the risks of being both high achieving and highly visible and sought to minimize those risks by changing her patterns of participation. Nikki's success was a threat to the boys in the class—as the Math Royalty practice became gendered. While she maintained the support of her gender group, i.e., the girls in the class, she felt encouraged enough to continue winning. There is not a lot of evidence about Nikki's social network or her standing within her peer group. However, as her social support diminished, even among the girls, it stands to reason that her move to intentionally lose was both a strategy of resistance and self preservation to avoid being teased and socially isolated. Unfortunately, this move also served to extinguish her engagement in mathematics learning.

### *Androgynous Patti*

In her opening discussion, Jones (2003) describes Patti as a large third grade Black girl having “black wiry hair, uses a tone of voice that is typically louder than that of her two teachers (though similar to her mother's), and usually dresses in clothing that does not fit stereotypical images of femininity” (p. 220). Jones delineates between three spaces (or communities of practice)—the classroom, home, and mathematics club, in which Patti's androgynous gender identity provided different constraints and affordances to her mathematics development. In her mathematics classroom, her androgynous identity was most problematic, according to her teachers, because:

She's just so big and aggressive. She's so loud...She's like a little Jane [her mother]. But maybe Tiffany [Patti's best friend] is rubbing off on her. The other day she came in with a backpack purse on and I told her, “Patti, I love your backpack purse!” (p. 225)



Jones notes these discourses around Patti's gender identity narrowed her access to identities as an ideal mathematics learner, even though she exhibited particularly strong competencies in spatial relations.

Patti's devalued status within her mathematics-learning block seemed to initially structure her math club experience as well. Jones notes:

It was immediately clear that the other girls in the club perceived Patti as a troublemaker, a girl who didn't fit in with the crowd. Girls refused to work with Patti on projects and would avoid sitting by her in our circle...As one girl put it to me: "I can't be friends with her. I'll be in trouble!" Patti understood what others thought about her and was careful not to open herself up to further criticism. Remaining a quiet disengaged participant was safe. (p. 228)

Over the course of the school year, Jones actively positioned Patti as a competent mathematics doer and Patti began engaging in a greater variety of mathematics activities that did not include her best friend, Tiffany.

At home, Patti's androgynous gender identity was somewhat of a concern for her mother, who encouraged Patti to explore different hairstyles and clothes that allowed Patti to take on other identities without negating her socioeconomic class and cultural identity. Patti's mother, Jane, was integral in her participation in the mathematics club and attempted to engender a positive mathematics identity telling her, "math is where it's at" (p. 227). Jones notes that the mathematics club created an inbound trajectory of participation, which led to greater engagement for Patti and provided traction for the support Patti received at home. Jones is reluctant to characterize Patti's story as a success story. She felt that the dissolution of the mathematics club at the end of the year left the girls behind to negotiate rigid gender norms in their regular mathematics classroom.

Patti's example suggests to me that her androgynous identity also left her essentially isolated, notwithstanding her best friend. Patti wasn't necessarily loud in being expressive. In fact, Jones describes her as relatively quiet and disengaged. However, her physical comportment and tomboyish demeanor seemed to amplify her actions. Further, one good friend was insufficient in anchoring her engagement in learning. On the brighter side of things, this example also suggests that culturally-aware and gender-sensitive instructors can positively influence children's engagement and, thus, their acquisition of subject matter content.

In both cases, Nikki and Patti were not favorably recognized by their peers. The girls' academic competencies within the community of practice were less salient to their peers' assessment of their value within the learning community than their social status as Black girls. Nikki's computational fluency and speed and Patti's spatial reasoning were secondary to their gender and race. Their enactments and social status as Black girls seem to supersede their academic contributions. Nikki and Patti both employed protective strategies of silence and withdrawal. While silence and invisibility seem to work for Nikki, this strategy was less effective for Patti, due to her physical stature and vocal intonation. These strategies were deployed to create social distance and, thus, protection. However, the girls' protection was followed by disengagement from the learning community. Of course, these strategies were used in response to their peers and were not a natural or necessary outcome, nor were these strategies purely agentic. The girls' strategic forms of participation were reflexive to a set of structural forces co-constructed with the teacher and peers.

## **The Relational Work of Mathematics Learning**

The experiences of Nikki and Patti are useful reminders that the mathematics learning involves relational work. This moves beyond the conceptualization of mathematics learning as a socially co-constructed phenomenon, where, for example, students and teachers are making-meaning together, towards a realization that the nature, quality, and kind of relationships developed in and through mathematics classrooms are central to learning experiences and outcomes. Jo Boaler's work is particularly informative in understanding the relational aspects of mathematics learning. In particular, she describes how equitable and productive relationships were formed in a working class high school, which she calls Railside, and resulted in improved outcomes in terms of course-taking and achievement differences among ethnic groups (Boaler, 2008). These improvements were attributed to three core values: commitment to the learning of others, in terms of reciprocity and taking responsibility when things go wrong; respecting other people's ideas; and learning methods of communication and support. These values are particularly relevant when considering mathematics learning as racialized (Martin, 2006) and gendered (Walkerdine, 1998) experience. The Railside example was driven by an institutional approach to mathematics instruction in which these relational aspects of learning were explicitly implemented in the classroom. Therefore, the groups of learners at Railside were organized and supervised by adults. Such groups are identified as "formal" versus "informal" (Brown & Dietz, 2009). Informal groups occur naturally and often engage through their own volition in activities together (p. 361). Boaler makes clear that creating relational equity was intentional and explicitly taught to promote mathematical success. Without explicit intervention by adults, children's informal groups dominate the social life

of the classroom. In the following section, I explore the informal relations among young Black girls and the implications this may have for their experiences in the classroom.

### **The Social Lives of Black Girls**

The extent to which children and adolescents are embedded within social groups and networks has broad implications for their social development and learning. With the rearrangement of traditional structures, i.e., the increase in one-parent households, the decline in the number of siblings, the increase in family mobility, and shifts in school schedules (Nestmann & Hurrelmann, 1994), children and adolescents' networks have become less uniform and, thus, have grown in relevance with respect to development, learning, and participation. Groups and networks are known to provide protective functions and help children and adolescents mitigate life circumstances by buffering stress and improving coping strategies (p. 5). In educational contexts, positive peer relationships provide emotional support, opportunities to communicate academic and social expectations, and resources and information that can lead to learning (Wentzel, 2010). There is certainly value in examining the *social immune systems* that support children and adolescents (Nestmann & Hurrelmann, 1994), instead of focusing exclusively on individual coping competences, such as resilience or grit. This is not to overstate the benefits of groups and networks. Beyond *social support*, groups and networks also create a variety of *relational demands and conflicts* in a regime of *social regulation and control*, which may be deleterious to children's and adolescents' health, development, and learning (cf. House, Umberson, & Landis, 1988). From a developmental perspective, it is the challenge of childhood and adolescence to balance *connectedness*, leveraging the benefits and power in relationships and groups, and *separateness*, developing a sense of personal power and

autonomy (Bryant, 1994). Of course, in addition to negotiating between social connectedness and separateness, children and adolescents are also constructing their identities around race, gender, linguistic background, etc., which manifest differently depending on whether children find themselves in short-term interactions, relationships, groups, or networks.

Exploring the relational lives of Black girls is a particularly interesting endeavor given Black women—Black girls’ developmental analog— are often depicted as strong, independent, solitary figures, i.e., without the need for relational ties (see, for example, Harris-Perry, 2011). This raises important questions about Black girls as learners, particularly, if they are being socialized or positioned as strong, independent, and autonomous in environments, like classrooms, which also require positive, effective, multivalent relationships. Unfortunately, there are few studies that investigate Black girls’ relationships and experiences in groups and social networks. Those studies that do address Black girls as a specific demographic seem to indicate the potential challenges that Black girls face versus the support they receive. In the following sections, I describe Black girls in the contexts of their friendship, informal peer groups, and social networks.

### **Friendship**

A child development textbooks defines friendship as: “[C]lose, mutual, and voluntary relationships (Gleason & Hohmann, 2006; Rubin et al., 2005). Reciprocity and equality are key features of friendships (Fujisawa Kutsukake, & Hasagawa, 2008), as empathy and perspective-taking (Rubin et al., 2005)” (Woolfolk & Perry, 2012, p. 279). There seems to be little investigation of the friendships of Black girls, despite its known benefits in supporting development. Belgrave (2011) notes that isolated Black girls are more likely to

have lower self-esteem than those with friends. In the friendship literature a robust finding is that children and adolescents tend to prefer same race (or ethnicity) peers. Further, within-race group friendships tend to be higher quality (i.e., involved more activities) (Graham, Taylor, & Ho, 2009). Friendship can satisfy desires of intimacy, enhance personal skills, engender sensitivity and understanding, and generally contribute to the cognitive and social development, as well as psychological adjustment (Way, 1995). Way conducted a study of urban girls' (and boys') friendships and found that these friendships are often marked by distrust and desire for respect. Feelings of distrust among Black girls, however, did not inhibit them from establishing new relationships, but seemed to negatively affect boys. In an ethnographic study, Jones (2010) found that urban girls often practice *relational isolation*, avoiding close friendships and strong ties of loyalty, as a means to reduce the likelihood of physical conflict. That is, in many urban environments, friends are expected to fight on behalf of each other out of loyalty. As such, many Black girls make a distinction between *friends* and *associates*. Associates convey weaker ties and no requirement to engage in a fight. Jones argues that in light of the code of the street "[g]irls are deliberately stunting the growth of their relational networks at a stage in adolescent development typically associated with the creation of healthy, trusting, and loving relationships" (p. 55). Interracial friends among Black and White girls also appear difficult to sustain, given White girls' tendency to value wealth and social status, in contrast to Black girls' tendency to value talent and creative ability, such as being a good dancer (Scott, 2004). These friendships between White and Black girls are less likely and usually of lower quality.

## **Groups**

Majorie Harness Goodwin (1994) has conducted one of the more in-depth studies of Black girls peer groups. Her work focused the inner workings of young girls' groups with ages ranging between 4 and 14. She found that young Black girls were engaged in a variety of activities that relied heavily on language skills, such as jump rope, dramatic play ("house" and "school"), planning club meetings, practicing dance steps, and making things. The older girls usually incorporated taking care of small children during their play. The girls were also engaged in talking for a greater proportion of time (than boys) during their play. Further, the girls enjoyed a relatively flat hierarchical structure that was monitored for inappropriate displays of differentiation, like boasting. As such, patterns of language (or linguistic moves) were often used to minimize difference and maintain the egalitarian structure of the group. Another feature of Black girls' groups was positions within the group were in constant flux, i.e., girls were in a continual process of *coalition formation*. Relationships were used as resources to establish position. Thus, vying over who would be friends with whom was a central activity with real consequences to the group functioning.

## **Social Networks**

Groups are embedded in social networks. Social networks represent higher level of abstraction of children's peer groups and are helpful in examining how groups, dyads, or isolates relate to one another. Ties between individuals can be strong or weak. In social networks, an individual's *social status* is foregrounded. For example, networks help to identify individuals who are popular, accepted, or rejected. Parkhurst & Hopmeyer (1998) note that there is a substantive difference between sociometric and perceived popularity. Whereas *perceived popularity* relies on peer nominations and is associated with visibility and dominance, *sociometric popularity* relies on self-reports of liking and disliking

members within the social network (Graham et al., 2009). Similarly, there are substantive differences between acceptance and rejection as reported by students or observed by researchers. Observations can reveal that children and adolescents may experience high levels of rejection without being rejected by a majority of their peers, which is often masked by student self-reports (Ladd, 2009).

Black children's sociometric status is affected by the classroom context, e.g., whether the classroom is majority-Black or White (Jackson et al., 2006). In an interracial context, Kistner and colleagues found that Black children's prosocial behaviors did not predict their popularity within the classroom as they did for White children (Graham et al., 2009). In all-Black contexts, aggression was long thought to be accepted, tolerated or even admired among Black children and adolescents, but more recent work suggests that Black children are relatively ambivalent to prosocial and antisocial characteristics when nominating or selecting their peers (p. 399). For example, Xie, Farmer, Cairns (2003) found that Black boys prone to physical and/or verbal aggression were more popular (sociometrically) than non-aggressive boys. Similarly, Black girls prone to social and/or relational aggression were more popular than non-aggressive girls. In another study, Estell et al. (2002) noted that academically competent-aggressive girls and boys were received as popular, whereas a group of academically at-risk-aggressive boys were not received as popular. They suggest that overtly aggressive behavior is not necessarily an impediment to social prominence for Black children. This also suggests to me that Black children are reading other children's behavior within its cultural context and able to effectively distinguish between resistant or assertive behaviors versus "acting out" or other negative attention getting behaviors.



Further, despite the influence of oppositional identity theory (cf. Fordham & Ogbu, 1986), there does not seem to be a great deal of empirical support to suggest that high-achieving Black children and adolescents are rejected by their peer groups. Horvat and Lewis (2003) found that Black children maintain multiple peer groups and strategically share their academic accomplishments based on their peer group norms versus shirk away from academic success (Graham et al., 2009). Further, efforts to camouflage their academic accomplishments are not about ostracism, but protecting the feelings of their less successful friends.

### **Learning from the Literature**

The ability of Black girls to cultivate positive relationships in the form of friends, groups, and social networks is integral to content learning, but also critical to their future selves. Unfortunately, popular media and literary images related to Black girls seem to suggest that they are “doin’ it for themselves” and by themselves (Harris-Perry, 2011). These popular images are important insofar as they have the power to transmit cultural messages that shape our understanding of personhood (Cortes, 2000). Therefore, the presumption of autonomy, strength, and independence attributed to Black girls is not benign, but often results in less attention being given to the social and relational life of and among Black girls. That is, social relationships have not been central to our understanding of Black girls’ experiences as learners. What we do know about Black girls’ relationally is refracted through images of their autonomy, isolation, or exclusion versus friendship and social support.

### **III. THEORETICAL FRAMEWORK AND CONCEPTUAL MODEL**

Conceptualizing learning as a social phenomenon is a well-accepted stance in mathematics education research. However, I should qualify that learning is considered *social* in the sense that “meaning-[making], thinking, and reasoning” are considered “products of social activity,” which “goes beyond the [cognitivist] idea that social interactions provide a spark that generates or stimulates an individual’s internal meaning-making activity” (Lerman, 2000). In the present study, I consider learning in mathematics not only as “the products of social activity,” but particularly as the products of interpersonal negotiations of relationships and identities. In this chapter, I explicitly describe my theoretical framework and use this framework to provide a conceptual map of Black girls’ negotiations between their classroom communities and social groups. I begin by defining classroom communities and social groups structurally, as communities of practice (Wenger, 1998) and social networks (Kindermann & Gest, 2009), respectively. Then, I discuss the negotiation as the reconciliation of multi-membership (Wenger 1998) in the context of goal-directed activity. Finally, I present a conceptual map that ties communities of practice, social networks, and processes of reconciliation, as a representation of Black girls’ learning.

#### **Communities of Practice**

Previously in the literature, communities of practice have been invoked as an aspirational type of school (i.e., Rogoff, Turkkanis, & Bartlett, 2001) or (mathematics) classroom (i.e., Goos, Galbraith, & Renshaw, 1999). For example, Goos, Galbraith, &

Renshaw (1999) “focus on how a particular type of mathematics classroom can be created, a classroom that enables practices, values, conventions, and beliefs characteristic of wider communities of mathematicians to be progressively enacted and gradually appropriated by students” (p. 36). That is, the label of *community of practice* has generally been applied to classrooms that seek to emulate “communities of mathematicians.” However, I take a more liberal view of *a community of practice*. Every classroom can be considered a community of practice, because every classroom “enables practices, values, conventions, and beliefs.” Now, those practices, values, conventions, and beliefs may or may not align with communities of mathematicians or other reform-based mathematics classroom communities, but every classroom promotes ways of being, doing, feeling, and talking. Every classroom is defined by time, space, places, tools, and artifacts. Every classroom has goals and purposes and every classroom has patterns of interaction between students and teachers. Present constructions of communities of practice as ideal or specialized classroom spaces suggest that only idyllic mathematics classrooms have a *mathematics culture*. This stance renders the “ordinary” mathematics classroom as an acultural space, whose practices are nonmathematical, instead of a particular kind of school mathematics.

When thinking structurally, communities of practice are organized into fields of participation ranging from full-participation to non-participation (Wenger, 1998). In classroom contexts, *full participation* is typically marked by high active engagement in classroom activities. Examples in many classrooms may include raising one’s hand, volunteering answers during discussion, and completing assignments. Of course, children may engage in more modest or less enthusiastic forms of participation, i.e., *non-participation* marked by passive engagement in classroom activities. In this case, non-

participation may include observing classroom activities, but not volunteering to answer questions or reading through assignments, but perhaps not completing the assignment. In **Figure 2**, the fields of participation are represented as concentric ellipses, where the innermost ring represents full participation and the outer rings represent varying forms of non-participation.

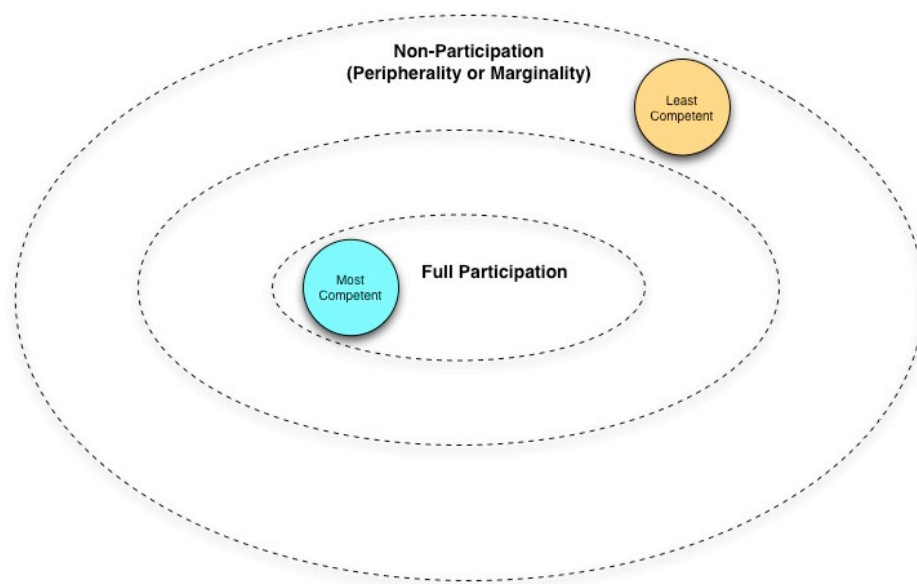


Figure 2-Representation of a community of practice.

In a community of practice, *learning* is the process of becoming a member of a community and striving toward full participation. This suggests a dialectic exists between personhood (membership) and developing skills that make full participation realizable.

However, striving toward full participation does not render non-participation invaluable. To the contrary, Lave & Wenger (1991) have argued that non-participation is a legitimate form of learning. Non-participation is of two varieties: *peripheral* and *marginal*. The difference between the two is the developmental path or trajectory afforded. Peripherality operated as an inbound trajectory with the potential for more inclusive forms of participation, whereas marginality operated as an outbound trajectory and, generally, outsider status (cf. Kahveci, Southerland, & Gilmer, 2008). Trajectories of participation and consequent membership status vary in terms of whether children perform various classroom activities with competence and how others recognize these performances (Carlone & Johnson, 2007). Additionally, trajectories and membership statuses are facilitated by participation structures (not usually within students' authority), which organize the evaluation of performances (Hand, 2010). For example, a teacher may only validate numerically "correct" or quickly provided answers. This narrows the type of performances that are considered valuable within the classroom community and, thus, students who tend to consistently defy these structural and cultural norms are positioned as less competent members. Competence, therefore, is typically the key identifier in distinguishing a classroom member's field of participation within the community of practice and allows them to be recognized as a particular kind of mathematics doer. In short, competent students are expected to be more fully engaged, and less competent students can be expected to choose other forms of non-participation (see **Figure 2**). As Holland and colleagues (1998) note, one's location within the community of practice has particular implications for learners' access to knowledge insofar as "knowledge...cannot be divorced from position and position [is] married to knowledge, within social groups" (p.

57). Of course, knowledge/power dialectic reveals that communities of practice are politicized spaces that produce structural positions for children within the context of their learning.

In addition to Holland et al. (1998), others have noted that the literature of communities of practice often fails to consider issues of power, privilege, and knowledge (Gutierrez, 2010). Returning to Lerman (2000), he notes that “Lave’s [and Wenger’s] work might seem to suggest that all individuals are subject to those practices in the same way. There appears to be a goal of learning which is characteristic of the practice, and apprenticeship into it is monolithic in application” (p. 27). Of course, this notion of a monolithic application into apprenticeship is obviously problematic. Walking into any mathematics classroom, children will be engaging in the practice of school mathematics in very different ways. Some scholars have tried to explain this by pointing to participation structures (Hand, 2010) or issues of recognition (Carlone & Johnson, 2007). However, these explanations consider children as disconnected, autonomous beings. These explanations also suggest that features of the practice, such as competence, experiences, or structures, are essential to organizing a learner’s participation or non-participation. In the following section, I introduce social networks as a simultaneous social structure to the classroom community that also organizes children’s positionality and forms of participation.

### **Social Networks**

*Social networks* impose an entirely different set of organizing structures in the classroom contexts through relational ties. These relational ties can be reciprocated or not. A child can have many relational ties indicating their (sociometric) popularity or fewer to no

relational ties suggesting that they are more or less socially isolated. When more than two children share reciprocal ties, they form a social cluster or clique. It cannot be assumed that cliques are egalitarian. In fact, cliques can comprise members of different status, such as nuclear, secondary, and peripheral members. Nuclear members are central to the identity and status of the clique; secondary members are affiliated but hold less power than the nuclear members; and peripheral members hold little to no power and maintain a more tenuous affiliation. Cliques are also organized by status, that is social clusters can be high to low status, depending on their visibility within the classroom community and how effectively they control the action of their members (and non-members) (Cairns & Cairns, 1994). Members of cliques may vary in terms of how they value their group. For some members, their clique may be highly salient in terms of visibility and desirability. This means that some members of a clique may be occupied by the group's status and position. Additionally, the clique may be particularly dominant for some members. In this case, members may have a strong need for belonging, so their actions may be controlled by the group.

**Figure 3** is an example of a sociogram of seven children. In this example, Child D is socially isolated because no other child has indicated having a relationship with her. Child E and Child F are a dyad, insofar as they maintain a reciprocal relationship and a social cluster is formed by the relationships between Child A, Child B, and Child C. I should note that Child B has been identified as a peer by several children and is the most (sociometrically) popular. Such relational ties create structures onto themselves, given children's tendency to favor children with whom they have close relational ties.

Furthermore, children appreciate status differences among groups and tend to rate members of low-status or out-group members negatively (Brown & Dietz, 2009).

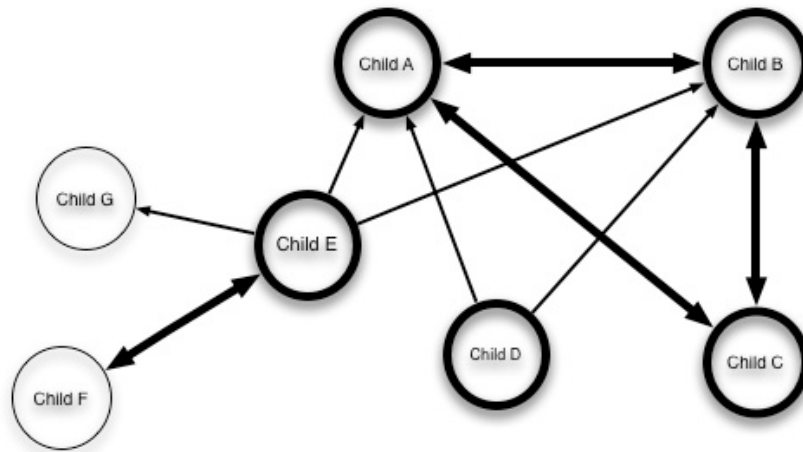


Figure 3-An example of a sociogram.

In addition to the structures of children's peer relations are the social dynamics between individuals and groups operating within the network. According to Brown & Dietz (2009), there are three key issues with respect to peer-group functioning:

- (1) the major emergent roles within a group that are vital to group functioning,
- (2) how specific members come to occupy these roles, and
- (3) how group activities serve to maintain (or, in some cases, undermine) the integrity of the group and the attitudes or behavior of group members. (p. 367)

However, in a classroom, the formation and functioning of children's networks are circumscribed by the learning activities. In other words, classrooms place particular



constraints on the formative and interactive processes between individuals and social groups. That is, children are managing memberships and statuses within multiple social structures in classroom contexts. For example, in a mathematics classroom, a child may be highly networked, but not particularly competent in school mathematics. Within a classroom activity, this child must negotiate her statuses and membership within the social network and the community of practice such that both her social goals (e.g., maintaining one's social desirability) and mathematical goals (e.g., understanding multiplication as repeated addition) are achieved. In the next section, I describe processes of reconciliation of multi-membership and the emergence of goals in learning activities.

### **Reconciliation of Multi-membership and Emergent Goals**

Wenger (1998) notes that reconciliation is one of the most significant challenges when operating in and between communities of practice. The fundamental challenge is negotiating the demands of multiple social spheres, such that an individual maintains a central sense of being or a singular identity. Wenger provides this useful example:

For a doctor working in a hospital, making decisions that do justice to both her professional standards and institutional bottom-line demands is not simply a matter of making discrete decisions; she must find an identity that can reconcile the demands of these forms of accountability into a way of being in the world. (p. 160)

Similarly, a child working in informal (or friendship) groups is not merely making discrete decisions in the context of a mathematical activity about fact families, for example. She is searching for an identity that allows her to reconcile the mathematical demands of the activity, as well as the social demands of her peers. An implicit, but particularly important, point to all of this is that reconciliation occurs most prominently in the context of goal-directed activity. Goal-directed activities, such as making a decision regarding a patient's

medical procedure or completing a mathematical assignment, bring to bear a particular set of salient identities, memberships, and statuses that must be reconciled.

In collaborative settings, such as children's peer groups, each child is bringing their set of salient identities, memberships, and statuses to the goal-directed activity. Saxe & Guberman (1998), using educational board games, have shown how goals emerge within the context of the mathematical activity, whereas Forman & Larremendy-Joerns (1995) have noted that tasks (or activities) have multiple goals. They suggest that "studies need to account for the plurality of goals, interests, and expertise and of the process of negotiation in order to effectively evaluate peer collaboration" (p. 561). Taking these studies together, I note that within in any collaborative activity children bring multiple goals pursuant to their identities, memberships and statuses, which are negotiated to produce emergent goals. In this sense, "the social context of learning not only facilitates or impedes the learning process but also chances what can be learned" (Forman & Larremendy-Joerns, 1995, p. 561). I would add that there is no expectation that the goals children bring to mathematics activity, for example, are exclusively mathematical. Given that children are expected to bring the full spectrum of their identities, memberships, and statuses to mathematics class, there is also an expectation that goals salient to these identities also emerge within the context of mathematical activities. Needless to say, the importance of goals in children's mathematics learning cannot be understated (Nasir, 2002).

### **A Conceptual Model**

It is my thesis that children negotiate two classroom structures that are consequential to their learning and identity development: the community of practice and the social network. On the one hand, a community of practice is a social structure "formed by people

who engage in a process of collective learning in a shared domain of human endeavor,” like school mathematics (Wenger, 1998). On the other hand, a social network is simply a set of relational ties between individuals. In a classroom, these structures co-exist simultaneously and include the same set of individuals as members. The simultaneity of these two social structures can be mutually enforcing or create tensions in how students are positioned in the classroom. As shown in **Figure 4**, the relational ties that children develop influence how they participate within the community of practice. These ties do not disappear—the ties are relevant and highly salient for some children. Notice in **Figure 4** how the relational ties between children can anchor children to particular fields of participation or push children into or out of their field of participation. Holland et al. (2001) provide a useful conception of the “figured world,” which establishes a singular vocabulary for describing both the community of practice and the social network. A figured world is defined as “a socially and culturally constructed realm of interpretation in which particular characters and actors are recognized, significance is assigned to certain acts, and particular outcomes are valued over others” (Holland et al., 2001, p. 52). This definition applies to both communities of practice and social networks. Figured worlds are also conceptualized as “narrativized” and “dramatized” worlds, insofar as figured worlds can be narrated “in the form of a story or drama” (p. 53). Moving forward, I will use the language of figured worlds to discuss both the social network and the community of practice to create some measure of coherence and symmetry in the abstraction of these two social structures.

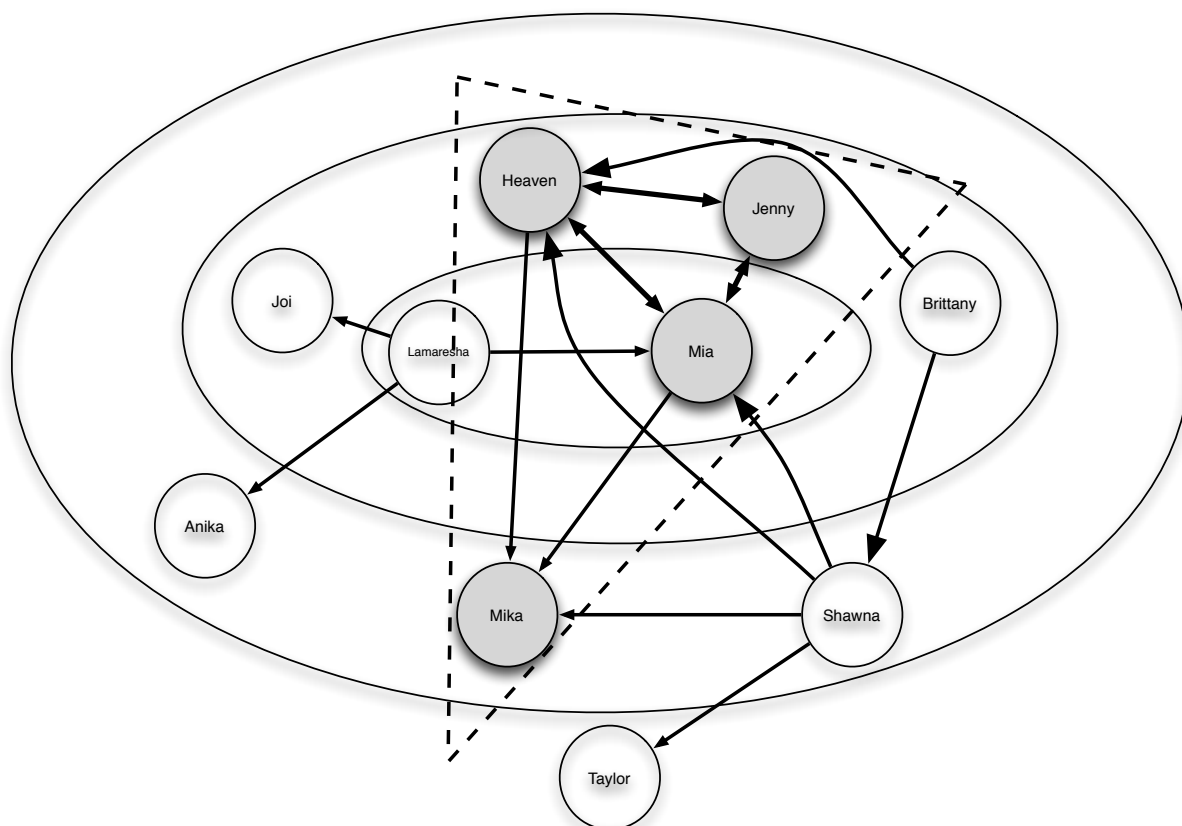


Figure 4- Relationship between the girls' participation in the community of practice and social network.

**Figure 5** is my conceptual map and approach to understanding the relationship between a Black girls' social network and their third grade classroom community. Children's negotiation between the mathematical figured world and the social figured world occurs through everyday social interactions with other children (and the teacher), resulting in positions. These positions solidify or laminate into patterns of participation,

which lead to enfranchisement or disenfranchisement in learning subject matter content (cf. Holland & Leander, 2004).

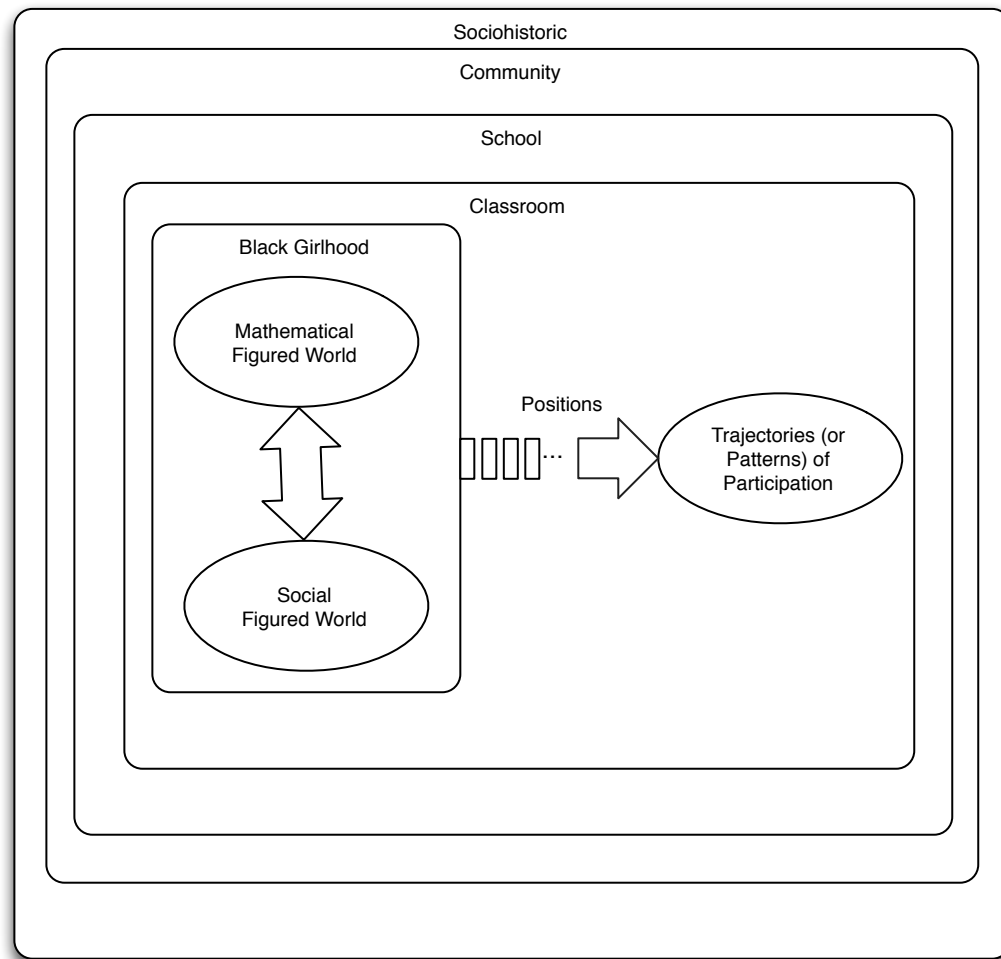


Figure 5-Conceptual map of the mediation of social and mathematical figured worlds.

The conceptual map includes multiple timescales. Wortham (2006) notes: “[W]e must attend to *other* timescales *beyond* sociohistorical and event-level emergence...we must study how local categories of identity emerge in the classroom over the academic year” (original emphasis) (p. 9). Therefore, to fully understand the phenomena between mathematical and social figured worlds, it is necessary to look *across* multiple timescales (e.g., socio-historically, over the months of the academic year, as well as face-to-face interactions). Accordingly, in **Figure 5**, face-to-face interactions create positions, which lead to well-defined trajectories (or patterns) of participation. Similarly, it will be necessary to look across levels of complexity in children’s relational experiences. That is, in understanding children’s negotiations between worlds, the girls must be considered as individuals: in interaction, in relationship, in groups and social networks. **Figure 5** does not capture this relational complexity.

### **The Context of Black Girlhood**

In addition to considering scales of time and relational complexity, it is important to attend to ecological complexity. The negotiation between the social and mathematical figured worlds occurs in multiple contextual layers, including socio-historic, community, and school contexts (cf. Martin, 2000). One contextual layer that I newly consider is Black girlhood in the classroom. I conceptualize Black girlhood as being the immediate context in which the negotiation between figured worlds occurs. Of course, Black girlhood is subject to larger contexts, such as *socio-historic constructions* of Black women, as well as more proximal *community-based contexts*, such as being able to juke (a Chicago-based dance style) and patterns of speech, and *school-based contexts*, such as, modes of dress and hair

styles. The interactions and positions created within the classroom are a byproduct of local understandings of Black girlhood.

There is no single way of being a Black girl. Black girlhood is best conceptualized as interlocking categories (or matrices of oppression) of age, race, and gender (Hill-Collins, 2005), as well as a context for nurturance, support, and competence (Gholson & Martin, 2014). I have suggested before that Black girlhood should be seen as an elastic and eclectic analytical construct for understanding the lives of Black girls (p. 32). Therefore, Black girlhood and my use of Black girls is *not* to imply, with any absolute certainty, a singular characterization of *all* Black girls. It is to communicate trends, tendencies, and occasions of a sample of Black girls in which the intersections of age, race, and gender converge toward a similar experience. There is great complexity in the ways Black girlhood is constructed and enacted in situations, which is specific to cultural milieus (Bettie, 2003), as well as time and place (Driscoll, 2008; Kirk, Mitchell, & Reid-Walsh, 2012).

Using the conceptual map in Figure 4, I explore how a group of young Black girls in the third grade negotiated two figured worlds—one mathematical and one social. In the following chapter, I describe the details of the study.

#### **IV. RESEARCH DESIGN, SETTING, PARTICIPANTS, AND METHODS OF COLLECTION**

In this chapter, I describe the research design of my study that was established from a larger research project. I then provide a detailed account of the research context. In particular, I discuss the school community through three lenses: (1) district documents, (2) a historical text, and (3) the contemporary sociopolitical context. This is followed by a description of the recruitment and selection of participants, coupled with a detailed description of the focal participants. I conclude the chapter with a discussion of data collection methods.

##### **Research Design**

The proposed study is part of a larger research project, known as Content Learning and Identity Construction (CLIC). The CLIC study is based on a theoretical framework that conceptualizes content learning and identity construction as integrated processes (Varelas, Martin, & Kane, 2012). Both processes, learning and identity construction, involve children's meaning-making and are equally critical to children's academic success. With respect to identity construction, Varelas and colleagues focus on the intersection of three identities: disciplinary, academic, and racial. In order to understand how children acquire content knowledge, such as concepts, tools, discourses, etc., they argue for exploring the ways in which these identities "interact, overlap, diverge, and develop together" (p. 325). A key impetus for the CLIC study was to better understand the learning experiences, particularly, of Black children in mathematics and sciences classrooms. As such, the research design was motivated to capture various aspects of Black children's identities—enacted and narrated. Below I describe the research design in detail as implemented and



highlight areas in which the design was emergent and, thus, co-constructed among the principal investigators, graduate research assistants, and research participants.

### **Research Context**

All three schools involved in the CLIC study were situated on the west side of Chicago, which comprises several neighborhoods, namely Austin, West and East Garfield Park, North Lawndale, and, according to some maps, Humboldt Park (City of Chicago, 2011). As of 2010, the community is densely populated in several areas with more than 5,000 Black residents and the median income is between \$0 and \$40,000 in annual income (U.S. Census Bureau, 2010). The community is also sprinkled with gang territories that often overlap with the elementary and high schools. Like many inner-city urban communities, the west side is plagued with many hardships and shows the toll of structural neglect over several decades (Lipman, 2012).

The primary research site for this study was June Elementary School (a pseudonym). In 2012, June's school population of 450 students was almost all Black (i.e., 99.4%). The overwhelming majority of the students, 96.8%, were considered by the school district to be low-income. Beyond demographics, the school enjoyed a vibrant and unapologetic Black cultural ethos. For example, the students sang the Black National Anthem, along with saying the U.S. Pledge of Allegiance to the Flag, in the morning, and student assemblies incorporated hip-hop music, with many of the students, teachers, and the administration rapping, singing, and dancing.

The school progress report (2012-2013) for June issued by the school district indicated that June had been on probation for the last six years and was considered a Level 3 school,

the lowest rating in CPS. Student growth was considered average; student performance was deemed far below average; and the school culture and climate was described as partially organized, indicating the school has a few strengths and several weaknesses. June was considered neutral with respect to having a supportive environment, ambitious instruction, effective leaders, collaborative teachers, and a safe environment, but was considered weak in effectively partnering with families and communities. With respect to behavior and discipline, approximately 82% of misconducts (or office referrals) resulted in suspension (in comparison to the district average of 57%). Student attendance was slightly below the district average at 93% and teacher attendance essentially reflected the district average of 96%. According to the report, most of the schools proximal to June were rated as Level 2 or Level 3 with only a few Level 1 rated schools (the best rating).

June Elementary was not always a predominantly Black school, as Amanda Seligman (2005) describes in *Block by Block*. She characterizes the transformation of the west side of Chicago from an annexed suburb to a neglected inner city. She details how this area was subject to a systematic disinvestment after years of racial strife and protest. Until the late 1960s, the west side was a predominantly White working-class community situated close to the blue-collar industrial jobs. However, the influx of Blacks during the Great Migration marked the beginning of the racial transition for this area. Contrary to narratives of the racially progressive north, Seligman notes that there was a great deal racial tension within the west side community that manifested acutely within the public schools during integration.

In 1965, Seligman describes June Elementary as approximately one-quarter Black (an integrated school). The Chicago school board attempted to further racially integrate the

west side schools, which was met with vociferous objection by white parents, according to Seligman. Contrary to overt resistance exhibited by Southern Whites to the racial integration of the public schools, the Northern Whites on the west side argued against “policy shifts that threatened to undermine the principle of the neighborhood school” (p. 121). These policies, of course, maintained a de facto segregation of the schools. However, as more Blacks began moving to the west side, it was difficult for White parents to simultaneously maintain racially segregated schools and defend the neighborhood school policy. Many white parents surreptitiously removed their children from their neighborhood school and by 1970 schools like June Elementary were overwhelming Black.

The concentration of Black children in schools led to a disinvestment in these schools, causing overcrowded schools. Seligman notes that the district attempted relieving the overcrowding in two ways: (1) they began requiring holding classes in all available rooms, like the gymnasium and book storage (until a tragic fire); and (2) splitting grades into shifts, where children were invited to attend school for only a portion of the normal school day (until issues of juvenile delinquency were raised). These solutions proved to be untenable. Black parents finally found relief when “dountables,” semi-permanent or modular buildings were built at several of the west side schools, housing ten to nineteen classrooms. In fact, the classroom of the present study was located in one of these demountable buildings at June, which now operated to the children and school staff as a permanent building.

Many White, west side residents fought along side Black parents to improve the west side schools and reduce overcrowding, but these efforts eventually ceased when progress could not be sustained. Parents had been previously worked to reduce average class size

from 47 to 36 students; only to have school officials redraw school boundaries, increasing the school rosters by 170 students. Community activist, Gale Cincotta, presciently and cynically testified on behalf of the June Elementary Parent-Teachers' Association that: "The White people here are already in a state of panic and if this new cluster plan [integration plan] is allowed to go into effect, you are going to have one more totally segregated 100 per cent Negro school" (p. 137).

During the 2012-2013 academic year, the west side was freshly embattled in new debate—a school closure debate. According to the Chicago's school board, the schools on the west side were no longer overflowing with students, but enrollments were purportedly declining in these schools. Ironically, low building utilization (of the semi-permanent buildings originally built to relieve overcrowding) and poor academic performance on state-wide assessments was used as the rationalization for placing several west-side schools on a closure list. This debate was also intimately coupled with the mobilization of Chicago Teacher's Union (CTU), which was pushing against a set corporate education reforms that were being ushered in by a new mayor, Rahm Emmanuel, and chief executive officer of schools, Jean-Claude Brizard (and, eventually, Barbara Byrd-Bennett by the end of the year). These reforms included an increased investment in privately-held charter schools (Lipman, 2012).

Needless to say, this climate made for a particularly volatile start to the school year in which the teachers threatened to strike in August and carried through with the strike in September. This affected several of the schools on the west side that used year-round academic calendar with intermittent breaks. These schools were in classes for roughly 4 weeks before the schools were closed for seven academic days. The strike provided

leverage around many of the teachers' concerns relating to, for example, teacher evaluations and overtime pay; however, the strike did *not* substantively shape the school closure debate, which droned on throughout the academic year. The CTU along with several community organizations protested the impending closures from their announcement until late March, when school closing decisions were made official. June Elementary School was one of the schools that was closed and reopened under a new name the following year. All of the school staff, including the teacher integral to this study, were laid off at the end of the 2012-2013 school year and were asked to reapply for their positions. While the young students engaged in the study seemed relatively ambivalent to the school closure debate and teacher strike, there was an uneasiness and agitation among the teachers and staff. As Lipman (2012) noted, "The psychic trauma and insecurity that is the 'collateral damage' of these [reform] policies (Lipman, Person, & Kenwood Oakland Community Organization, 2007) reverberates in children's educational experiences and life chances" (p. 11). This context was inescapable, and any findings are certainly refracted through this political climate.

### **Recruitment and Selection of Participants**

In the previous academic year, specifically, April of 2012, the CLIC research team held a professional development event, entitled, "Teaching science and mathematics to African American and Latino children: A conversation among teachers." During this event, the PIs shared some of their previous research and engaged teachers from CPS around issues of identity and content learning. One motivation for the professional development was to identify teachers who would be willing to participate in the CLIC research study in the

following year. Using potential leads from the professional development session, the PIs contacted several teachers and received recommendations for participants.

By July of 2012, four teachers had been identified: an upper elementary mathematics teacher, a lower elementary mathematics teacher, an upper elementary science teacher, and a lower elementary science. These teachers attended a four-day workshop in which the details of the CLIC study were discussed in a collaborative forum. Due to a professional conflict, the upper elementary mathematics teacher withdrew from the project. A new upper elementary mathematics teacher was not replaced until late November.

The school year began in mid-August with my entire focus on the lower elementary mathematics teacher, Ms. Ms. Patterson Patterson. Ms. Patterson is a middle-aged, self-identified Black woman. She is small in stature with a particularly courteous nature. For example, she refers to everyone as “Mr.” or “Ms.” Ms. Patterson was previously an early-childhood teacher but had transitioned to elementary during the last eight years. I developed a strong, amicable relationship with Ms. Patterson.

Over the course of the year, the number of students on Ms. Patterson’s roster reached a total of 26 (13 girls and 13 boys), but there were never more than 18 to 22 children in her classroom on any given day, as different students withdrew and enrolled over the course of the year. All of the children in Ms. Patterson’s class were categorized as Black/African American according to school records.

I distributed the assent forms on my second visit to the initial group of children and all but one student agreed to participate that day. (This child later changed his mind and agreed to participate in the study.) As new students enrolled, I would talk with them individually during a quiet moment and send a consent form home with them. By the

study's conclusion (with Ms. Patterson's assistance), I had received consent and assent forms from the parents and students with a participation rate of 85% (with 100% participation of the girls).

I also maintained positive relationships with almost of all of Ms. Patterson's students. I certainly was fond of particular students—some for their energy and enthusiasm and others for their polite nature. I had little jokes with a few of the children. I was always greeted with hugs and addressed by the moniker, "Ms. Maisie." I had deep affection for Ms. Patterson's students and saw these students as a "fictive kin" of sorts that deserved care, patience, and concern—as if they were my children. During my time at June, I was skeptical that this sentiment of care was shared widely among the teachers and staff. My affection led me to an emic perspective. That is, my desire increasingly became to understand more fully the world from the students' point of view. This affected my perspective and purpose for data collection.

### **Participants**

My study focuses on the girls of Ms. Patterson's class. Table 1 describes the girls, who were members of Ms. Patterson's class for the majority of the year. The girls were identified by their school records as Black/African American. As shown in **Table 1**, all of the girls in the study were nine years of age by the end of the school year. Brittany, the oldest, was the first of the girls to be turning ten in the summer. With respect to math grades assigned by Ms. Patterson, most of the focal girls scored primarily Bs during each grading period. However, Mia scored mostly As. There does not appear to be much distinction between the girls from the perspective of Ms. Patterson's gradebook. Yet, the

girls' assessment scores suggest varying level of competency in mathematics over the academic year.

The girls took three assessments at different times during the year—during the fall around early September (BOY), during the winter in January (MOY), and, finally, during the summer in June (EOY). By the end of the year, Mia is ranked in the 84<sup>th</sup> percentile, whereas Jenique and Brittany are ranked in the 53<sup>rd</sup> and 59<sup>th</sup> percentile, respectively. These girls improved in their ranking over the course of the year. The ranking of the other focal girls, Shawna, Lamaresha, and Heaven, declined or plateaued over the course of the year around the 30<sup>th</sup> percentile.

Name	Race	Age in Yrs (Birth Month)	Math Grades and Test Scores				Attendance and Discipline Data	
			Final Math Grade	Test Score (Percentile Rank Nat'l)			Absences	Suspensions
				(BOY)	(MOY)	(EOY)		
Mia	Black/AA	9 (Sept)	91	56%	65%	84%	5	0
Jenique	Black/AA	9 (Apr)	88	24%	32%	53%	10	1
Brittany	Black/AA	9 (Jul)	84	24%	53%	59%	7	0
Shawna	Black/AA	9 (Mar)	84	47%	29%	--	8	2
Lamaresha	Black/AA	9 (Feb)	82	38%	29%	35%	20	0
Heaven	Black/AA	9 (Mar)	85	29%	38%	38%	29	0
Taylor	Black/AA	9 (Unknown)	65	< 1	6	< 1	6	0
Lanae	Black/AA	9 (Unknown)	71	17	10	27	10	0
Joi	Black/AA	9 (Unknown)	81	32	38	30	7	0
Aliyah	Black/AA	9 (Unknown)	68	3	6	3	10	0

Table 1-Demographic, achievement, attendance, and school discipline data.



**Figure 6, Figure 7, and Figure 8** describe the girls' growth on district benchmark tests. These figures show projected gains or losses between BOY and MOY; MOY and EOY; as well as BOY and EOY. Meeting or exceeding projected gains in comparison to students of similar ability level is characterized as "positive growth," whereas "negative growth" means gains (if any) were less than the projected gains for students of similar ability level.

In **Figure 6**, three girls, Lamaresha, Shawna, and Lanae show negative growth in the first semester. The rest of the girls in the class show positive growth. In particular, Brittany and Taylor exceeded their projected gains by large margins, whereas Mia, Jenique, Joi, Heaven, and Aliyah exceed their projected gains by less than one standard deviation.

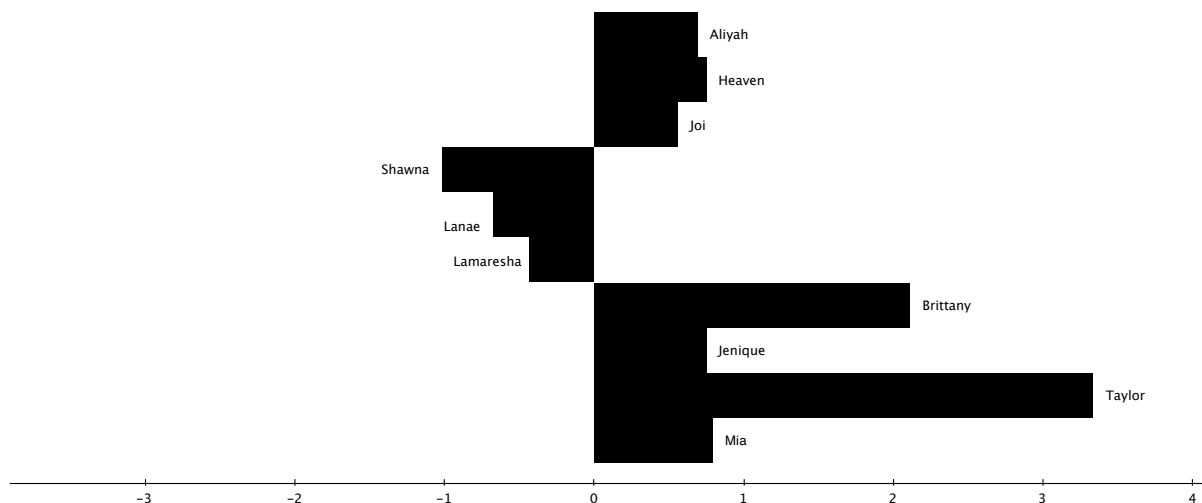


Figure 6- Growth of girls on district benchmarks between BOY and MOY.

**Figure 7** shows in the second semester an entirely new set of girls experience negative growth, including Heaven, Joi, Aliyah, and Taylor. Some of the girls, Mia, Jenique, and Lanae exceeded their projected gains, whereas others, namely, Brittany and Lamaresha, essentially met their projected gains. Shawna transferred before sitting for the EOY assessment in the summer. As such, growth data is not available for Shawna between the BOY and EOY.

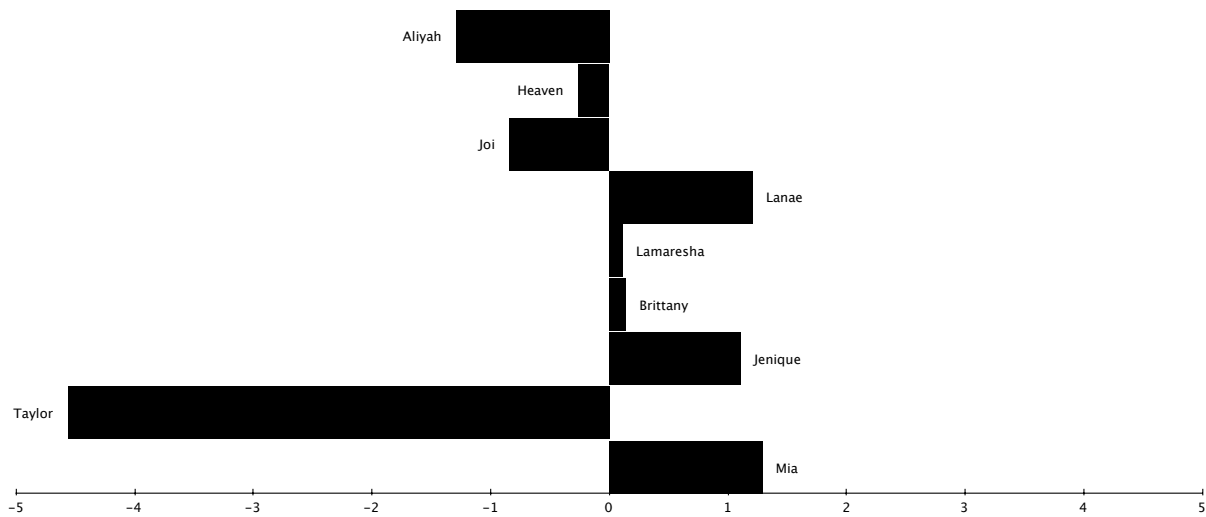


Figure 7-Growth of girls on district benchmark between MOY and EOY.

In terms of growth over the academic year, as shown in **Figure 8**, five of the girls, Mia, Jenique, Brittany, Lanae, and Heaven, showed positive growth. The other girls, Taylor, Joi,

Lamaresha, and Aliyah, showed negative growth. Again, because Shawna transferred before the EOY assessment, growth scores are not available for her.

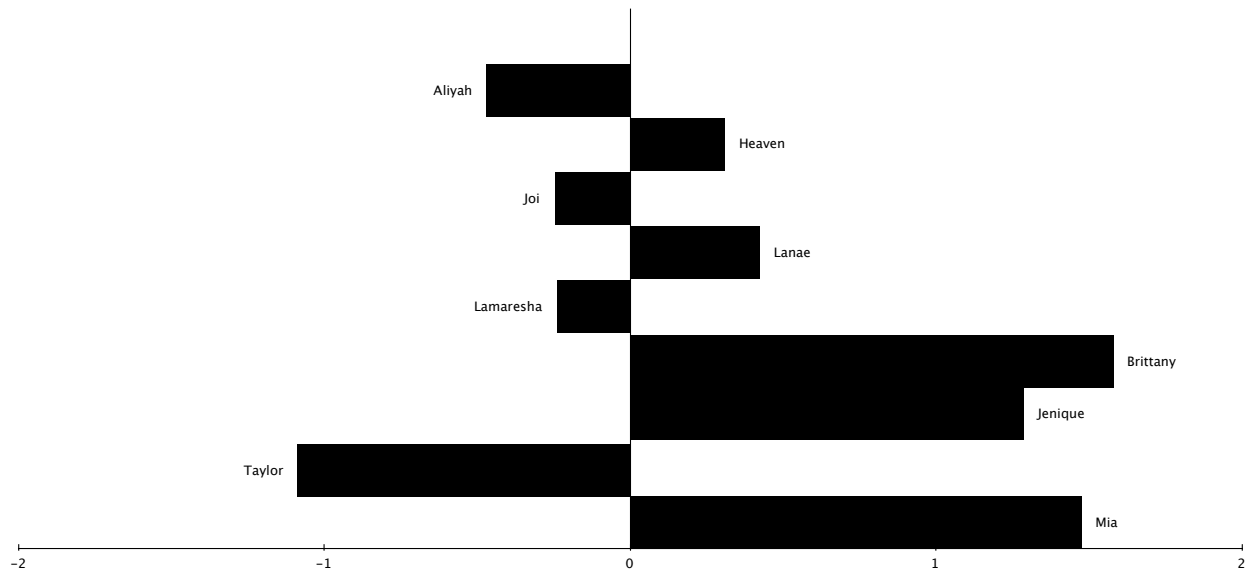


Figure 8-Growth of girls on district benchmarks between BOY and EOY.

With respect to attendance and discipline data of the focal girls, Heaven had the most unexcused absences at twenty-nine, followed by Lamaresha with fourteen, then Brittany and Shawna both with seven, Jenique with four, and, finally, Mia with three. Only two girls were suspended. Jenique was suspended once and Shawna was suspended twice over the academic year.

### Focal Girls

In **Table 2**, I provide a summary of the focal girls with respect to their physical appearance, home background, gender performance, and academic characteristics. The

girls embody a range of physical characteristics from their stature, skin color, and hair styling, which position them as particular kinds of Black girls and project particular kinds of socio-economic statuses.

While the girls' home background provides superficial information about their home lives, this data is useful insofar as these descriptions reveal the variety of living arrangements and support structures for young Black children. Three of the girls live within family structures that extend beyond the typified meanings of nuclear family (cf. Jarret & Burton, 1999). For example, Mia and Jenique live with their grandmothers, and Lamaresha lives with her aunt. Also, this data counters narratives about the exclusively matriarchal structure of Black families (Smith, 1982). Jenique, Brittany, and Heaven all live with their father or stepfather, and Shawna's father despite not living with her, according to Ms. Patterson, was very active in her schooling.

<b>Name</b>	<b>Physical</b>	<b>Background</b>	<b>Gender</b>	<b>School</b>
Mia the Model Student	Light brown-skinned; skinny & tall; long, braided plaits	Lives with grandmother and younger brother	Hyper-girlish	<ul style="list-style-type: none"> <li>• “A” student;</li> <li>• regular attendance;</li> <li>• no discipline issues;</li> <li>• enjoys school;</li> <li>• considers herself to be good at school</li> </ul>
Jenique the Enforcer	Medium-brown skinned; chubby & average height; long braided extensions or plaits	Lives with father and grandmother	Girlish	<ul style="list-style-type: none"> <li>• “A/B” student;</li> <li>• regular attendance;</li> <li>• one major discipline issue;</li> <li>• ambivalent about school;</li> <li>• doesn’t consider herself to be one of the better students</li> </ul>
Brittany the Helper	Dark-brown skinned; average-stature & tall; long braided plaits	Lives with mother, stepfather, and siblings	Hyper-girlish	<ul style="list-style-type: none"> <li>• “B” student;</li> <li>• regular attendance;</li> <li>• no discipline problems;</li> <li>• loves school;</li> <li>• considers herself to be an improved student</li> </ul>
Shawna the Bully	Medium-brown skinned; chubby & tall; short cornrow braids	Lives with mother and older sisters	Tomboyish	<ul style="list-style-type: none"> <li>• “A/B” student;</li> <li>• minor attendance issues;</li> <li>• major discipline issues;</li> <li>• ambivalent about school;</li> <li>• does not consider herself to be a good student</li> </ul>
Lamaresha the Enthusiast	Dark-brown skinned; skinny & short; semi-straightened hair worn in pony tails	Lives with aunt, mother, cousins, and siblings	Tomboyish	<ul style="list-style-type: none"> <li>• “A/B” student;</li> <li>• major attendance issues</li> <li>• no discipline issues;</li> <li>• loves school;</li> <li>• considers herself to be a good student</li> </ul>
Heaven the Fallen Party Girl	Medium-brown skinned; skinny & tall; short cornrows braids or afro-puffs	Lives with mother, father, and sisters	Girlish	<ul style="list-style-type: none"> <li>• “A/B” student;</li> <li>• major attendance issues;</li> <li>• no major discipline issues;</li> <li>• enjoys school;</li> <li>• considers herself to be a perfect student</li> </ul>

Table 2- Summary of the focal girls

Additionally, in **Table 2**, I provide some coarse descriptions of the girls' emergent gender racial identities. For gender identity, I assigned three different categories, including hyper-girlish, girlish, and tomboy. As an example, Mia signaled her gender identity through overt means of dress—lip-gloss, hair styles, and use of color, such as pink. Other girls, like Heaven, were more modest in their dress, but were primarily concerned with stereotypically girlish activities, like singing, dancing, or playing with hair. And still, other girls, such as Lamaresha and Shawna, were overtly tomboyish. This was conveyed through dress, usually pants with no color or girlish adornments, as well as a tendency to roughhouse with the boys and sometimes other girls.

Finally, with respect to the girls' academic identities, Lamaresha, Mia, and Heaven describe themselves as “the good one,” “the smart one,” and “kinda perfect student,” respectively. Brittany describes herself as “an excited student,” who has improved from being in third grade last year. These girls have positive academic identities. However, Jenique and Shawna do not consider themselves to be good students. Jenique and Shawna's negative self-assessments as students relate to their struggles to enacting “good student” behaviors, such as being quiet, nice, and doing their work.

### **Data collection**

Over the course of the year, I collected various data as shown in **Table 3**.

### **Observations**

I visited Ms. Patterson's classroom approximately 35 times for classroom observations over the course of the academic year. On the weeks that I observed Ms. Patterson's classroom, I visited twice or three times during the week. I took on the role as participant

<b>Data Type</b>	<b>Quantity</b>	<b>Description Frequency</b>
<b>Classroom observation</b> <i>(Video recordings with a stationary camera and moving camera)</i>	33 <i>(54 recordings; each 60 to 90 minutes)</i>	Every class visit throughout the year
<b>Field notes</b>	35 <i>(5-80 sheet steno pads)</i>	Every class visit throughout the year
<b>Small group work (audio recordings)</b>	80 <i>(each 30 to 90 minutes)</i>	During group work throughout the year
<b>Student work</b>	~500 pages	Every class visit throughout the year
<b>Artifacts</b>	~100 articles, including photographs, student drawings, or miscellaneous documents	Occasionally
<b>Achievement data</b>	3 district-benchmark tests, state-standardized annual scores, & classroom grades	Three sessions in fall, winter, and spring
<b>Attendance data</b>	Totals for the year	Once at end of the year
<b>Student interviews of focal students</b> <i>(video recordings)</i>	30 interviews <i>(3 interviews for each focal student)</i>	Three sessions in late summer, winter, and spring.
<b>Teacher post-reflection interviews</b> <i>(audio recordings)</i>	18 interviews	Occasionally (mostly in the fall)
<b>Community artifacts</b>	~50 articles, including letters, fliers, field notes & audio recording from community meeting, etc.	Occasionally

Table 3-Data collected in Ms. Patterson's 3rd grade classroom.

observer, partly because Ms. Patterson's instruction demanded the engagement of anyone who entered her classroom for a sustained period of time. Also, authentic participation was

my way of developing rapport through “trust and cooperation” (Jorgensen, 1989), as an outsider to the community. I also took an ethnographic approach to the data collection and observation, meaning I used thick description (Geertz, 1973) in an attempt to best capture the classroom culture with detail and specificity.

#### *Field notes and memos*

There are approximately five 80-page stenographer pads of field notes. These notes vary in quality and length. Most of the field notes include references to who was absent that day; seating arrangement, particularly, if relevant to the activity; rough dialogue; and what I considered noteworthy interactions between students. Especially at the beginning of the year, some of the field notes are accompanied by reflection memos, which capture my thoughts about individual students and the class as a whole. In Appendices A and B, I include a first draft list of guiding principles for classroom observations, as well as a list of field note cues that I use to help focus my observation of the classroom.

#### *Video recordings of whole-group*

In addition to the field notes, with the exception of two observation days (where I did not yet have full assent and consent), there are video recordings of the classroom activity. After the third visit, I realized that one video camera was insufficient in capturing the activity in Ms. Patterson’s classroom. I petitioned the PIs for a second camera to be used a stationary camera for capturing a “wide shot” of the room and the first camera would be used with a dolly to follow class transitions and zoom into small groups. The majority of the classroom observations include two camera angles of the classroom activity.

#### *Audio recordings of Small-group*



When students were situated in small groups a set of audio recorders were positioned at their desks or on the floor to capture group conversations. In more than half of the classroom observations, students were working in groups.

## **Interviews**

To better understand the teacher and children's perspective to classroom phenomena, interviews were conducted during the academic year.

### *Student*

A subset of the students in Ms. Patterson's class was interviewed. These students were referred to as *focal students* and initially included five boys and five girls. However, after the initial days of interviewing, I added a sixth girl and, after one of the boys left during the middle of the year, I added a sixth boy, as well. These students were selected collaboratively with Ms. Patterson to reflect a range of mathematics performance and personality, keeping in mind student's attendance patterns. Students were interviewed in the fall, winter, and spring using a semi-structured protocol design to understand a range of children's lived experiences. There were sections in the protocol that posed questions of children's home life, being Black (or African American), school, mathematics, as well as a set of student specific questions regarding events in the classroom. The interview protocols are included as Appendix C.

### *Teacher*

I also interviewed Ms. Patterson occasionally to get her sense of one or more students and record how she felt the students received particular lessons. A majority of these interviews were conducted in the fall. A standard list of questions is included as Appendix D.

### **Student work, Artifacts & Other Data**

Finally, a great deal of student work was collected. Class assignments were collected on the day of observation, as well as work that related to identity on any day. Identity work included journal entries or home projects. Other classroom artifacts were photographed and/or collected to give a sense of the classroom culture. At the end of the year, students' grades for each six weeks were also collected, along with their attendance data. Further, standardized tests scores were collected including district benchmark tests and students' standardized state assessment scores. I also collected letters from the school district that were sent to the community and parents. Finally, I also attended a community meeting where the closure of June was being discussed. I have field notes and an audio recording from that event. The district also posted video recordings from this event, which has been downloaded.

### **Teacher Meetings**

The teachers from the study, including Ms. Patterson, also participated in bi-monthly teacher meetings with the PIs and graduate assistants. During these meetings, the PIs developed an agenda and the group discussed issues relevant to the CLIC theoretical framework. For my purposes, these data have been used sparingly and have been excluded from **Table 3**.

## **V. OVERCOMING ANALYTICAL CHALLENGES TO STUDYING BLACK GIRLS LEARNING MATHEMATICS**

This chapter explores the analytical complexity of studying Black girls' participation in their mathematics classroom. This analytical complexity is not exclusive to Black girls, but highlighted by taking seriously the intersection of race and gender in mathematics learning. I begin by describing the analytical challenges of studying Black children and introducing Martin's (2012) integrated framework for studying "learning mathematics while Black." Using Martin's framework, I propose four analytical methods to consider the mathematics learning at the macro-, meso-, and micro-levels. I characterize my analytical approach as a methodological eclecticism and defend this approach by leaning on Black feminist theories. I conclude the chapter with a detailed account of how I used portraiture as a solution in tying the seemingly disparate methods of social network analysis, ethnographic analysis, and identity analysis.

### **The Challenge of Analysis**

My analytical framework is primarily qualitative, adapting several methods including: social network analysis (Borgatti, Everett, & Johnson, 2013; Cairns, Xie, & Leung, 1998), identity analysis (Sfard & Prusak, 2005), ethnographic analysis, including aspects of microethnography (Bloome et al., 2005), and portraiture (Lawrence-Lightfoot & Davis, 1997). I have selected these methods to integrate multiple analytical levels—a known challenge in studying Black children's learning and participation in mathematics (Martin, 2012). Schoenfeld (2006) (as quoted by Martin) puts the challenge this way:

The grand theoretical issue is how to meld such theoretical perspectives, and other powerful perspectives, into or with the sociocultural and cognitive perspectives that now predominate in discipline-oriented fields such as mathematics education...The issue is how to put things together—how to see everything connected to an

individual...and the communities to which the individual belongs as a coherent whole.... What is called for in theoretical terms is specifying the linkage between...identity and knowledge base. (Schoenfeld, 2006, pp. 497-500)

How then does one study metacognition, knowledge, and beliefs in mathematics learning, while attending to the racialized and gendered complexity of a young Black girl's life? Once we have analytically broken her apart, how do we put the Black girl back together again and learn something meaningful from her life experiences as a mathematics learner? Martin (2012) proposed an integrated framework for studying "learning mathematics while Black." His framework included micro-analytic concerns introduced by Schoenfeld (1985), i.e., knowledge base, heuristics, metacognition, and beliefs; meso-analytic concerns, i.e., mathematics socialization and identity experiences; and macro-analytic concerns, i.e., phenomenal Black realities. I have modified this framework to include social relations and networks within the meso-analytical level, an often overlooked level that connects children's broader, phenomenal realities to their identities and socialization. The values of being Black, being a girl, being a child, as well as a mathematics knower and doer, exist in a larger social context, but these meanings are negotiated and meted out within smaller organizational structures, such as classroom social networks, cliques, and friendship dyads. I take a structural approach to the phenomena of children's mathematics learning, suggesting that it is necessary to understand the social structure of the classroom and to view this structure as relatively stable and durable (cf. Stryker, 1980).

For each of these analytical levels, as shown in Figure 5 (a modification of Martin's (2012) figure), I use appropriate methods to describe the phenomena of the Black girls' learning mathematics in Ms. Patterson's class. I used *social network analysis* to establish the social relations and structures operating among the girls in the classroom. I also used

*identity analysis* to individually characterize the girls' beliefs, mathematics socialization, identity experiences, and phenomenal realities. I relied on *ethnographic analysis* to describe moments, events, and processes (i.e., culture) that relate to the girls' practices, mathematics socialization, identity experiences, and phenomenal realities. Finally, through *portraiture analysis*, I combine these disparate analytical techniques aesthetically and empirically to construct a coherent, compelling narrative—a gestalt. In the following sections, I describe the analytical techniques in greater detail.

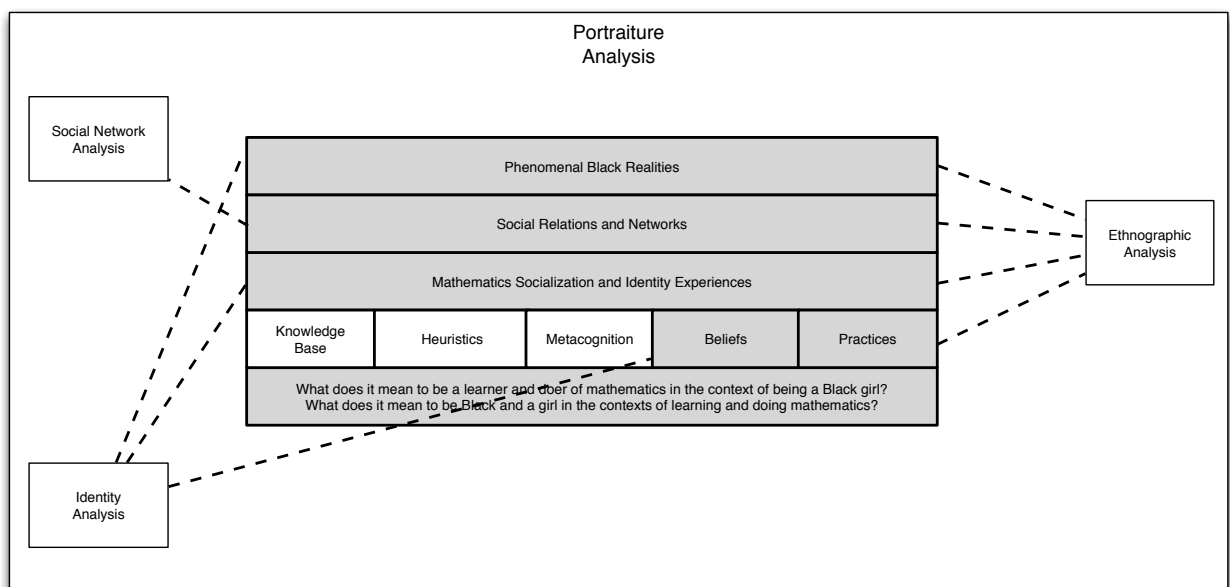


Figure 9- A modified integrated framework for studying "learning mathematics while a Black girl."

### What Does It Mean To Go "A Piece of the Way"?

Perhaps an expected critique to my analytical approach is, as the girls would derisively say to one another, "You doin' too much!" In this context, meaning there is no real benefit to

the use of different methods, like social network, identity, and ethnographic analysis. However, I argue that the *methodological eclecticism* represented by the above methods is necessary to meet theoretical and methodological challenges of linking Black children's knowledge, identities, and phenomenal realities (Martin, 2012). The challenge, as I see it, is not about how to analyze the parts (see the elements comprising **Figure 9**)—this has been done before and done brilliantly by others, who precede me (e.g., Berry, 2005, 2008; Larnell, 2014; Martin, 2000; McGee & Martin, 2011; Stinson, 2008; Terry, 2011). The present challenge is how to recreate a new whole from the elements of beliefs, practices, mathematics socialization, identity experiences, social relations, and phenomenal realities to articulate something meaningful about mathematics learning and participation that may build up to more than these constituent parts.

So, while I believe these methods are necessary, I take them only “a piece of the way,” as they move me closer to analyzing the phenomena of the meditational effects of the girls' social network on mathematics learning. Davies (1994) pulls from a Zora Neale Hurston tale that articulates a relational model with “strangers.” Hurston described after waving and exchanging pleasantries with a stranger that she would “[go] a piece of the way with them” towards their destination. Davies eloquently argues:

In this formulation, then, I want to engage all of these theories [and methods] as visitors. This comes from the recognition that going all the way home with many of these theoretical positions—feminism, post-modernism, nationalism, Afrocentrism, Marxism, etc.—means taking a route cluttered with skeletons, enslavements, new dominations, unresolved tensions and contradictions. Following many of the theory/theorists “all the way home” inevitably places me in the “homes” of people where I, as a Black woman, will have to function either as maid or exotic, silenced courtesan, but definitely not as a theoretical equal. Going all the way home with them means being installed in a distant place from my communities. I believe that the “visitor theory” approach offers a technique of interaction similar to the intention of “multiple articulations.” It becomes a kind of *critical relationality* in which various theoretical positions are

interrogated for their specific applicability to Black women [and girls'] experiences and textualities and negotiated within a particular inquiry with a *necessary eclecticism*. It is a particular way of reading or writing the Black/female experience which plays on a variety of possible configurations. It is at once a process and a pattern of articulations. (p. 46)

Leaning on Davies, I do not purport fealty to any methodological approach per se. My interest is in the articulation and preservation of Black girls' experiences in Ms. Patterson's class as mathematics learners. As such, I go "a piece of the way"—a distance with each method— as method informs the portraiture and helps to construct a credible and believable story of the girls.

### **Portraiture as a Solution to a Challenge**

Portraiture analysis was used in developing a coherent narrative that integrated the social network, identity, and ethnographic analysis. Sara Lawrence-Lightfoot defines social science portraiture as "a method of qualitative research that blurs the boundaries of aesthetics and empiricism in an effort to capture the complexity, dynamics, and subtlety of human experience and organizational life" (p. xv). Portraiture is a method that endeavors to construct an empirically-based, aesthetic whole, whose sum is greater than its parts. To create such a whole, Lawrence-Lightfoot (1997) attends to four dimensions:

[T]he first is the *conception*, which refers to the development of the overarching story; the second is the *structure*, which refers to the sequencing and layering of emergent themes that scaffold the story; third is the *form*, which reflects the movement of the narrative, the spinning of the tale; and last is the *cohesion*, which speaks about the unity and integrity of the piece. (emphasis added, p.247)

With respect to conception or overarching story, this is best captured by the conceptual map in **Figure 5**. Initially, through the person of Shawna, I came to realize that there was a struggle between her social position as a bully and outsider to the other girls and her participation during mathematics learning. This observation was broadened to understand

the negotiation between the girls' social network and their participation within the community of practice.

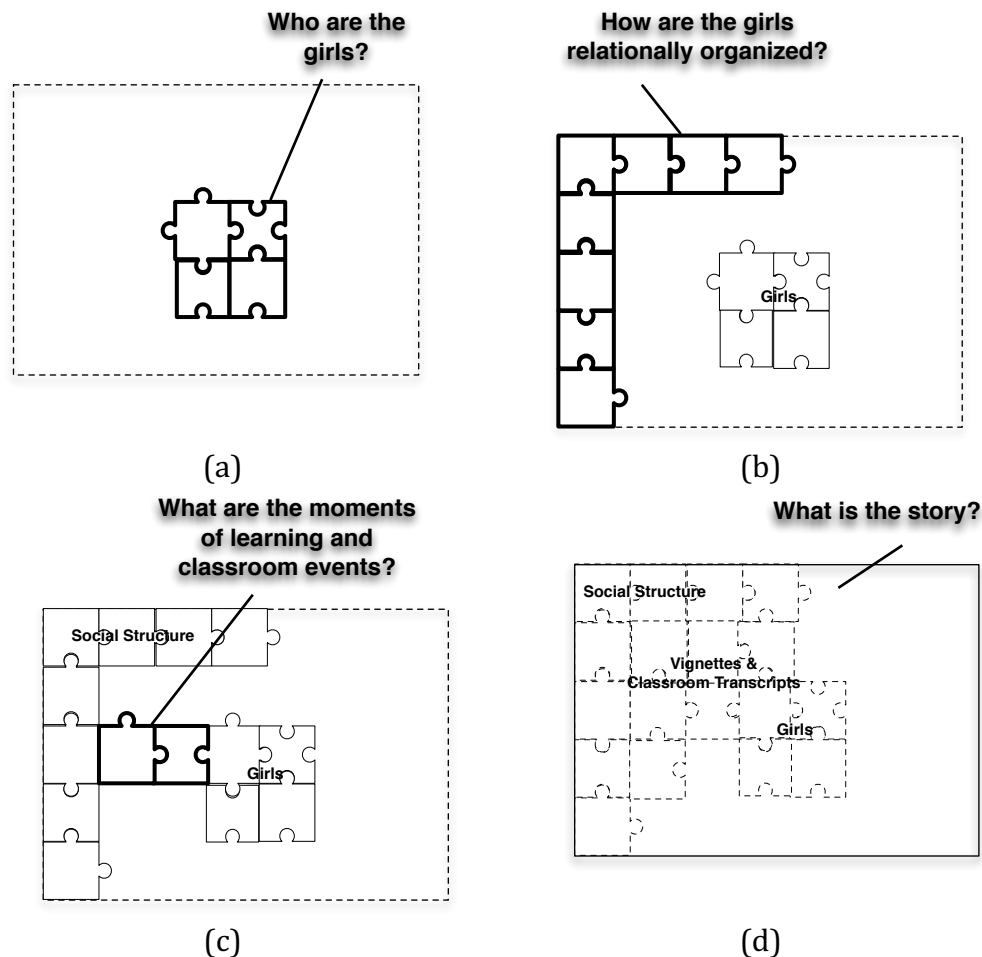


Figure 10-The creative process for constructing a gestalt of mathematics learning and participation includes (a) identifying who the girls were as individuals, (b) establishing the relational structure between the girls, (c) strategically selecting moments of learning and classroom events and (d) constructing a coherent story comprising the respective parts.

However, the story is structured and sequenced using the findings from the social network analysis (both quantitative and qualitative). These analyses reveal the girls' social network shifted between periods of relative calm characterized by the maintenance of



social relations to contentious periods characterized by reformation of social alliances. The portrait of the girls learning mathematics in Ms. Patterson's class is described in four phases as the girls maintain and reform their social network.

With respect to form, it is a high status social cluster in the girls' social network that animates the story. In particular, the shifts in membership within and around this social cluster create movement for the girls' story as mathematics learners. The dissolution of a friendship and the formation of another between girls, who we come to identify as particular kinds of young Black girls, drives a tale of social support in mathematics learning and participation.

Finally, with respect to cohesion, I selected a series of vignettes and excerpts from classroom transcripts from the observational days to construct a unifying narrative. LeCompte and Schensul (2013) define vignettes as "snapshots or short descriptions of events or people that evoke the overall picture the ethnographer is trying to paint" (p. 269). Vignettes can be normative depictions describing a typical day in the classroom, for example, or critical events signifying a turning point in the course of events (LeCompte & Schensul, 2013). The vignettes were chosen to balance normative and critical events. For example, physical fights although frequently referenced by the girls rarely occurred in the classroom. However, towards the end of the year, a physical fight broke out in the class. I included this as a vignette, because it encapsulated the themes of tension and conflict among the girls. Of course, several of the other vignettes describe the normative practices within the mathematics class. These vignettes generally describe the children sitting on rugs, engaging in classroom conversation, and cooperating with one another. The critical

vignettes are used to push the narrative, whereas the normative vignettes anchor the narrative to the classroom daily life.

In addition to the vignettes, I also incorporated classroom transcripts to create cohesion and a more intimate perspective to the girls as learners. In this sense, I move liberally between microethnographic and traditional ethnographic accounts of the phenomena. For example, in one section, I begin with a vignette of the classroom events followed by two simultaneous classroom transcripts of two different social groups. The vignette is based on participant observation and the mapping of events at the classroom level and the classroom transcripts provide an inner view of the talk between girls of two different social clusters. The former being associated with more traditional ethnographic work and the latter likely characterized as microethnographic.

Despite criticisms between these two camps—(macro)ethnographers and microethnographers—of one another (Philips, 1993), I am all but forced to trade between these two scales of ethnographic description to document the inner workings of social networks in mathematics classrooms at the meso-level. In Ms. Patterson's classroom, the girls' social groups, triads, and dyads represent a meso-level or mediating structure between the larger school forces and the girls' interpersonal interactions. In other words, social networks, as organizations and communities, are neatly juxtaposed between the macro- and micro-analytical levels (Bruhn & Rebach, 2007). In order to keep track of the classroom and the girls as a whole, their social groups, as well as the unfolding of face-to-face interactions, I selected data sources at different analytical levels. However, via portraiture, I attempt to create a unifying and coherent whole that is neither entirely macro

or micro-analytical, but a compromise, reaching towards meso-analytic ethnographic description.

### **A credible and believable story**

With this tangle of method and the analytical ambiguity consonant with the meso-analytical level, how does one evaluate the present study of Black girls' learning mathematics specifically, but portraiture, more generally? Following Goetz and LeCompte (1984), Lawrence-Lightfoot and Davis (1997) assert that the quality of portraiture is measured with respect to the development of a "credible" and "believable" story. For Lawrence-Lightfoot and Davis, they use criteria proposed by Eisner (1985), as well as Miles and Huberman (1994). For example, Eisner suggests structural corroboration and referential adequacy. With respect to structural corroboration, Eisner is quoted as, "Evidence is structurally corroborative when pieces of evidence validate each other, the story holds up, the pieces fit, it makes sense, the facts are consistent" (p. 245 of Lawrence-Lightfoot and Davis, 1997). In the present study, irrespective of the disparate the methods, the individual findings analyses cohere and reinforce the girls' participation in the mathematics classroom as a function of the shifts in the social network. I believe the present study also passes muster with respect to referential adequacy given that much of the raw observational data has been archived and upon further analysis would most likely reveal similar patterns with respect to the girls' social status and participation.

Miles and Huberman offer two different relevant criteria, holistic fallacy and elite bias. With respect to holistic fallacy, the messiness of classroom life, for example, is interpreted as more patterned and congruent than reality provides, whereas elite bias cautions against relying too heavily on high-status, articulate participants over low-status, less articulate

participants. In the present study, there is a lure to describe the girls' participation with their social status linearly—the higher status, the greater the participation within the classroom. However, I have intentionally included vignettes that show one girl's (Lamaresha) vigorous participation, in spite of her low social status. More than construct a simple picture of social power and classroom participation, I attempt to characterize the conditions in which social status and participation are mutually enforcing or create tension. Further, to guard against elite bias, I include girls within and outside of the high status social cluster. While the conflict within the high status girls group does animate the narrative, girls from different social status (at different times) provide their perspective on the functioning of this group, its effect on the classroom, in addition to its effects on individual girls.

### **Social network analysis**

With respect to the social network analysis, I used the girls interview data to create a set of relations between the girls. These data were presented in tables as sociomatrices and used in two different social network analysis programs, UCInet (Borgatti, Everett, & Freeman, 2006) and NodeXL, a software plug-in for Microsoft Excel™ 2007. A variety of measures were generated using these software, including network level measures, such as cohesion, density, geodesic distance, degree, and fragmentation, as well as node level measures, such as degree, betweenness, closeness, and eigencentrality. NodeXL also was able to generate sub-graphs or sociograms that represent an individual girl's proximal relations at varying geodesic distances. These quantitative measures were helpful in describing the social position of the girls and shifts in their positions over the course of the academic year.

## **Identity analysis**

Identity analysis was also used to generate portraits of the girls and describe their identities as academically, mathematically, and racially (cf. Varelas, Martin, & Kane, 2012). These portraits were developed using demographic data, data from Ms. Patterson's gradebook, test score data, and, most extensively, interview data. With the exception of one girl, the girls were interviewed three times over the school year. Each interview was coded structurally and descriptively (Saldaña, 2009), using MAXQDA. Structural codes were applied by question number and by question topic within the interview protocol, namely, "background," "neighborhood," "being Black," "mathematics," "school," etc. The interviews were read multiple times and descriptive codes were also applied for other emergent patterns. Structural and descriptive codes relating to the girls' academics, mathematics experiences, and race-based experiences, respectively, were grouped by girl and then summarized. The portraits are re-presentations of these summaries, which include some direct quotations when clarifying.

The girls' responses to interview questions were also analyzed across girls. For example, in the case of the girls' conceptions of being Black, I read and re-read the girls' responses to the interview questions and generated a list of categories: linguistic, history, skin color, humanist, nationalist, etc. These categories were then organized into broader themes: observable performances, socio-cultural/historical, physical features, and ideological/political. Each girl's summary of being Black was assigned one or more of these themes based on their responses in the interview data.

Finally, constructs from Martin (2000) and Cobb, Gresalfi, and Hodges (2009) were used to generate a comprehensive list for characterizing mathematics identity. These

constructs were often useful, but reinterpreted so as to align with the interview protocol of the present study. Questions from the interview protocol were associated with one or more constructs, such as their views on the nature of ability, their perception of mathematics authority, their understanding of how mathematics problems should be approached, or their belief about their own and others ability, as some examples. The girls' responses to these questions were read to develop overarching categories. For example, in Martin's (2000) multilevel framework, there is a construct related to "beliefs about math ability." This construct was matched the interview question: "Think about your classmates: do you think some of your classmates who do well in mathematics/science are naturally good at mathematics/science or do they practice and study?" For Martin beliefs about mathematics ability related to positive, negative, or mixed feelings about one's ability, whereas in the present study beliefs about mathematics ability was conceived in terms of being natural versus effort-based. For the construct of belief about math ability, each girl was assigned to a category— effort-based or naturalized— based on her interview response. A similar process was used for the other mathematics identity constructs.

### **Ethnographic analysis**

In addition to the social network analysis and the identity analysis, the present study also relied upon (micro)ethnographic analysis (Bloome et al., 2005; Philips, 1983). That is, the girls' social network, as well as their identities, are informed by the (micro)ethnographic analysis. For example, the quantitative analysis makes clear that substantive shifts occurred within the social network. Yet, the factors, which led to shifts in the social network, were established by the fieldnotes, interview data, photographs, videorecordings, etc.

Similarly, the girls' narrated identities as presented in the interview data provide a useful way to understand these Black girls as mathematics learners. However, the girls' identities-in-practice are made visible by the ethnographic approach (Carlone, 2012). Additionally, characterizations of Black girlhood in Ms. Patterson's class was established through participation observation—watching the girls play and interact and attending to the subtleties of eyerolls, pencil snatching, and recoiling from or being receptive to physical contact.

Ethnographic analysis was also used to establish Ms. Patterson's classroom as a community of practice with a particular cultural ethos towards learning mathematics. I used a variety of data sources, including fieldnotes, photographs, drawings, and reflective memos to capture the features of the community of practice. I had created a on-going list of unique routines that Ms. Patterson introduced to the children. Her class patterns in terms of lessons and questioning were based on my experience as a participant observer. Additionally, observation videos for each day were coded in five-minute intervals for activity structures, i.e., whole class, small group, individual, and location, i.e., on the rug, desks, small tables, or around the room. Each observation was also coded for mathematical topics, like number and operation, and sub-topics, like multiplication or fractions.

## VI. THE SOCIAL FIGURED WORLD

The present chapter explores the social world of Black girlhood by establishing the relationships among the girls and the resulting social structures from these relational ties. The chapter begins with outlining the social network quantitatively and then moves to phenomenal realities of the girls. Both the quantitative and ethnographic accounts reveal the cultural-structural conditions of the girls as they navigate friend-making and mathematics participation and learning.

### The Quantitative Structure of the Social World

The girls' social network for Ms. Patterson's class was established using questions from the interview protocols. The girls were asked questions regarding their friendship and working relationships in the class. For example, in the BOY protocol, the girls were asked, "What about in class—who are the kids that you play and work with the most? Why do you like playing and working with these kids?" (Question 17, BOY Interview Protocol). In the MOY protocol, the girls were asked these questions separately, "Who are the kids you work with the most?" and "Who are the kids that you play or hang out with the most?" (Questions 9 and 10, MOY Interview Protocol). The girls' responses to these questions were used to develop a set a relational ties, which are represented in **Table 4** and **Table 5** below as one-mode (i.e., student-to-student) sociomatrices.

In **Table 4** and **Table 5**, the presence of a relational tie is represented by 1, where the absence of a relational tie is represented by 0. In other words, the ties are binary. The ties in this network are inherently bidirectional, insofar as if a girl (Mia) works or plays with another (Heaven), it follows that Heaven also works and plays with Mia. The underlying



assumption here is that work-play relations needn't be experienced as reciprocal, which is different from a friend nomination. Given that the relations between the girls are symmetric, only half of the tables are provided.

	Mia	Taylor	Jenique	Brittany	Lamaresha	Lanae	Shawna	Joi	Heaven	Aliyah
Mia		0	1	0	1	1	0	0	1	0
Taylor			0	0	0	0	0	0	0	0
Jenique				0	0	1	0	0	1	0
Brittany					0	0	1	0	1	0
Lamaresha						0	0	1	1	1
Lanae							1	0	1	0
Shawna								0	0	0
Joi									0	0
Heaven										0
Aliyah										

Table 4-Sociomatrix for the girls' social network at BOY.

	Mia	Taylor	Jenique	Brittany	Lamaresha	Lanae	Shawna	Joi	Heaven	Aliyah
Mia		0	1	1	1	0	1	1	0	0
Taylor			0	0	0	0	0	0	0	0
Jenique				1	0	1	1	0	0	0
Brittany					0	1	1	0	0	0
Lamaresha						0	0	1	1	0
Lanae							1	0	0	0
Shawna								0	0	0
Joi									1	0
Heaven										0
Aliyah										

Table 5-Sociomatrix for the girls' social network at MOY.

The girls were asked about their relationships with other students in their third grade class, including boys. For the purposes of the present study, only the social relationships of the girls are being examined. The girls' social network is "complete" in the sense that responses have been collected from a bounded population of actors (Gruspan et al., 2014), i.e., the girls in Ms. Patterson's classroom. It is also important to note that the social network has been established by the six focal girls, meaning the work-play responses from four of the girls are not included. Although four of the girls were not interviewed, the

depicted network is largely supported by the observational data. Additionally, the two networks represent “cross-sectional realizations” of social relationships, at two points during the academic year (p. 169). Social networks are inherently dynamic structures. That is, social relationships “form, break, strengthen, and weaken over time” (p. 169). So, the networks as represented in the tables above and the diagrams below (see **Figure 11** and **Figure 12**) are generalizations and may not reflect the social alliances between girls on a particular day; however, these networks represent the general structure of the girls’ relationships. The diagrams of the girls’ relationships are referred to as sociograms. In such diagrams, the presence of a relational tie is represented by a line (or edge) and the girls, as social actors, are represented by circles (or nodes).

### **General Description**

At the beginning of the year, in **Figure 11**, the girls’ social network comprised a social cluster of four girls, a triad, five dyads, and one isolated member. The social cluster included Heaven, Mia, Lanae, and Jenique. For descriptive purposes, I will refer to this social cluster as “the Mean Girls,” although the membership changes by the middle of the year. The other girls were connected to the Mean Girls in dyadic or triadic relations. For example, Lamaresha is connected to the Mean Girls through work-play relationships with Mia and Heaven, forming a triad. Lamaresha also shared dyadic relational ties with two other girls, Joi and Aliyah, who are otherwise disconnected from the other girls. Brittany was connected to the Mean Girls through a dyadic work-play relationship with Heaven and also shared dyadic ties with Shawna. Shawna was connected to the Mean Girls through a dyadic work-play relationship with Lanae and, as previously mentioned, also connected in a dyadic tie with Brittany. Taylor was an isolate having no reported relational ties.

By March (the middle of the year), in **Figure 12**, the girls reported a new configuration to their social network. This social network comprised a social cluster, two triads, and two isolated members. The social cluster of the Mean Girls newly comprised: Mia, Jenique, Lanae, Shawna, and Brittany. Heaven had been excluded from the Mean Girls and had formed a triad with Lamaresha and Joi. Lamaresha and Joi were also in a triad with Mia, one of the Mean Girls. Taylor and Aliyah were now both isolates.

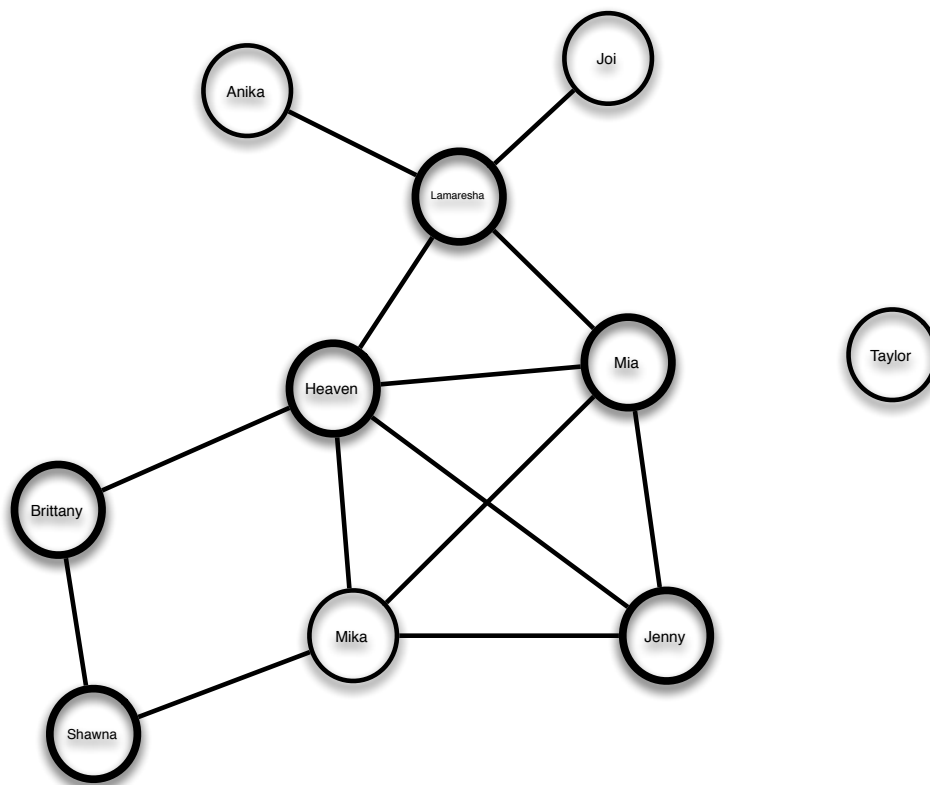


Figure 11-Sociogram of the girls' social network at BOY.

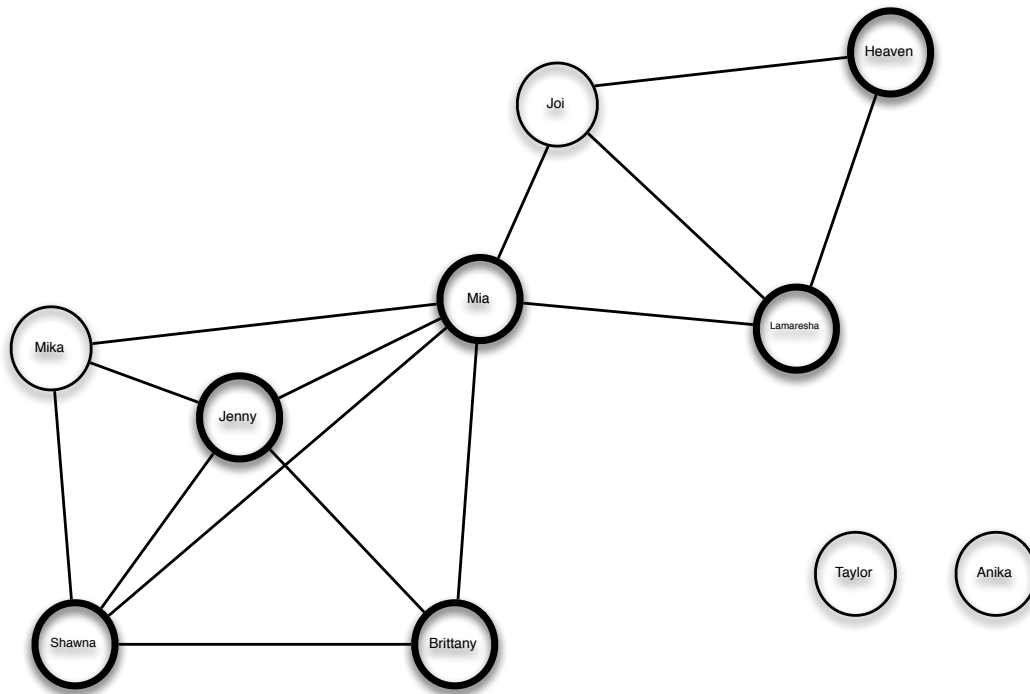


Figure 12-Sociogram of the girls' social network at MOY.

## Group Status

The social clusters can be labeled according to their status, for example, high or low status. Such labels are a function of *salience*, i.e., visibility and desirability, as well as *dominance*, i.e., the group's ability to control the actions of other girls in the classroom (Cairns & Cairns, 1994). The high or low-status label is conferred in part by the social status of the individual girls, but also as a designation unto itself that can do work to improve or diminish an individual girl's status as a member of the group. The Mean Girls in

Ms. Patterson's class was a high status social cluster and functioned as an exclusive social group. The low status triads and dyads in some ways functioned in opposition to the Mean Girls and served primarily as inclusive pairs or groups. Of course, different girls made meaning of the Mean Girls' status in different ways. Individual girls positioned themselves in relation to how they interpreted the salience and dominance of the Mean Girls.

### **Network Level Measures**

One important feature of the girls' network is to understand how the girls are intertwined relationally, i.e., the "connectedness" of the network, and how these relations changed from the beginning to the middle of the year. The girls' network can be measured in several different ways that account for the "connectedness" of the network structure: density, geodesic distance, average number of ties, and fragmentation. Each of these measures provides a different aspect of the network's cohesion and is provided in **Table 6**.

Cohesion Measures	Network 1	Network 2
Density	.289	.311
Avg. Geodesic Distance	1.71	1.48
Avg. Degree	2.8	3.2
Fragmentation (Connectedness)	.20 (.80)	.38 (.62)

Table 6-Network level measures for BOY and MOY.

In terms of network level measures, the *density* of the girls' social network increased from .289 to .311 from the beginning to the middle of the year. The inclusion of Brittany and Shawna into the high-status social cluster and the exclusion of Heaven resulted in a denser social network. The density is the probability that a tie exists between any two girls. In a classroom of ten girls, a girl is likely to have a work/play relationship with three other girls in the class. This probability increases slightly over the course of the year. As the network density increased, the *average geodesic distance* between the girls decreased. That is, the length of relational ties between girls, in the classroom has decreased. Further, the *average number of relational ties* between the girls has also increased slightly from 2.8 to 3.2. Similar to density, a girl on average has approximately three work/play ties during the school year. So, even as shifts occur in the social network, girls are not just excluded but replaced such that the average number of ties slight increased. Finally, the overall network became more fragmented as a result of two girls, Taylor and Aliyah, becoming completely isolated. Importantly, beyond these relatively minor quantitative shifts in cohesion, there was a key structural change in the network. For example, the girls' social network began as a relatively diffuse (or evenly spread) structure to a bow-tie structure in which the two distinct groups are connected via one girl, Mia.

### **Node Level/Ego-Centric Measures of Focal Girls**

The above network level measures provide an overview of the social structure and describe how tightly the girls are connected. Centrality measures offer structural information about each individual girl and how she is situated within the social network. Several different centrality scores are provided below, which highlight different aspects of the girls' importance within the social network. Degree is the most straight-forward of

centrality measures, which describes how many relational ties an individual girl enjoys. Betweenness, a geodesic (or distance) measure, describes the girls who operate as bridges or brokers between social groups. A girl with high betweenness may be easily overlooked because she is not particularly close to anyone in their social group but may be important in negotiating relationships between two distinct groups. Closeness, another geodesic measure, describes the girls that are deeply embedded in their social group. Girls with high closeness measures can generally influence their local groups and can easily spread information within their groups. Eigencentrality is a score that measures “popularity” in terms of the popularity of one’s surrounding relational ties. Therefore, a girl with relational ties with other popular girls is considered to have greater eigencentrality than a girl who has the same number of ties but surrounded by less popular girls. Girls with high eigencentrality are usually leaders of the network. The values for each of these centrality measures are provided below in **Table 7**.

In addition to an individual girl’s centrality scores, **Table 7** also includes each girl’s subgraph. Subgraphs provide an ego-centric perspective of the structural constraints and affordances of their position within the social network. When examining the subgraphs, it is a question of how the structure of a girl’s social network changed in complexity, as well as her vantage, i.e., looking out to her peers.

The subgraphs also help to describe how each girl experiences her network as, for example, “a dense local structure [that] exhibits high social closure, indicating that one’s behavior or attitudes are unlikely to escape the observation or critique of others,” or a “less dense [structure]—hav[ing] greater freedom to act or think, but have limited access to the instrumental or expressive resources” (Carolan, 2014).






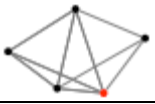

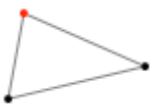






Node	Degree 1	Degree 2	Betwn 1	Betwn 2	Close 1	Close 2	Eigen 1	Eigen 2	Sub-graph 1	Sub-graph 2
Mia	4	5	4	12	.083	0.111	.174	0.172		
Jenique	3	4	0	1.33	.067	0.091	.148	0.168		
Heaven	5	2	10.5	0	.091	0.059	.190	0.040		
Brittany	2	4	1.5	1.33	.063	0.091	.072	0.168		
Shawna	2	4	.5	1.33	.053	0.091	.066	0.168		
Lamaresha	4	3	13	2.5	.077	0.083	.121	0.075		

Table 7-Node level centrality measures for BOY and MOY.

## **Egalitarianism and the Girls**

The present data supports others' accounts of Black girl peer groups, like Goodwin (1994), who describes the tendency toward an egalitarian social structure. For instance, returning to **Table 7**, consider the eigencentality values of the girls at the BOY and MOY. Among the focal Mean Girls, there is a wider variation around the mean eigencentality score for the girls at the beginning of the year (.171, SD=.0173, n=3), than the middle of the year (.169, SD=.00173, n=4). This clearly suggests that shifts within the high status girls functioned to equalize the social statuses between girls. Here, I am providing a quantitative, structural accounting of egalitarianism. Goodwin (1994) provides an ethnographic, interactional account:

Girls, in contrast [to boys], rather than using unambiguous criteria for differentiating members, display relative positionings by formulating alliances, which also shift with new activities. The resources that girls use to define themselves are not positions in competitive games, but rather relationships with other girls. Girls sanction actions that might be seen as proposing that one girl is superior to the others, and this practice has consequences for the type of social organization displayed within the group. Whereas the actions of boys revealed hierarchy, within the girls' group there were continuous processes of coalition formation as they vied with each other over who would be friends with whom and who would be excluded from such friendship arrangements...Girls differentiate themselves by formatting coalitions against particular girls (Berentzen, 1984; Eder and Hallinan, 1978; Lever, 1976b; Thorne & Luria, 1986), attempting to exclude them from valued play roles (Goodwin, 1990: 133-34). (pp. 40-41)

The interactional processes between the girls are discussed in greater detail within the narrative description of the social network. However, it is worth noting that the girls' pursuit for egalitarianism—or what they refer to as “less drama”—also reveals itself quantitatively.

## **The Phenomenal Reality of the Social Figured World**

The above section provided a structural account of the relationships between the girls. In the following section describes the inner workings of the social world. Here, I describe the history and rules of Black girlhood, in addition to Black girls at play and the meanings of embodiment for the young Black girls in this classroom.

### **The History and Rules of Black Girlhood**

#### *Grudges and relational history*

It is important to note that the girls' relationships did not begin in Ms. Patterson's third grade class. In fact, several of the girls talked about being in classes together and knowing one another since Pre-kindergarten. For example, the development of Heaven's friendships, as well as the grudges, begins in second grade, when she first arrived to the school.

#### *Story 1*

Heaven: Because when I had came here in March in 2<sup>nd</sup> grade all the kids in the classroom had a problem with me and I didn't really do nothing. So as they kept getting mad at me because the teacher kept giving me presents because I was quiet. So they had ripped the teacher book and it wasn't even mine and then they ripped my folder. They ripped everything in my desk. Then my teacher had bought me some new stuff and then they all // they all tried to fight me. So, Shawna been picking on me since 2<sup>nd</sup> grade and she been picking on Mia, but Mia she has been coming to me and I just tell her to stay calm and don't get in trouble because of her.  
(Interview, BOY)

Heaven narrates the genesis of the bad feelings between her and Shawna in second grade, as well as lays claim to her to friendship with Mia. Shawna tells an entirely different story, wherein *her* personal property, not Heaven's, was destroyed.

#### *Story 2*

Shawna: Me and my friend was talking, but she had transferred in second grade and that's when Heaven kept messing with me and I kept on telling the teacher and Heaven kept on getting in trouble. Then, and one day I had to go to the doctor. I had came back and everything was out my desk. Then it

said Heaven, Heaven, Heaven and it was her handwriting. (Interview, BOY)

What the mere text of both Heaven and Shawna's stories fails to convey is the tone of victimization and hurt. It is not only that the girls harbor animus towards one another from a year ago, but how deeply this sentiment is felt. In the same interview, Shawna makes clear that Heaven is not her friend or associate: "I play with Lanae. I mean I work with her and that's my bathroom partner. And who I don't play with is Heaven. I don't get by her or talk to her." Shawna and Heaven had irreconcilable differences that persisted throughout the year.

#### *Saying you're sorry*

Each of the girls describes their relationships with other girls over the course of the year. The girls describe the changes in their relationships as a result of gossip or a change in behavior/attitude of another girl. Within the high-status group, there seems to be a struggle for the affections/attention of the group that vacillates between Lanae and Heaven. Mia and Brittany express a desire for everyone to be friends, which Heaven does not endorse due to her history with Lanae. It seems at the beginning of the year Heaven and Lanae had a fight where a crowd of encircled them and goaded the girls into a fight. Mia, Jenique, and Brittany all described Heaven as someone who didn't want everyone to get along, because of her refusal to befriend Lanae. Heaven's recalcitrance to adhere to the social group's norms for making-up and being friends positioned her as the drama-maker.

#### *Drama-making and makers*

The changing of crews seems to be the source of the drama. "Drama" is the term the girls used to describe the relational tensions between each other. Some of the girls

characterize the relational problems as drama, because they believe that the tension could be avoided. For example, Mia, Jenique, and Brittany seem to think Heaven is the cause of the drama, because she refuses to be friends with Lanae. However, Heaven believes Lanae is the one who makes drama. Lamaresha as an outsider to the high-status group believes all of the girls within the high-status network are responsible for the drama. The girls describe drama-starting as including gossiping, calling-names, or levying insults. All of the focal girls believe that drama is the worst thing about the school year.

#### *Being (best) friends*

Being friends means: working together on assignments, sharing candy, juices and chips; sharing money; having name-brands or specialty items like Hello Kitty; eating lunch together; jumping rope; talking on the phone; doing hair; and telling secrets. These activities and practices are how the girls engage as friends, but also seem to be the activities through which bullying occurs. For example, if a girl doesn't want to share her candy, this may result in her being bullied or picked on by a girl.

#### *Bullying, getting picked on, and gossiping*

The girls acknowledge bullying (and being picked on) as a problem in their social group. It seems that the girls (and boys) can get picked on for "doing too much" (I.e., wearing jewelry or trying to be cute), getting a math problem wrong, or not sharing their snacks. Within the first weeks of school bullying had become a problem, which Lamaresha's mother felt she needed to address during Open House.

I only recall two of Ms. Patterson's students from this year coming into the room—Lamaresha & her mother and Jacob & his grandmother. Lamaresha's mother noted that Lamaresha was being bullied by Lanae and Shawna. Her mother said that she wanted to come and talk because she didn't want Lamaresha to be put in position of "snitching" on her classmates, but Ms. Patterson said I want her to tell me in front of the other girls. Ms. Patterson said she wants them to know that Lamaresha is so big

and bad that she isn't afraid to tell. Lamaresha's mother seemed unmoved by Ms. Patterson's appeals. She signed the form and they were on their way. (Reflective Memo 08/28/12)

One particularly pernicious kind of bullying that the girls described was gossiping. The girls provide a variety of examples of how gossip was used to undermine friendships or start fights. According to Lamaresha, the gossiping and drama seems to begin during lunch and recess and then continues to escalate for the remainder of the day. Goodwin's (1994) description of gossiping also seems to hold true for the girls in this class:

Reporting to a recipient what was said about her constitutes an important stage preliminary to a gossip confrontation event, the most elaborated speech event in the girls' group; it is the point at which talking about someone "behind her back" becomes socially recognizable as an actionable offense. The party talked about may then confront the party who was reportedly talking about her behind her back. Proceedings resulting from an initial telling about having been talked about may occur over several days, and the effects of the dispute be felt over several weeks. (p. 41)

Gossip was described as a precursor to a more serious confrontation—physical fighting.

### *Fights and fighting*

Fights seem to have developed from being picked on, bullied, or gossiped about. There is consensus that the girls engaged in several physical fights over the year, which made the year difficult for everyone. The girls describe several reasons that fights start: being bullied by girls and boys, mother's encouragement, encouragement from other girls or boys, encouragement from the older kids, or disagreements over work, such as cheating. Apparently, Heaven and Lanae were in the first fight of the year, where other children circled around Lanae and Heaven and goaded them into fighting. This was one of six fights that the girls describe in the interview. While some of the girls talked about the negative side of fighting, Lamaresha described fights as a form of entertainment when school is boring. Jenique described her fight with Lanae with a cartoonish flair—a re-enactment that

exhibited the entertainment value of such fights in contrast to a typical school day. To curb the number of fights, Ms. Patterson apparently threatened students' promotion to the fourth grade, which a few of the girls noted. This threat seemed to be an incentive for some of the girls to disavow fighting. Some girls had reasons of their own for not fighting. Mia didn't want to fight because she wanted a bicycle and Lamaresha said she didn't want to fight because she wanted to maintain good grades.

### *Social relations and academics*

The girls link their personal relationships with how their work gets done and how they characterize their academic year as good or bad. Several of the girls also mention that they like working with one another because there is no drama and they can focus on their assignments. On the one hand, Lamaresha argues forcefully that the girls engaging in "crews" makes girls, who would otherwise be smart, dumb. On the other hand, Brittany identifies her social group as the smart kids and draws a clear distinction between them and the "low-functioning" kids.

At the beginning of the year, Jenique did express some tension between herself and the other girls who were not doing well academically.

Maisie: Okay, so who are the kids that you play with the most?

Jenique: Mia, Heaven, and Lanae. And John. But I cannot play with Mia anymore because my score is a 66 and Lanae, she on red. Her school real low—she and Heaven's score. I gotta stop playing with them two, but not Mia. I can talk to her but not during in school-afterschool. I'm on yellow. I don't know what Mia on—I think that she's on green. (Interview BOY)

Here, Jenique felt that she shouldn't continue to be friends with girls who scored red (a cautionary color for low performance). Jenique also felt that she needed to improve her yellow score before she could play with Mia, who was on green.

## Play as the Social Work of Black Girlhood

Through historical archives, Marcia Chatelain (2015) shares the sociohistorical complexity in the construction of Black girlhood. Who is a Black girl and the various meanings this holds has *always* been a contested space, particularly, in educational contexts (p. 14). In this section, I describe how the girls use play to negotiate roles within Black girlhood. I describe this negotiation as *social work* although not in terms of capital and productivity. I use social work to connote the relational negotiations within children's activity, namely play. The classroom, the playground, and the lunchroom offered a surveilled, controlled, and, yet, permeable subspace within the urban in which the girls can reconstruct their own private, rule-bound worlds that included themes and characters from their lived experiences. The girls could experiment with the knowledge of adults' worlds, as well as their own worlds using established interactive patterns. Therefore, the girls' play was not merely reproducing the adult world, but providing the social material to organize their meanings of Black girlhood and the social order. One game of particular interest that emerged in the middle of the year was called "playing Mama." In this game, one of the girls would be a mother and the other girls would be her children. The girls describe the "rules" of the game. First, Jenique describes what the game is, how to play it, and, finally, who can play.

- Jenique: It's about a mama and some kids. We never have a baby daddy.  
Maisie: So tell—so play mama with me. Show me how to do it. I want to do it.  
Jenique: If you was a little girl you can play.  
Maisie: So if I was a little girl, I could play?  
Jenique: No you don't have to like // say like your my momma and I'm your daughter. You play in my hair and you say, "I got to do your hair tomorrow."  
Maisie: So do you have to do it like this?  
Jenique: What?  
Maisie: Do you have to do your neck like this?



Jenique: Yeah.  
Maisie: Yeah. Ok so if I was // if I was not me, could a little white girl play mama?  
Jenique: [Nods affirmatively.]  
Maisie: She could?  
Jenique: She can play. Only if she be nice.  
Maisie: Can she do all the stuff that you were doing? Like this.  
Jenique: Yeah because you got to be bossy to be a mama because your kid may not listen. (Interview MOY)

According to Jenique, only little girls can play the game. The game seems to exclude adults, as well as boys, given they never have baby daddies. The game comprises interacting like a mother and daughter, for example, getting one's hair styled. Playing mama also includes a particular performance of neck rolling and speaking—a persona of being “bossy.” After some reluctance, Brittany describes other aspects of the game, which includes being “pregnant,” in addition to when and where the girls play mama.

Maisie: Yeah, playing Momma, or being Momma, that some of the girls play?  
Brittany: Oh, [inaudible]  
Maisie: Is that what it is? Can you tell me what that's about? What is that?  
Brittany: I don't play it.  
Maisie: You don't play it?  
Brittany: I play it one time.  
Maisie: Okay. How does it go? Tell me how it goes.  
Brittany: So, you got a [inaudible] in your sweater and you got big like this and a baby in there too, and carry it around.  
Maisie: Okay. Carry it around. Do the other girls in the class play that game?  
Brittany: Yeah.  
Maisie: And when do they play that game.  
Brittany: When we outside for recess. (Interview MOY)

The girls seem to acknowledge that there is something salacious about the game. For example, Heaven describes the game of playing mama as inappropriate for school and implicates individual girls who play the game. Heaven also illuminates that another aspect of the game is hitting the “children,” which she thinks is done too hard.

Maisie: Ok so you never heard of the girls playing a game called mama or anything like that?

Heaven: Talking about the children being the mama and the mama//  
 Maisie: //Yeah what's that like?  
 Heaven: It's like where the moms hit the children and they always hit the children too hard in the classroom and I don't play it because I don't think it's right for school. You can use it for home, but not in school.  
 Maisie: So who are the children in the...in the game?  
 Heaven: Mia, Jenique, Shawna, and Lanae.  
 Maisie: Ok, so some of them are mommas and some of them are children?  
 Heaven: Um, Shawna plays as the momma and the rest of them play as the children. (Interview MOY)

While Heaven clearly implicates Shawna as a player, Shawna denies any involvement in the game.

Shawna: I never played that game.  
 Maisie: Do you think the other girls played that game?  
 Shawna: I don't know. (Interview MOY)

Lamaresha, who ardently disapproves of the game, is the most vocal about the game's potential inappropriateness. For Lamaresha, the adult material of the girls' game did not belong in school. References to having a baby daddy or having a baby were considered "nasty" to her.

Lamaresha: And this is very nasty. I don't know what to say, but you know when I said Lanae said leave Heaven out of Mia and them? They [00:32:19 inaudible phrase] like [00:32:21]. You know you're my baby daddy. I had a baby by you. Ya'll nasty. [00:32:26 inaudible phrase] because they kept shouting out. (Interview MOY)

I never witnessed this game and only learned of it through happenstance and then solicited more information about it during interviews. The importance of this game is not necessarily the adult themes of being a mother, having babies, or a baby daddy, but that Black girlhood is being defined through the play of being a particular kind of Black mother.

As another example, consider another instance of the girls' play that was captured on video in which the girls pretend to be Hello Kitty™, Hello Kitty's best friend, and a fairy.

During this time of imaginary play, Lamaresha, Lanae, and Taylor had stayed in the classroom to help clean. Lanae was Hello Kitty and chased by Lamaresha. Lamaresha narrates, "One day Hello Kitty fell asleep. She was under a deep dark curse from the evils of Taylor." Lamaresha begins screaming, "Wake up, Hello Kitty, wake up! The fairies are looking for you!" Lamaresha begins tugging on Lanae's arms who has been lying on the floor pretending to be asleep. Once pulled up by Lamaresha, Lanae says, "I can't see anything!" To which, Lamaresha excitedly replied, "You're alive!"

The girls do not believe themselves to really be Hello Kitty or a fairy. Just as they don't in fact believe themselves to be baby mamas and children. This is an imaginary landscape based on salient life material for the girls. Therefore, I do not consider playing mama an imitation game of adulthood (although the girls do seem to be reproducing certain social scenes and images), but the enactment of adult themes to organize a social order between themselves as little Black girls. That is, who gets the elevated position of mama versus who gets to be the girls? Whose hair gets petted, played with, and stroked? Who gets hit for acting bad and who does the hitting? And within the Hello Kitty play, who gets to be the coveted character, Hello Kitty? Who gets to be the supporting cast? Who gets chased? Whose body becomes an object of the play to be pulled versus who is doing the work during the play of pulling? The answer to such questions establish a context of Black girlhood that has implications not only on the playground, but in the mathematics classroom, because these statuses and interactions do not disappear within the context of learning and participation.

## Embodying Black Girlhood

As a final aspect of Black girlhood, I consider the role of embodiment. Carrie Paechter (2006) rightly argues that gender is constructed *through our bodies*. To put it succinctly, gender and race are embodied constructs. Meaning these constructs are actualized or experienced in the context of a particular bodily form. Further, it is not just the physical characteristics of the girls' bodies, but how they are framed by temperament (e.g., smiling or frowning), how they move in the classroom (e.g., athletically or clumsily), and occupy space. Embodiment provides access to and forecloses on different associations, positions, and identities.

For example, as described in **Table 2**, Jenique has medium-brown skin, chubby, average height, and wears her hair in long plaits, whereas Shawna has dark brown skin, chubby, tall, and wears her short hair in cornrows. Both Shawna and Jenique are chubby girls. On the one hand, Shawna's chubbiness is often read as brutishness, given she is taller, relatively athletic, dark skinned, short hair, and often frowning. On the other hand, Jenique, being somewhat clumsy, relatively lighter skinned and shorter in height, is read as unthreatening. Teachers and students alike would refer to Jenique as a little grandma, but Shawna was commonly referred to as a bully.

As another example, consider Lamaresha. She was the shortest of all the children in Ms. Patterson's classroom. She was also tomboyish in her comportment. Lamaresha would move around quite a bit in the classroom zig-zagging through children and occasionally jumping on someone's back in a playful manner. Her fast talking and biting insults levied onto other children seemed cute, instead of cutting, as heard from her high pitched voice. Other teachers (and myself included) would pick her up and swing her when hugging her.

Lamaresha's small stature, coupled with a dimpled, smiling face positioned her doll-like, toy-like, which gave her freedom to move about the room as she liked and interact with adults favorably.

Finally, consider Mia, who had light-brown skin and long hair. She represented an ideal type. For example, Ms. Patterson believed that the other girls gravitated towards Mia because they thought she was pretty. Lighter skin and long hair has been construed more favorably within the larger Black community than darker skin, particularly for women (Hill, 2002) and children similarly make evaluations of positive and negative traits, as well as social roles, based on skin color (Averhart & Bigler, 1997).

Black girlhood in this sense is certainly constrained by weight, height, skin color, hair length, vocal tone, as well as material trappings, like shoes, belts, and bracelets. While embodiment of race and gender did not wholly define the girls or determine their classroom lives, distinctions related to skin tone, weight, height, etc. did seem to confer certain privileges of favorability and desirability among the girls.

## **VII. THE MATHEMATICAL FIGURED WORLD**

In this chapter, I provide an overview of Ms. Patterson's class as a community of practice, generally, and as a mathematics community of practice, specifically. The overview establishes the context of the girls' mathematics learning and participation. I begin with detailed descriptions of the features of the community of practice, including the classroom space, social norms, routines, roles, tools, and purposes of the classroom, as well as participation structures. I conclude with a description of the sociomathematical norms of Ms. Patterson's classroom are described, for example, how mathematical authority and agency are negotiated, how problem-solving is approached, how solutions are offered and recognized. It is through this chapter that a portrait of Ms. Patterson as a mathematics teacher comes into view. Ms. Patterson's presence is invoked through the values and norms that she promotes in the classroom. These values are made manifest in how she designed her classroom, the ways of being she encouraged, the purposes and goals that were instilled, and the structures of participation that she established. Within this figured world, I place more emphasis on the structures Ms. Patterson built, rather than her interpersonal style and skill she used, which was often masterful. My decision to minimize the person of Ms. Patterson was a deliberate effort to describe teaching as both structural and interpersonal work with the former being underconceptualized.

### **Features of the Community of Practice**

In the following section, I characterize Ms. Patterson's classroom as a community of practice (or, in short, a classroom community). I do not present Ms. Patterson's classroom as an idyllic mathematics classroom, but simply a real place with a unique cultural ethos. As

Goos, Galbraith, & Renshaw (1999) put it, my work is: “to reveal the working assumptions, the tacit classroom culture, that underlie the interaction patterns between teachers and the students” (p. 36). Using the descriptive question matrix by Carlone (2012), I outline several aspects of Ms. Patterson’s classroom: the space, ways of being and doing, roles, tools, purposes, and activities.

### **The Room: A Map and Description**

Ms. Patterson’s room was a special place. As shown in **Figure 13**, there was a mix of furniture—student desks, student tables that were rectangular and trapezoidal in shape, bookshelves, cubed shelves, and cabinets. Each bit of the wall was covered by student work or large white chart paper. Even one of the walls, which was covered by windows and looked onto an alley and the back of neighborhood homes, had window shades that were dressed with chart paper posters. The book shelves were packed with picture and chapter books. The cubed shelves were packed with containers of pencils, markers, map pencils, and dry erase markers. There were stacks of paper, textbooks, and workbooks on every available surface, including the air conditioning unit, which took up the length of one of the walls. Every corner of the room was dressed with some classroom material. Ms. Patterson’s room brimmed of activity even when the room was empty of students.

This full space was remarkably organized and partitioned into well-known places. There was the teacher’s corner, which comprised a free-standing circular table with one adult-sized wooden chair and three child-sized chairs around it. The table sat at the junction of two bulletin boards and small storage unit. While Ms. Patterson considered this her workspace, she shared it openly with the children.

The library was another place in the classroom, comprising a series of shelves. On one side was a set of reference books and another side comprised a series of fiction and non-fiction books of various sizes. There was a bin of blankets in the library for the children.

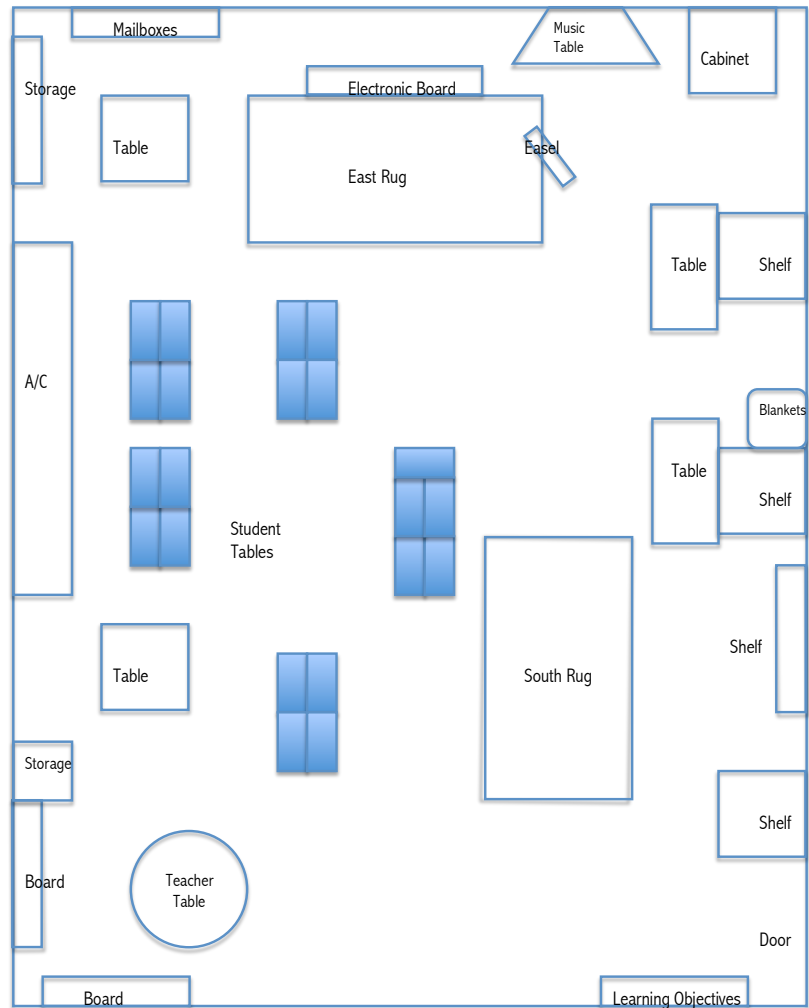


Figure 13- Map of Ms. Patterson's classroom.



Then, there were the east and south rugs. Two large rugs with a multi-colored political map of the United States, where students gathered for large and small group activities. The east rug, which was used the most often, was enclosed by an easel and large white board. Additionally, the room contained workspaces for the children, known to class as “nooks.” These were specialized places—on top of the air conditioner or a small corner—that belonged to individual children in the class. Some children’s nooks were in open spaces, like a worktable, which were shared. Other children’s nooks were private. The worktables also doubled as small group spaces, when children were expected to work collaboratively. Finally, student desks occupied the center of the room. These desks were arranged in different configurations throughout the year, for example, in pods of four, long pods of ten, and once in rows. While the student desks changed frequently, as well as the children’s seating assignments, the outer room maintained a relatively stable arrangement.

## **Ways of Being and Doing**

### **Tools**

There were a variety of tools that were used in the community of practice including, , map pencils, markers, dry erase markers, and small whiteboards. Markers and map pencils were used almost daily. Ms. Patterson often encouraged the children to draw.

One of the most used tools was the children’s toolkits. A toolkit was essentially a large plastic bag that contained a small calculator, a template with both metric and standard rulers, and a manipulative clock with moveable small and big hands. There were also base-ten blocks, fake money, and pattern blocks that were stored in plastic buckets in cubbyholes. The children would often use these materials, sometimes on their own volition and other times with Ms. Patterson’s encouragement.

The children also used their Everyday Mathematics™ workbooks, composition books, and Everyday Mathematics™ reference books, as well as anchor charts (large charts of notes drawn up by Ms. Patterson). Ms. Patterson encouraged the children, even during mathematics lessons, to use their reference materials, including dictionaries to figure out what words mean or to remind themselves of a concept.

### **Purpose and Goals**

The purpose in Ms. Patterson's class was unambiguous—it was to become a student. In addition to or perhaps more than acquiring (in Vygotsky's terms) scientific concepts and mere content, Ms. Patterson sought to “make children into students.” That is, Ms. Patterson was particularly focused on developing productive dispositions towards learning and being in school. Her euphemism for children with disruptive behaviors in the classroom is: “They haven't learned how to be a student yet.” She would often relate student behavior to its potential for “distracting others learning.”

Given this purpose, one of Ms. Patterson's clear goals is for the class to be in “100% participation.” Ms. Patterson often chides the classroom for not fully participating. Although “100% participation” is a class mantra, this often means for the children to watch another child doing. Yet, another goal circumscribed in becoming a student was performing well on standardized tests from the district and state. This goal may have been a function of school-wide pressure to improve tests scores due to the threat of the school closing. For example, on one occasions, Ms. Patterson spent class time to discuss the children's results on district benchmark and to complete individualized goal sheets.

## **The Possibilities of Participation**

### **Activities and Participation Structures**

There were few reoccurring activities in Ms. Patterson's class. Each class felt different—reinvented. However, there were certainly reoccurring participation structures. Hand (2010) helps to describe participation structures:

As individuals orchestrate their activity with one another over time, they develop well-worn and highly coordinated participation structures (Phillips, 1973), which comprise and influence ongoing social interaction over time. By participation structures, I refer to interactional routines (in discourse, gesture, posture, etc.) that are shaped by implicit rules and norms that participants in a social activity come to expect over time and support coordinated action (p. 100-101).

For simplicity's sake, activities comprise both the educational material to be taught and learned, as well as the participation structures, i.e., communicative and spatial arrangements for students and teacher interactions. With the exception of Number of the Day and timed multiplication tests, I didn't observe the same activity twice. Number of the Day involved re-representing the day's date, e.g., the fifteenth, in different ways. For example, children would draw fifteen tally marks, write numerical sentences, like 20-5, or draw base ten blocks of a rod and five cubes. Towards the middle of the year, after the introduction of multiplication, the children also took timed multiplication tests. These worksheets had silly names, like Fantastic Fives or Twirling Twelves, and included multiplication facts for a number family. These were the only activities that occurred with some regularity.

Now, there were clear participation structures, which served as a stabilizing force in the children's learning activities. These participation structures were of three types: whole group, small group, and individual. Whole group activities were teacher-led and involved the majority of the class. The class was involved in whole group activities 75% of time,

during my observations. Whole group activities included deskwork (37%), when children sitting at student desks usually engaged in doing/writing—working independently—on the same task; as well as rug time (34%), when children were sitting on rug usually listening and/or watching another child or teacher engaged in a task. In deskwork and rug time, the children were tethered to desks or the large rugs, respectively. Another whole group activity involved children standing or moving about the room. This occurred about 4% of the time. During this time, the children were usually listening/watching another child or teacher engaged in a task; dancing; or enjoying unstructured time. Children were untethered to a space, but bounded by the activity. In all of these activities, most of the children, unless called upon and singled out, operated as an undifferentiated whole. So, it was common for the class to respond verbally and through gesture in chorus.

Small group work occurred about 18% of the time during my observations. In small group work, the children worked in well-defined groups and were situated in a variety of places, sitting at student desks, worktables, or even the floor. While the children sat in well-defined groups, they usually worked independently and occasionally collaboratively. In other words, even though the children sat together, they did not necessarily engage each other in their mathematical thinking or problem solving. The small groups were usually student selected and could range from children working in pairs to larger groups of four and five. For the most part, these groups were child-selected, but Ms. Patterson would occasionally group the children by ability level based on test scores and classroom performance.

For about 7% of the time, the children worked independently in nooks. Nooks were a student-constructed, private space, where children worked alone on a task. The task was

usually the same task as other students, but there was expectation of collaboration or talking. This was generally a quiet time in Ms. Patterson's class. The nook as a space was more permeable for some children. There were some children who preferred solitude and would partition their space carefully, whereas other children would prefer to sit close to, i.e., within arm's reach of, other students.

While the mathematics activities could feel stilted or contrived, i.e., not well-planned or generally lacking a clear instructional direction, Ms. Patterson's masterful orchestration of these participation structures created a sense of engagement and meaningfulness.

### **Positioning and Framing Norms**

When considering Ms. Patterson's classroom community as a mathematics community of practice, I return to Hand (2010) to distinguish between two kinds of norms: positioning and framing norms of mathematical activities. Hand notes that "Positioning norms shape and are shaped by domain-related classroom activity," and describes for mathematics classrooms "how students and teachers organize their work and each other in relation to mathematical practices" (p. 101). In mathematics classrooms, positioning norms amount to sociomathematical norms, which relate to "normative understanding of what counts as mathematically different, mathematically sophisticated, mathematically efficient, and mathematically elegant in a classroom" (Yackel & Cobb, 1996, p. 461). Additionally, how students and teachers construct mathematical authority and accountability are important to the functioning of mathematics activities. Positioning norms can be conceived in broad terms and encourage an expansive view of what it means to do mathematics. Alternatively, positioning norms can be conceived of very narrowly and restrict children's conceptions of what counts as mathematics or what it means to be mathematical.

Equally important to positioning norms are framing norms (Hand, 2010). “Framing norms are conceptualized as organizing distinctions in general participation, such as mathematical versus social activity, which may challenge taken-for –granted assumptions about what certain behaviors mean” (p. 101). Framing norms are concomitant to participation structures, which can be understood as polarized or flexible. Polarized participation structures create clear distinctions between domain-related activity and social activity, whereas flexible participation structures tend to blur these distinctions and provide a permissive classroom environment that encourages engagement for a variety of learners (Hand, 2010).

If we think of positioning and framing norms as axes that create as quadrants (see **Figure 14**), Ms. Patterson’s class would be mathematically narrow with flexible participation structures. Her class would be behaviorally permissive, i.e., allowing for multiple ways of being productive or seen as a participant. Children, who were sprawled on the rug or stood on their desks, were seen as valued participants during class activities. The participation structures were flexible with respect to modalities of engagement. However, the mathematics in Ms. Patterson’s class was conceived in relatively narrow terms, insofar as single solution paths were usually offered that led to “correct answers” using rote procedures. This creates an interesting classroom environment that I will refer to as, *survivalist approach* to mathematics instruction. That is, to encourage participation and, simultaneously, to seemingly guarantee success, the teacher allows for any and all forms of participation that are funneled narrowly into a well-defined conception of school mathematics. This approach promotes achievement on standardized tests. One consequence of the survivalist approach, as in Ms. Patterson’s mathematics classroom, was

the children—the girls—played an active role in constructing the participation structures. As such, the girls were able to influence the structures, based on their own heuristics as to what constituted legitimate conditions for participation that day.

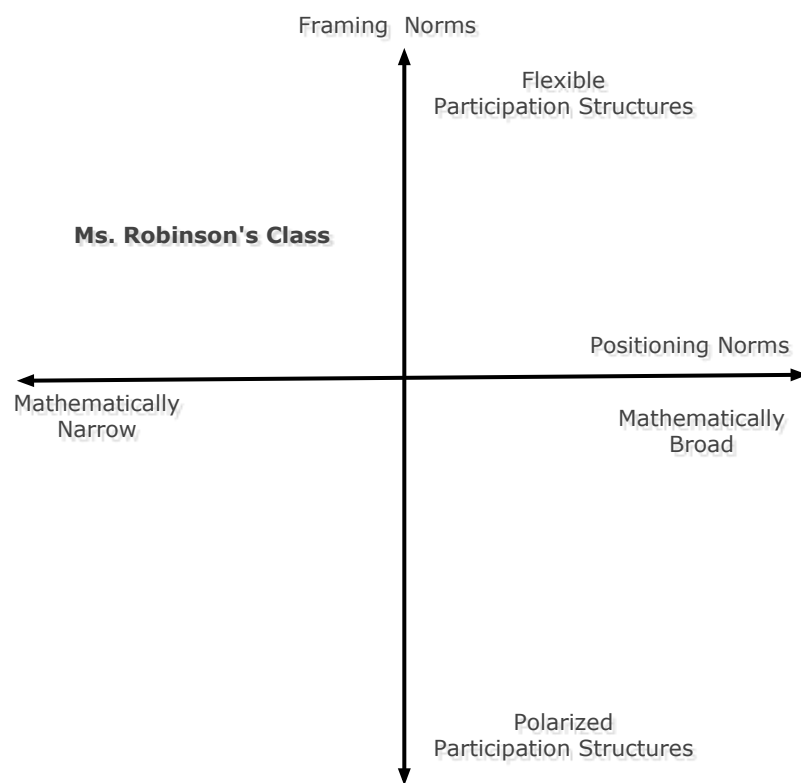


Figure 14-Characterization of Ms. Patterson's participation structures.

The mathematics block of Ms. Patterson's class occurred in the late afternoon and was split between the lunch/recess period and Specials, which included technology and music classes, in addition to a visit to the library. This made mathematics lessons particularly tumultuous, because conflict that occurred quite regularly during lunch, recess, or between students and teachers of the Special classes often carried over into mathematics lessons. The scheduling of mathematics class at this particular time of day was, I believe, a primary reason that I was able to observe the social dynamics between the girls.

The delivery of mathematics lessons typically took place on the rugs and varied in duration. Depending on the activity, mathematics practices took place in nooks, on the rug, at student desks, or worktables. The children were almost exclusively accountable to Ms. Patterson. She would often point at student work and declare it, although lovingly, as "right" or "wrong." Children rarely turned to one another to discuss solution strategies or answers to problems. To this end, the children exercised limited agency in their use of different methods for solving problems. The class mantra during mathematics class was "I show you, we show each other, and you show me." Of course, the "I" and "me" in this mantra referred to Ms. Patterson, who was positioned as the center of mathematical authority. That is, solution strategies originated with her—"I show you"—and ended with her approval—"you show me."

Ms. Patterson's lessons were tripartite in structure. Typically, she would first introduce an idea or problem type, then provide a solution strategy or exploration of the idea or problem, and conclude by discussing the solution. The introduction of an idea or problem varied. For example, sometimes Ms. Patterson would use literacy concepts from the



children's reading lesson to introduce an activity. When conducting a lesson on area and perimeter, Ms. Patterson asked the children to recall the idea of compare/contrast to set the stage for the children to generate a list of properties of area and perimeter. In another lesson, Ms. Patterson had one of the children look up the term "carousel" to make sense of an activity in which they would walk around the room. At times, Ms. Patterson's lesson hooks were not germane to the mathematics and took the class away from mathematical content. It was not uncommon during a mathematics lesson that some children would become confused when chorally responding to Ms. Patterson's questions and shout out an answer completely unrelated to mathematics.

With respect to the second stage of Ms. Patterson's lesson, problem solving by the children was typically conducted privately. Typically, the only publicly shared strategies were Ms. Patterson's. When student thinking did rise to the attention of the class, this was considered a special occasion. Mathematical thinking and problem-solving was heavily scaffolded by Ms. Patterson. She often called on students to ventriloquize (i.e., fill-in-the-blanks) of her own explanations. She would funnel the children through procedures by asking leading questions. The questioning could quickly devolve into children guessing and shouting out different answers to provide Ms. Patterson with a plausible answer. Rare opportunities in which children were staged to share their work in front of the class were often interrupted if children were not making timely progress. Ms. Patterson would ask a student if they needed help and would displace the "stuck" student with a "ready" student when progress in the activity ebbed. In this situation, the helpful student was positioned as an expert.

When solutions are offered during a lesson, the children typically respond at once, chiming various answers. Ms. Patterson often picked out an answer of interest from an individual student. Sometimes asking a student to repeat their response. This instructional strategy gave an opportunity for every child to participate, but also allowed Ms. Patterson to avoid “wrong answers” and move directly to the desired answer or solution. Counting chorally was also a standard practice in Ms. Patterson’s class. Many times the class would count together, understanding that often the last number recited was a solution.

Finally, once an answer or solution was being considered, the class would be asked to evaluate nonverbally with a thumbs up or down. Even though children were able to exercise some authority in evaluating answers, the thumbs or down was ultimately deemed appropriate or inappropriate by Ms. Patterson. That is, children providing conflicting responses of thumbs up or down did not create debate, but merely opened the space for Ms. Patterson to reveal which response was correct. It was during these times of evaluation of answers that sense-making occurred, not during the process of problem-solving, but post-hoc. Further, wrong answers were not starting points for re-entering the problem-solving process. Once deemed wrong, student responses were usually abandoned and Ms. Patterson would usually continue in evaluating another answer. Mathematical difference between children’s responses was usually a sign of a wrong answer. When difference was at issue, Ms. Patterson usually determined off-handedly whether answer was the same as another. Mathematical sophistication was typically unaddressed and there seemed to be a great deal of latitude in providing an acceptable mathematical explanation and justifications. However, only certain students were given the opportunity to engage in this form of mathematical argumentation. Generally, Ms. Patterson provided mathematical

explanations and justifications. Interestingly, while ways of solving problems were construed relatively narrowly, children's ability to be able to describe these pathways was particularly liberal. A mere attempt in describing a procedure, despite its coherence, was often met with adulation and accolades, such as a cheer. The valorized practices in Ms. Patterson's classroom included providing correct responses to leading questions; providing correct answers to math problems; providing think time to other students, but being ready to provide "help" if they got stuck; and attempting to explain your thinking if given the opportunity.

Over the course of the year, the class covered a variety of topics that primarily fell into two large categories: number and operation (70%) and data analysis (24%). The remaining lessons related to geometry or multiple topics. Within number and operation, the class attended to four sub-topics including: multiplication (22%), addition/subtraction (22%), fractions/decimals (44%) or multiple operations (13%). The year began with several lessons on data analysis, related to graphing and analyzing data, followed by several lessons related to multiplication, then addition and subtraction. The year ended with several lessons on decimals and fractions. Other sub-topics were interspersed throughout the year, like a lesson on using mathematical tools (e.g., rulers, calculators, and clocks) or a lesson on area and perimeter.

The nature of the mathematical tasks within any given lesson varied. Mathematical tasks were generally decontextualized and required students to carry out a numerical operation. Additionally, the level of demands was generally lower-level memorization or procedures without connections (Stein, Grover, & Henningsen, 1996). Some of the lessons

involved multiple tasks. For example, in a probability activity, the children had to accomplish multiple tasks, like counting M&Ms of different colors; graphing the different color of M&Ms; recording with tally marks the color of M&M chosen randomly; and, finally, responding to questions about theoretical versus experimental probability. However, in activities such as this, due to time constraints, the class never completed the lesson and only accomplished the initial mathematical tasks in the lower demand levels and never connected the graphing to concepts of probability.

Overall, the irregularity of activities, the heavy scaffolding of questioning that often clouded the overarching instructional objective, coupled with lower demand level tasks, led to disjointed curriculum with a collection of mathematical topics that never coalesced into a unified body of mathematical understanding, but succeeded in equipping some students with survivalist mathematics strategies for passing standardized tests.

### **Bids for Recognition**

Following Carlone (2012), I pay particular attention to the girls' bids for recognition, the response to their bids of recognition, and the extent to which girls are able to hold the floor. I also attend to nominations for recognition, which are initiated by the teacher.

Bids for recognition relate to students' volunteerism to engage in mathematics activities. In Ms. Patterson's classroom, this can be difficult to assess, because so much of the interaction is chorally structured, i.e., organized through group response verbally and through gesture. Therefore, what tended to stand out among the students were forms of non-participation, i.e., when students fail to volunteer in chorale activities. During bids of recognition, participation is defined by who gets recognized, at what time, and for what kind of behavior or talk.

In addition to the girls' bids for recognition, Ms. Patterson also nominates students to participate in mathematical tasks or answer questions. Sometimes these selective nominations occur as the class is responding chorally, which gives Ms. Patterson the ability to screen students' responses. For example, many students may be responding to her question, but Ms. Patterson may nominate a student to share their particular response. In this case, participation relates to not only who is being selected, but what are they being selected to do or say.

Another aspect of the girls' participation in Ms. Patterson's class is the uptake of bids, such as how does the class respond to bids or nominations of recognition? As Carlone (2012) notes students' bids, which I extend to nominations, can be "ignored, praised, or even admonished" (p. 21). Therefore, participation is also shaped by the teacher and peer response to bids and nominations of recognition. As an example, are particular girls' bids recognized as valuable contributions or are particular girls nominated to respond to a question only to be admonished?

Finally, the most infrequent in Ms. Patterson's class and, thus perhaps the most special forms of participation is "holding the floor." Carlone (2012) notes that most classrooms, like Ms. Patterson's, follow an initiation-response-evaluation (IRE) discourse pattern. So, when a student is given the opportunity to speak for "long" stretches this represents an example of "full participation," when a girl is positioned as an expert.

In Chapter 9, I describe how the girls situate themselves in the mathematics community of practice, not behaviorally, but (meso-) ethnographically. Meaning, I do not attempt to "count" the frequency of the above events to make some claim of the girls' participation as purely a function of number. This misunderstands that some singular events may have an

indelible effect on the girls' participation in mathematics class, whereas other more frequent events may be fleeting in conditioning the girls' mathematics identities. As such, I take a narrative, descriptive approach to the girls' participation in mathematics. My goal was not define the girls' participation in a fixed sense, but describe how it responds to social conditions.

### **Emergent Mathematics Identities**

In **Table 8**, I provide a variety of signifiers of the girls' developing mathematics identities. These signifiers are based in part on the fourth level of Martin's (2000) multilevel framework; Cobb, Gresalfi, and Hodge's (2009) interpretative scheme for analyzing identities that students develop in mathematics classrooms; as well as other potentially salient markers of mathematics identity. I consider these signifiers of the girls' emergent mathematics identities versus identity constructs, given the girls' developmental age and the shortness (or non-narrative structure) of their responses. While these signifiers are based on prior work, I make different qualitative interpretation of these markers, in order to align with the present study. These signifiers have been roughly organized into five groups: personal identity and goals, beliefs about mathematics and mathematics ability, perceptions of competence, perceptions of the teacher and classroom obligations, and perceptions of peers. Again, because Shawna left before the last interview, several of her signifying responses were unavailable.

#### *Personal identities and goals*

With respect to personal identities and goals, except for Shawna, the girls hold positive views of themselves. The girls were often eager to answer questions about what they wanted to be when they grew up. Their answers were consistent over the different

interviews and were wide-ranging, including being a singer, a police officer, doctor, nurse, or teacher.

#### *Beliefs about mathematics and mathematics ability*

All of the girls maintained a high affinity to learn mathematics and cited math as their favorite subject at least twice over the academic year. The girls all believed mathematics was important but for different reasons. Some of the girls described mathematics as important for pragmatics reasons, i.e., getting the right answers or taking tests. Other girls considered mathematics important to future goals, such as getting a job, going to college, or being promoted to the next grade level. I refer to these reasons as aspirational. The girls also had different beliefs about the origin of their mathematics ability. Some girls believed that mathematics ability was based on study and practice, whereas other believed in their natural-giftedness in the subject.

#### *Perceptions of competence*

Gresalfi et al. (2008) established that mathematical competence is constructed in mathematics classrooms. That is, mathematical competence is negotiated among teachers and students. With the exception of Jenique, the girls described themselves as competent mathematics doers, although they had different reasons for basing their arguments. For example, some of the girls used their grades or good classroom behaviors, such as being quiet and following instructions, as indicators of being good mathematics students. Other girls described their relationship to others as indicators of the ability as mathematics doers. These girls described being able to help others or being placed in new ability groups as evidence of the mathematics skill. Shawna was the only girl who described her mathematics ability in solely mathematical terms. She believed herself to be a good

mathematics student for her ability to be able to compute operations quickly. Additionally, the girls had different reasons for exhibiting (or not) their mathematics competence. Some of the girls exhibited competence for acquisitive reasons, like obtaining grades or promotion to the next grade level. Other girls cited social reasons for exhibiting or not exhibiting mathematics competence. For example, Jenique believed it was important so that she wouldn't be teased, whereas Lamaresha believed it was important to be able to help others. Heaven believed it was not important to show mathematics competence, because this would just cause negative social consequences, such as people asking to copy her work. Mia, Brittany, Lamaresha, and Heaven all believed that Ms. Patterson supported the idea of them as good mathematics students, but Jenique and Shawna seemed less sure about Ms. Patterson's perceptions of them as mathematics students. Mia, Lamaresha, and Heaven also believed that their classmates supported the idea of them as good mathematics students, but Jenique and Brittany were less sure. Jenique thought her peers would be jealous if she were to score well on assignment and Brittany thought her peers would think she cheated if she scored well on an assignment.



<b>Identity signifiers</b>	<b>Mia</b>	<b>Jenique</b>	<b>Brittany</b>	<b>Lamaresha</b>	<b>Shawna</b>	<b>Heaven</b>
Personal Identity <sup>4</sup>	Positive	Positive	Positive	Positive	Ambivalent	Positive
When grow up	Singer	Police or Doctor	Nurse or Doctor	Teacher	Police or Doctor	Singer
Beliefs about (personal) math ability <sup>4</sup>	Effort-based	Effort-based	Effort-based	Naturalized	—	Naturalized
Affinity to learn math	High	High	High	High	High	High
Instrumental importance of mathematics <sup>4</sup>	Pragmatic	Aspirational	Aspirational	Aspirational	Pragmatic	Pragmatic
Assessment of personal math competence <sup>5</sup>	Positive	Ambivalent	Positive	Positive	Positive	Positive
Basis of assessment of math competence	Behaviors & grades	Relationship to others	Behaviors & grades	Relationship to others	Computational fluency	Behaviors & grades
Reasons for exhibiting math competence	Acquisitive	Social	Acquisitive	Social	—	Social
Perceived peer regard for math competence	Supportive	Critical	Critical	Supportive	—	Supportive
Perceived teacher regard for math competence	Supportive	Critical	Supportive	Supportive	Critical	Supportive
Perception of teacher <sup>1</sup>	Positive	Critical	Positive	Positive	Positive	Positive
Distribution of authority <sup>2</sup>	External	External	External	Mixed	—	Internal
Exercise of agency <sup>5</sup>	Disciplinary	Disciplinary	Disciplinary	Disciplinary	Disciplinary	Disciplinary
Perception of peers <sup>4</sup>	<i>Discussed in Chapter 6.</i>					
Differential treatment from peers <sup>4</sup>	<i>Discussed in Chapter 6.</i>					
Assessment of others' math competence <sup>5</sup>	Favorable	Favorable	Favorable	Unfavorable	Favorable	Favorable

Table 8-Key signifiers of girls' developing mathematics identity.

<sup>1</sup> Based in part on the fourth level of Martin's (2000) multilevel identity framework.

<sup>2</sup> Based in part on Cobb, Gresalfi, Hodge (2009) interpretative scheme for analyzing identities that students develop in mathematics classrooms.

### *Perceptions of teacher and classroom obligations*

The girls also maintained positive perception of Ms. Robison as a teacher, although Jenique was critical of how Ms. Patterson talked to her on a few occasions.

Besides Heaven, most of the girls saw the distribution of mathematical authority resting externally to them as individuals. These girls knew they were correct because they received verbal feedback from Ms. Patterson, their peers, a calculator, or, ultimately, a grade. Only Heaven described using her own checking strategies to determine whether her answer was correct. All of the girls saw their exercise of agency as disciplinary, meaning they followed rote procedures and methods for solving problems, instead of developing their own strategies and solutions.

### *Perceptions of peers*

As previously mentioned, the girls relationships to one another are a key consideration of this study. So, these are key themes in Martin's framework will be elaborated through social network analysis in Chapter 6. At this time, I will mention that besides Lamaresha, who was a vocal critic of the girls' social network, the girls shared largely favorable views of their peer girls' mathematical competence, particularly when allied with them in social groups.

## **VIII. THE UNFOLDING OF FIGURED WORLDS**

In this chapter, I provide a “narrativization” of the girls’ figured worlds. The previous two chapters described the social and mathematical figured worlds structurally. I described the relational and material structures that organized each figured world, as well as the patterns of everyday interactions, in Chapters 7 and 8. Here, I describe the narrative structure of the figured worlds. While there may be a sense of the girls as characters, this chapter established the “plot” of the narrative. From the unfolding of the plot, I provide a distillation of the girls’ stories as social trajectories. I describe the girls as social climbers, fallers, or maintainers. These labels describe girls who rose in social status improved, declined, or remained relatively stable. However, these labels are insufficient in describing the girls rise or decline, for example. I also use a second set of labels, campaigners, free-riders, resisters, or enforcers, that describe the mode of the girls’ social trajectory. For example, both Shawna and Brittany improved their social status and are labeled as social climbers. On the one hand, Shawna contested her social position in the girls’ network. She used various devices, such as bullying and gossiping, to change her marginalized position. On the other hand, Brittany’s rise in social status was achieved passively or through free-riding. After describing the girls using these labels, I conclude the chapter with a discussion of liminality over time or structural position as a key feature of the girls’ figured world.

### **The Narrative Structure of the Figured Worlds**

A fairly reasonable question to ask at this point is—what happened? How did Heaven, for example, move from a high status member to a low status member in the social world? How did two low status members, like Brittany and Shawna, become high status member of

the Mean Girls? For those that were interviewed, there were different stories that each girl told. The following is *a* story of the social network that has been stitched together from a variety of sources including field notes, reflective memos, interviews, and video-recordings of the classroom. While the quantitative data provide the “bones” of the social network, the following section provides “muscle” or the animating forces that created particular opportunities for the dissolution, formation, strengthening, and weakening of relational ties between girls. This story provides some of the clues as to what unfolded between the girls as individuals and groups. Of course, many of the girls’ motivations remain hidden, but what is revealed is some of the machinery by which inclusion and exclusion occurs for young Black girls in this third grade mathematics classroom. Just as the quantitative measures provide descriptions of the social structures, which confine the girls socially, the narrative provides a storyline and roles from which the girls cannot easily escape socially. This story describes how particular labels and positions came to adhere to certain girls in the classroom.

Relatively early on during my visits, I began jotting little notes about different social events—when a child was sitting alone, when there was an exchange between girls (or boys), or when a girl was clearly being excluded from the others. **Figure 15** shows excerpts from my field notes of conflict, exclusion, and isolation of the girls in Ms. Patterson’s class in timeline form. These notes provide a general frame of my observed story.

The interviews of the focal girls describe a similar story of conflict, exclusion and isolation among the girls of Ms. Patterson’s class, but implicate additional actors and motives than what is implied by the fieldnotes. Through coding the girls’ interview, several key phases emerged in the social network that aligned with the fieldnotes: the beginning of

trouble, Shawna campaigning for inclusion, Heaven as the problem, and Heaven campaigning for inclusion.

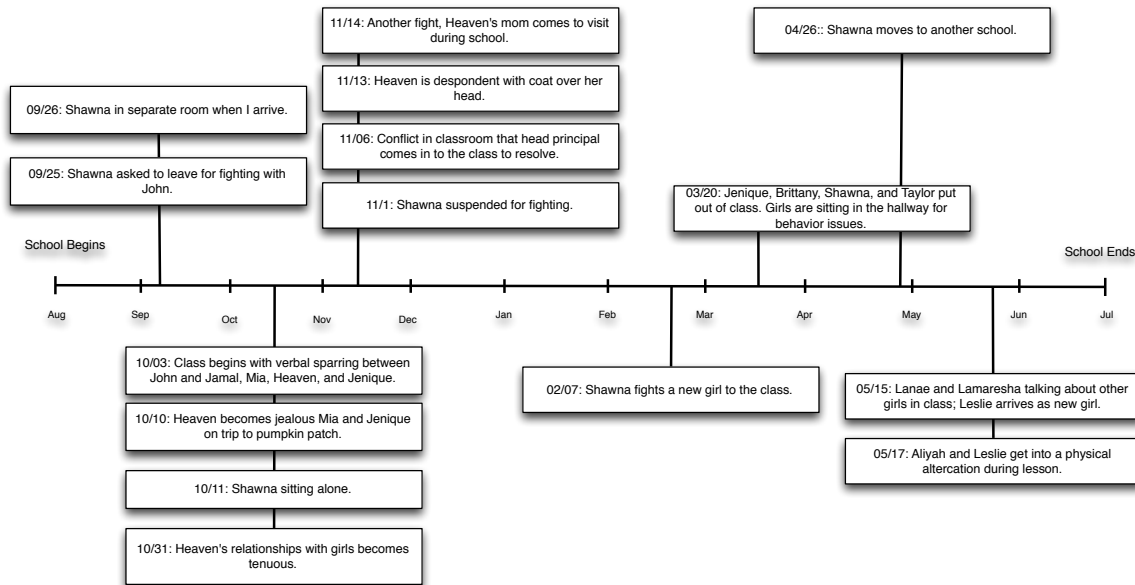


Figure 15-Phrases in fieldnotes marking contentious or isolating social events over the year.

### *The beginning of trouble*

According to the interview data, the beginning of conflict in the girls' social network occurred initially between Lanae (the Pretty Little Fighter) and Heaven (the Fallen Party Girl). Lamaresha and Brittany provide examples.

- Lamaresha: It just usually be the girls. They just get everybody in trouble. And then Lanae tried to fight Heaven and Heaven tried to fight Lanae. You want me to tell you when it all started when they tried to fight?
- Maisie: When?

Lamaresha: The first day of third grade.  
Maisie: Really? What happened?  
Lamaresha: Well Lanae, right. She kind of started it because Heaven was actually good. She don't...you know how she acts like now? She wasn't like that. She would actually be good. Me and Joi used to do all our work, but Lanae had to come over there start stuff with her. Talking about her and stuff. And that's when there was the first fight in third grade. And you know who they be around each other. You know how somebody fight in a whole. A bunch of people just crowd up.  
(Interview EOY)

The girls' social network started on contentious ground with a fight between Lanae and Heaven on the first day of school. Lamaresha's description is corroborated when Heaven harkens to the fight while describing why arguing in mathematics class is different from arguing elsewhere.

Lamaresha: They are different [math arguments and physical fights] because when you are in math you are disturbing others and then when you're outside you just make a whole big circle and then you just made a show for the school can see. (Interview EOY)

In Brittany's example, she describes her initial friendship with Aliyah at the beginning of the year and how she stood up for her when some of the bullying and conflict started.

Brittany: Lanae was picking on Aliyah, then Heaven, she stop it (inaudible)  
Maisie: With picking on who?  
Brittany: Picking on Aliyah.  
Maisie: Picking on Aliyah? Uh-huh.  
Brittany: Why you all messing with her? What she do to you. She like, she won't give us none of her chips.  
Maisie: Is that why people pick on people? 'Cause they want candy and chips and stuff?  
Brittany: Sometimes. (Interview EOY)

Both Brittany and Lamaresha's example point to initial conflicts and bullying that occurred between Lanae and Heaven. Despite these beginning of the year skirmishes, Heaven initially identified Lanae as work/play mate.

### *Shawna Campaigning for Inclusion*

Shawna identified Lanae as a friend and worked hard to be included among the Mean Girls. There are examples from Mia, Jenique, and Shawna (herself), which describe how Shawna campaigned to be included as a member of the Mean Girls.

- Maisie: Didn't you and Heaven use to be best friends?  
Mia: We used to.  
Maisie: Can you tell me what happened?  
Mia: Yeah. She noticed, what she used to be, she used to like to make a lot of stuff up when I – when she usually don't be here like she usually don't be here a lot, so one day when she [Heaven] wasn't here, Shawna say, "You shouldn't be Heaven's friend. She been talking behind your back, and she really loves it. She been talking about your hat. She been put it on, like this (inaudible).  
Maisie: My goodness.  
Mia: And then she went, "Additionally, she been mean to you. She been telling me stuff," but then I said, "How she been telling you stuff when she been around me all this time?" Cause she never been bashing, she never did like, and I didn't either. I knew she know her [Shawna] since kindergarten, she used to bully me a lot.  
Maisie: Mm-hmm – I'm sorry to hear that. So then you and Heaven stopped being friends once Shawna told you that?  
Mia: Yeah, the next day, I asked her, "Have you been talking behind me, behind my back?" I just wanted to see, so I asked. And she said, "Well," then she said, "sometimes." And I said, "I can't have a BFF that's going to talk about, behind my back, but if it won't tell me stuff. Like, if you know something's wrong for me, you should just tell me, and maybe I could fix it."  
(Interview EOY)

Mia describes how Shawna gossiped about Heaven and created dissension between Heaven and Mia. Shawna's campaign for inclusion involved a play for Heaven's exclusion from Mia and the Mean Girls, generally. Jenique provides a second example of Shawna's tactic of gossiping to make friends with Mia, and, thusly, the Mean Girls.

- Jenique: ...Shawna try to make her undo my friend. She gone go over there to Mia like this. "Mia, look." [Jenique taps on chair—enacts trying to get Mia's attention.] This is Shawna over here and this Mia's seat. She knocked on Mia. [enacts tapping Mia on the shoulder and whispering into ear]. She got up and said, "Mia, Don't, say, 'Apple, apple,' because Jenique doing too much. I don't like her no more. She doing too much for her ugly self."

That's what she told Mia. I was like, "Didn't I tell you?" She was like, "Don't tell nobody." And I say, "I don't know what happened." I was like, "Oh!" and then (inaudible) that was when I start like, I was pouting, but I didn't really care.

Maisie: So, did Mia stop being your friend for a little while?

Jenique: For like 5, 6 days. (Interview EOY)

Jenique's example also narrates Shawna as a gossip who was sowing seeds of dissension between Jenique and Mia, although Shawna's tactics did not have a lasting affect for Jenique, who only stopped being friends with Mia for about a school week.

Shawna's interview from the beginning of the year also reveals her appeals to be included in the Mean Girls. Shawna describes pictures (**Figure 16**) that she drew at Ms. Patterson's urging of having a good day.

Maisie: Tell me about these pictures you drew. I really like them. You're a good artist. Tell me about them. Show the camera.

Shawna: [Showing the camera her picture.]

Maisie: Ok and tell me about that picture. What // tell me about that picture.

Shawna: This is me being nice.

Maisie: Ok and point to what's happening in the picture.

Shawna: This is Heaven. This is me and this is Mia and Taylor and this Lanae. Lanae is finna go next after Heaven and me and Mia going last and Taylor after Lanae.

Maisie: Oh you're jumping rope.

Shawna: We jumping rope and then we going to play hop scotch.

[...]

Maisie: And tell me why you drew this picture.

Shawna: Because I can show everybody I want to be an nice.

Maisie: Do you feel sometimes that you're not nice?

Shawna: Yes.

Maisie: And why do you think sometimes /

Shawna: Because I mess with people.

Maisie: And why // why do you think that happens? Are you having a bad day sometimes?

Shawna: Yes.

Maisie: Are there other reasons why?

Shawna: Sometimes they hit me. [Nods negatively.]

Maisie: They do? And what do you /

Shawna: And sometimes I tell and they hit me again and I hit them back. (Interview BOY)



Shawna clearly wants to be included in the Mean Girls' social group. Her good day is contingent upon playing with a group of highly desirable girls. On the one hand, Shawna's campaign involves relational aggression, including gossiping and, on the other hand, Shawna's campaign also involves making an effort to be nice by engaging in fair play (i.e., turn-taking in the game of hop-scotch). Shawna's campaign was successful, insofar as she was finally included in the Mean Girls' group, but her position seemed to be hard fought, figuratively and literally. Shawna's inclusion was accompanied by Heaven's exclusion.

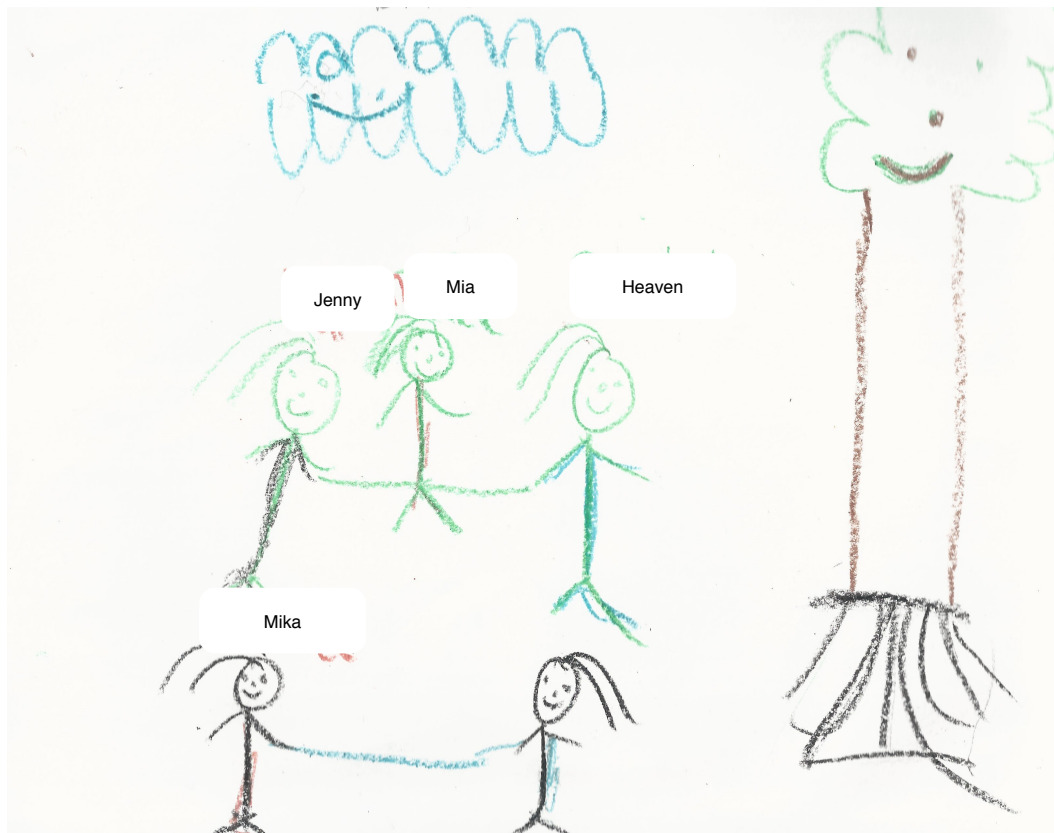


Figure 16-Shawna's drawing of the girls.

### *Heaven as the Problem*

Heaven emerged as the problem in the network, according to several of the girls. Mia, Jenique, and Brittany all identify Heaven as a drama-maker, who causes problem between the girls.

Mia: Well, Heaven is really a drama maker, because, right, when she wasn't here, we had so much fun and everything. But we was trying to be, everybody friends, she don't like Lanae, and me and Martinique and Brianna, we tried to go tell her, and she said, "I don't like Lanae. She too phony." And I said, "Could you just give her another chance? Maybe she could fix it, cause she been nice to us, so maybe she can be nice to you." And Lanae want to be her friend, but she kept on saying, "No." And that's when she walked away. So me, Brittany and Jenique walked away too. I said then, we all said, "She ain't got to be our friend, she the one that's going to be lonely." (Interview EOY)

Jenique similarly describes Heaven as the problem within the group.

Jenique: Well, she don't like Lanae and I'm tired of drama. I'm not going to be going through drama making. We tired of drama makers, and Lanae, that's all she want to do is be our friend, now she'll be the boss of someone. All she want to do is be our friend, but Heaven, she want to be the boss of us, and talk about people." (Interview EOY)

Brittany implicates both Heaven and Lanae, but concludes that Heaven is the primary problem in the group.

Brittany: And they get mad when other people try to hang with, so they like they friend. Like Heaven, she got mad because we tell her we everybody friend. 'Cause(inaudible), she was a, she always start stuff, she always make people do stuff. She always gets in trouble and stuff, so we//

Maisie: Y'all decided not to be her friend anymore? You talking about Heaven or you talking about Lanae?

Brittany: 'Nae-nae.

Maisie: Lanae.

Brittany: Now we back her friend [Lanae]. Heaven mad. The reason we going to get her another chance, 'cause she says she's sorry for picking on us. (Interview EOY)

All of the girls identify Heaven as the source of problems or drama within the social network. While the girls also acknowledge that Lanae has also been problematic in her relations with the other girls, Lanae has expressed contrition and a willingness to get along within the group. Heaven was not inclined to forgive Lanae, which seemed to facilitate her exclusion.

From Heaven's perspective, she had been excluded due to her problems with Lanae and Shawna attempting to break up her friendships with the other girls.

Maisie: No? Because at the beginning of the year you and Mia were best friends and ya'll aren't...are ya'll best friends now?

Heaven: [Shakes head no.]

Maisie: No. So can you tell me like who your best friends were? First it was Mia then it was who after that?

Heaven: It was Mia and then Jenique and then...Brittany.

Maisie: And then Brittany? Uh huh. And why do you think your best friends changed over the school year?

Heaven: Because it happened from Lanae trying to tell them I be trying to do and then I don't even be doing it. So it was just Lanae and Shawna breaking our friendship up.

Maisie: Yeah. What sorts of things they say you would say?

Heaven: They say that I will trade on them and I just want them for their candy and stuff and then I don't because my mother she got a job and my dad and we go out to the movies a lot and we go see every new movie. Like the new movie that's coming out we fixin' to go see it. (Interview EOY)

### *Volleying for Inclusion*

While Heaven was eventually excluded from the Mean Girls' group and at first resigned herself to marginal social status, she did not retreat completely, nor fully accept, her low-status position. Lamaresha describes the constant volleying for inclusion between Heaven and Lanae over the year.

Lamaresha: They're trying to be a crew. It isn't working because they keep switching sides. To Lanae, to Heaven, to Lanae, to Heaven, to Lanae, to Heaven. And they're trying to be a crew Now, they're trying to say it's

Heaven's crew. It's Lanae crew. It's Heaven. It's Lanae, it's Heaven. I could not take another crew...(Interview EOY)

Heaven expressed that she had grown tired of the back and forth between the girls in her last interview. She describes a cycle of alliance reformation.

- Maisie: So do you still want to be friends with those girls even though sometimes you don't get your work done? If you could you all get a long would you want to be friends with them?
- Heaven: No.
- Maisie: Really? Why not?
- Heaven: Because if we be friends and then they'll kick one person out they're little groups they make and then they'll get another person to kick their person that they were really close to so...
- Maisie: You just don't want to deal with it anymore?
- Heaven: [Shakes head no.] (Interview EOY)

The relations between some of the girls, namely, Heaven and Lanae, started off as strained, as indicated by their fight on the “first day of school.” Shawna leveraged such relational tensions within the group during in her campaign for inclusion and Mia seemed to be the primary audience for this campaign. While Shawna’s tactics of gossiping didn’t work to exclude Jenique from the Mean Girls, her tactics proved to be one of the forces that helped to push Heaven from the social group. The gossiping, coupled with Heaven’s refusal to make amends with Lanae, positioned her—justified or not—as the problem of the social network. Heaven continued to vie for recognition within the social network, even from her low-status position, but was successful for only short periods of time.

### **Phases and Trajectories in the Girls’ Social Network**

Through the fieldnotes, the girls’ interviews, and the social network data, a few distinct phases can be discerned in the unfolding of the social network. These phases also correspond to social trajectories for the individual girls, as shown in Figure 16.

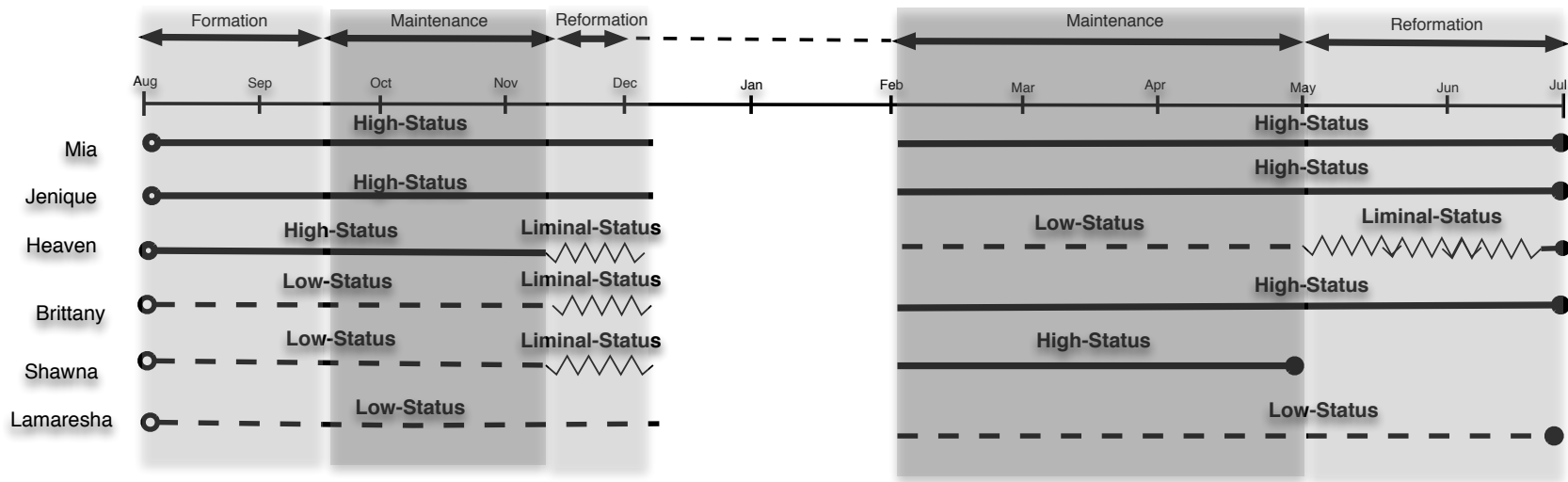


Figure 17-Phases of social network and individual trajectories over year.

For example, there was an initial period of *formation* of the social network, where the seeds of social strife seem to originate between Lanae and Heaven as members of the high status social group. Mia and Jenique were also members of this high status social group. The other focal girls, Brittany, Shawna, and Lamaresha, were not part of the high status social cluster and had relatively low-status among their girl peers. After this period of formation, the social groups become more visible and Shawna, having been excluded, works to be included in these now crystallized groups. This was a period of *maintenance*, where the girls in the high status group sought to defend their ranks by excluding other girls, like Shawna.

The period of maintenance was followed by a period of *reformation* in which the high status group begins to fracture and Heaven emerges as a problem for the group. During this period, Heaven, Brittany, and Shawna are situated in a liminal social status, subjected to daily negotiations of inclusion or exclusion. Mia's, Jenique's, and Lamaresha's social status appeared to be unchanged during the reformation period. After the reformation period (which included the winter break), a new social network emerges in which of the focal girls Mia, Jenique, Brittany, and Shawna were part of the high status social cluster and Heaven has been relegated to an outsider and a member of a low-status triad. Lamaresha, seemingly not part of the social machinations of the high status social cluster, has withdrawn further into low social status. Over several months, the girls work to sustain this new social network, which marks the second *maintenance* phase.

Towards the end of the year, a second phase of *reformation* occurs after Shawna leaves the school and a new girl enters. This reformation period is characterized by jockeying of position between Heaven and Lanae. Each girl is never fully excluded from the group and

subject to the daily social events, including the entrance of a new girl in the classroom.

Heaven returns to a liminal social status; Lamaresha continues within her low-status; and the other girls, Mia, Jenique, and Brittany maintain their high status positions.

### **Social Climbers, Fallers, and Maintainers**

While all of the girls experienced some change in the position within the social network, three categories emerged for the girls: social maintainers, whose relative position and status did not change dramatically over the course of the year (i.e., less than 25% change in eigencentrality); social climbers, whose relative position and status improved over the course of the year (i.e., greater than 25% positive change in eigencentrality); and social fallers, whose relative position and status declined over the course of the year (i.e., greater than 25% negative change in eigencentrality).

#### *Social Maintainers*

*Mia the Model Student.* Mia's centrality scores remain relatively stable with the exception of her betweenness score, which increased from 4 to 12. By the end of the middle of the year, Mia is well-positioned as a broker between two social groups. According to her centrality scores, Mia is quite popular with respect to maintaining work/play relationships with other girls. She is also an influential member within her social group with some of the highest closeness scores among the girls. While Mia's eigencentrality score slightly decreased, it is relatively high, indicating that she is also a leader of sorts within her group. Mia's ego-centric network was relatively less dense than the other girls who are members of the high status cluster, indicating that she may have had greater social freedom towards the end of the year.

*Jenique the Enforcer.* Jenique maintained several work/play relationships with other girls, but these relationships seem to be insular. Her position as a member of the Mean Girls only solidified. Jenique was not positioned as a broker within the social network at any point and her closeness score increases indicating that her influence within her social group has improved. Her eigencentality also increases, indicating that she shared leadership with the girls in her group. Structurally, Jenique was embedded in a neighborhood of high social closure, indicating that her behavior and attitudes were confined by her social group.

#### *Social Climbers*

*Brittany the Helper.* Brittany has gained two relational ties. Brittany is no longer situated between two girls who are disconnected. All of her girl peers are now connected within a social group. Brittany has moved from being at the margins of the social network to embedded in a social group with her closeness score increasing from .063 to .091. Brittany has also gained prestige among her popular girl peers with her eigencentality score increasing from .072 to .168. At the beginning of the year, the two girls in Brittany's neighborhood were not connected relationally which resulted in a network density of 0. Brittany then moved to the high status group and experienced complete social closure.

*Shawna the Bully.* Like Brittany, Shawna has gained two relational ties and was no longer situated between two peers exclusively, but is now connected to a social group. Shawna moved from being at the margins of the social network to embedded in a social group. Her closeness score rose from .053 to .091. Shawna gained in prestige among her popular girl peers with an eigencentality score that increased from .066 to .168. The two girls in Shawna's neighborhood were not connected relationally which resulted in a



network density of 0. Shawna then moved to the high status group and experienced complete social closure.

### *Social Fallers*

*Heaven the Fallen Party Girl.* Heaven has lost the most relational ties among the girls from 5 to 2. Heaven also went from being a broker among social groups with a betweenness score of 10.5 to 0. Similarly, Heaven went from being *the* most influential member in her social group to the least. Additionally, her eigencentrality score .190 fell precipitously among the popular girls. Heaven's initial high brokerage status provided a social structure that was not completely closed in comparison to the other Mean Girls, although Heaven's new social structure is relative simple with high closure.

*Lamaresha the Enthusiast.* Lamaresha has lost a relational tie. She also lost her position as a broker between groups over the academic year. Lamaresha became slightly more influential locally with her closeness score increasingly slightly from .077 to .083. However, her eigencentrality also declined from .121 to .075. Lamaresha's neighborhood was diffuse, indicating that she was able to experience greater social freedom, but likely fewer social resources provided by the network.

### **Campaigning, Free-riding, Resisting & Enforcing**

As previously mentioned, the change in girls' relative position and status can be characterized in three categories: social maintainers, social climbers, and social fallers. For example, Mia and Jenique were social maintainers; Brittany and Shawna were social climbers; and Heaven and Lamaresha were social fallers. While these categories adequately describe the girls' trajectory within the social network, it doesn't necessarily characterize their mode of trajectory. For example, when their social status of Heaven and Shawna was

challenged, both actively sought to include themselves or exclude others within the social network, whereas Brittany was less agentic to and was passively included or excluded by the high status social cluster, depending on their group's functioning.

On the one hand, while Shawna was a social climber and Heaven was a social faller, they were both *social campaigners*. The high status social group held high salience in terms of visibility and desirability, as well as high dominance in terms of controlling their actions. On the other hand, Brittany was a social climber, but did little as reported by other girls or observed by me to change her position. She was a *social free rider*. For Brittany as a free rider, the high status social network held low salience but high dominance, insofar as she joined the high status group. During small group work, Heaven can be heard calling Brittany a follower for going along with the other Mean Girls.

Still, there is a third kind of trajectory—a *social resister*. Mia and Lamaresha's trajectory indicated a studied perspective on the social dynamics of the high-status social cluster, but a disinclination to comply with or value the high status group norms. The high status social cluster carries high salience for these girls as resisters, but low dominance. Resistance in this sense did not mean exclusion, but moving towards more inclusive and authentic relational ties. For example, Mia prefers to work with low status girls and newly high status member Brittany because they don't start drama.

- Mia: Sometimes I work with Joi. Sometimes it's Lamaresha. Sometimes I even work by myself. Sometimes with Brittany.
- Maisie: Why do you like working with them?
- Mia: Because they don't start arguments or start drama saying she said this. You should go tell her and go hit her. What I like about Brittany is she keep things real like if someone start drama, she go tell the teacher instead of go tell someone else 'cus something that happened a long time ago. (Interview EOY)

As for Lamaresha, she sees the Mean Girls as phony and doesn't consider the Mean Girls true friends.

Lamaresha: And then ever since Heaven came. It's just crew, crew, crew, crew, crew, crew. I'm not they friend. And then they try to talk about me. And then every time Brittany—you know because I know where she lives. Every time she gets out of school she acting all phony trying to be my friend. I'm like, "Hey, I'm not your friend." And then, Heaven, phony. I'm not your friend. All of them, phony. I can't... [shaking her head] (Interview EOY)

Being a resister was less consequential for Mia given her elevated social status, but proved to further marginalize the already low-status Lamaresha within the social network.

Jenique comprises a fourth mode of the observed social trajectories, as indicated by her moniker. Her trajectory was that of a *social enforcer*. Jenique's social status was never challenged in any lasting or meaningful way. Like the campaigners, the high status social cluster held high salience and dominance for Jenique. However, given that Jenique did not need to change her status, she served more or less as a gatekeeper to particular girls' inclusion within the high status social cluster. In small group work, Jenique can be heard monitoring other girls' behavior, who have been excluded from the Mean Girls' group.

### **Liminality in Space-Time and Structure**

Different girls experienced liminality (or in-betweenness) within the social network. Gutierrez (2012) introduced the construct of liminality or *Nepantla* to the mathematics education research community, through the work of Gloria Anzaldúa. Gutierrez describes *Nepantla* as: "the uncomfortable space where there is no solid ground, that has not official recognition;" "constant tensions (e.g., of belonging and not belonging, of being highly visible and invisible at the same time);" and "knowing that everything is conditional, that we may

need to pull out another hat to wear at any moment” (p. 35). In this section, I describe two kinds of liminality—in space-time and structure.

The girls’ social status has been constructed in relatively rigid terms of high and low via thresholds of centrality scores, but also within the narrative as periods of inclusion and exclusion. The girls’ trajectories as social climbers and fallers suggest that they experienced a transitional period between low and high status. In **Figure 17**, Brittany, Shawna, and Heaven move into a liminal status during the first reformation period. Brittany and Shawna are transitioning from low to high status, while Heaven is transitioning to high to low status. At the end of the school year, Heaven attempted to reassert herself within high status social cluster during the second reformation period, thereby entering a second liminal status. These three girls experienced spatio-temporal liminality over the course of the academic year.

Liminality can also be experienced as a structural position within the social network. For example, consider Lamaresha and Mia’s position in the network in **Figure 18**. Both girls are respectively positioned as brokers situated between high and low status members within the social network. This position is also indicated by their high betweenness scores, 10.5 for Lamaresha at the beginning of the year and 13 for Mia in the middle of the year. Lamaresha and Mia’s social status did not change from high to low, but their location in the network was situated between groups.

The period of liminality in space-time, as well as liminality with respect to structural position, are useful in examining the processes of learning and participation. As Gutierrez (2012) notes, liminality has “contributed to the expansion of new ways of asking questions,

new theories, and more interdisciplinary approaches to understanding the world around us” (p. 35).

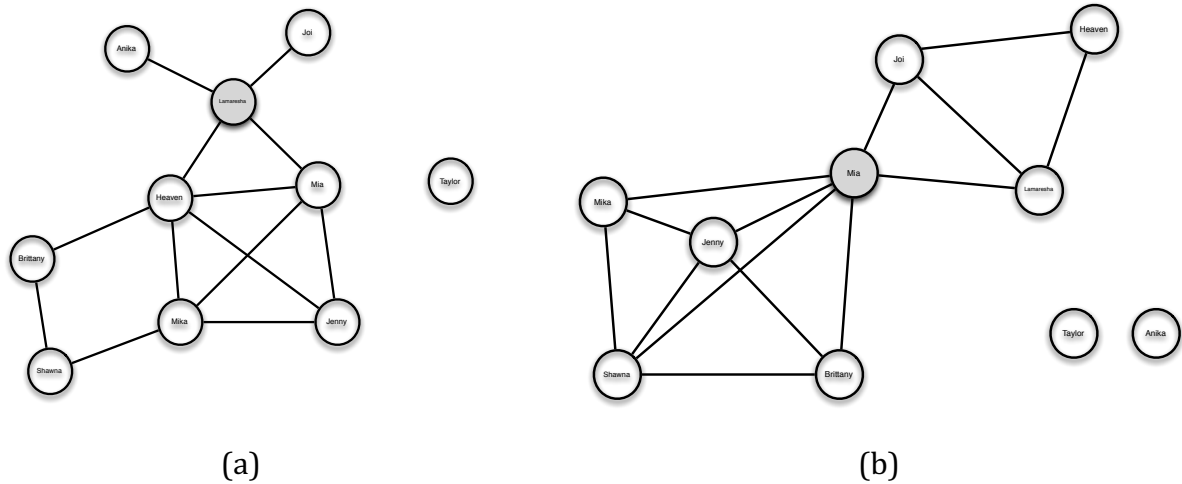


Figure 18-(a) Lamaresha's liminal position within the social network at BOY and (b) Mia's liminal position within the social network at MOY.

## **IX. THE COLLISION OF FIGURED WORLDS: PORTRAITS OF THE GIRLS**

This chapter paints portraits of the focal girls in this third grade mathematics classroom. Through the portraits, I attempt to show the complexity of learning when the girls' social and mathematical worlds collide. The portraits provide examples of girls whose social status improved, decreased, and or maintained. However, in addition to describing the girls' social trajectory, the portraits also provide an account of the strategies of participation that each girl used to achieve her social and mathematical goals. Figure 19 is a snapshot of the portraits, which span different phases in the unfolding of the social world. I chose to focus on nine days in the year, which allows me to speak across the some of the portraits.

These portraits are a compilation of the social network, identity, and ethnographic analysis. The portraits are complex representations of the girls in relation to: their classroom communities, their social groups, the content of school mathematics, small working groups, etc. In each portrait, there are moments that span half an hour and moments that lasted only a couple of minutes. Similarly, there is general talk that is described in the context of the story juxtaposed with very detailed turns of talk, which have been formatted as a transcript and numbered by line. This zooming in and out, fast forwarding over days and months, in addition to pausing over certain moments are all representational devices in service of the gestalt. This chapter is the pursuit of a gestalt that seeks to make whole and rational the experiences of young Black girls learning mathematics.

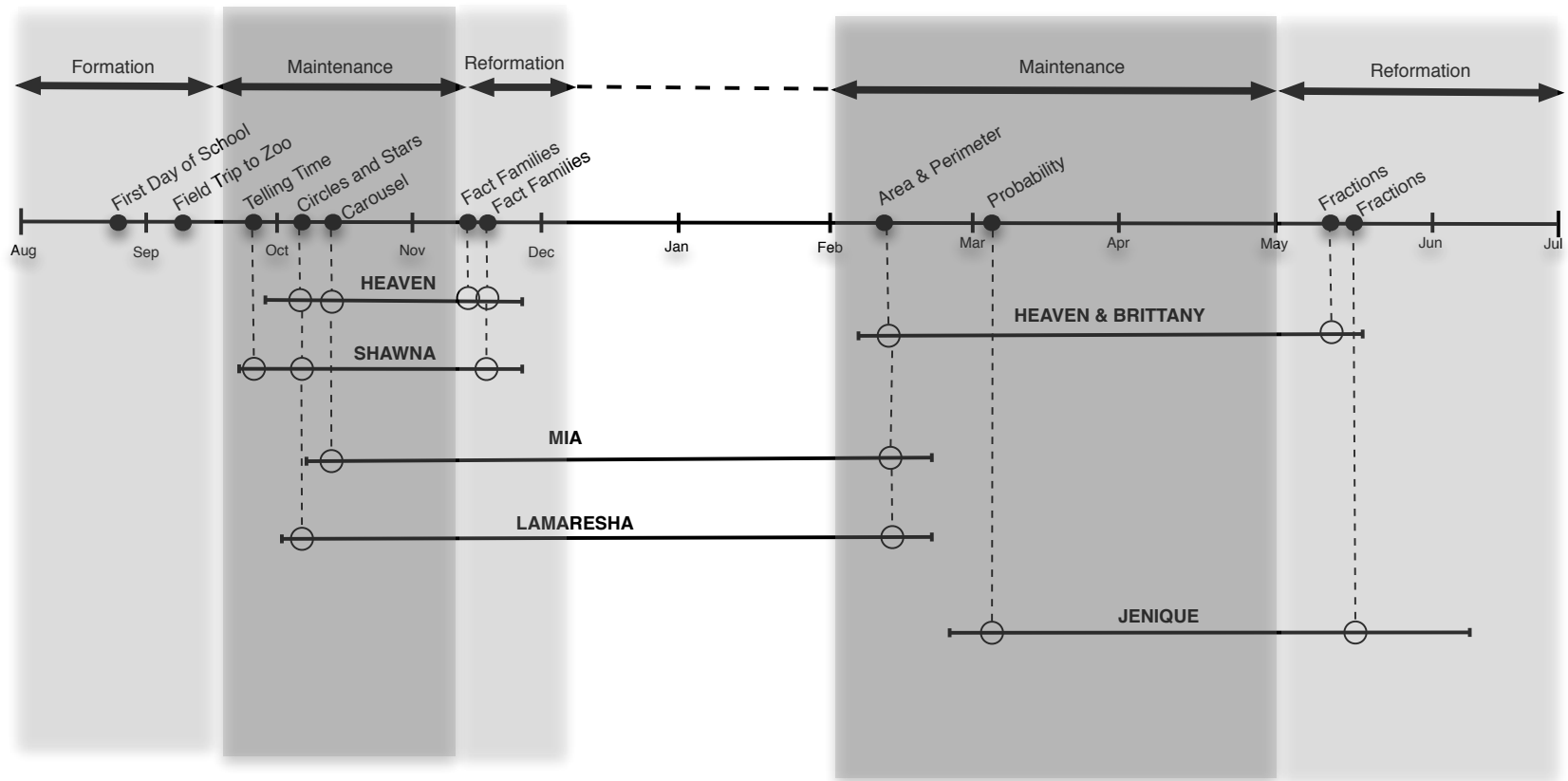


Figure 19-The timeline of the girls' portraits.

### **Heaven: A Portrait of Campaigning on an Outbound Trajectory**

Heaven was fun. At the beginning of the year, like a hurricane, she seemed to cull the energy of the other girls and create a sense of excitement within the mundaneness of third grade. Three of her peers at the beginning of the year described her as someone who is fun and who they invite to their parties, the highest of compliments. Heaven was tall and lanky with medium-brown skin. Her hair was often combed into neat cornrows with colorful barrettes hanging on the ends. Other days her hair was neatly arranged in one or two soft afro-puffs, tightly bound by a colorful rubber band. She had large, doe-like brown eyes, a button nose, and a wide smile. While Heaven was always clean and neat, she lacked the girlish flares in comparison to some of her girl peers. They wore sandals or sequenced tennis shoes to her black sneakers and their pleated skirts stood in contrast to her shorts and jeans. However, what Heaven lacked in material flare was compensated by a fanciful, imaginative personality that often operated below the radar of adults, but transmitted on just the right frequency for other young girls to be moved to action.

At the beginning of the year, Heaven would often be huddled on the classroom rug with Mia, Jenique, and Lanae. Sometimes the girls were sprawled about the rug. Other times the girls would sit in a group with their legs crossed playing with one another's hair, rubbing each other's shoulders, or cupping their hands and whispering in one another's ears. Sitting comfortably with her friends, Heaven volunteered occasionally during lessons and usually provided the desired response to Ms. Patterson's questions with ease. It was not unusual for Heaven to be asked to complete mathematical tasks in front of the class.



### *Heaven as Competent Mathematics Doer*

During an equipartitioning lesson at the beginning of the year, Ms. Patterson said, “Okay, there are 20 erasers on the table. Now, I want Heaven to put these into equal groups for us. Let’s see what she does to make each group equal.” The children in the class began to huddle around Heaven as she begins to move one eraser at a time into a group. She stopped and counted the erasers and picked up one and moved it the other group. Ms. Patterson then asked, “How many erasers, Heaven?” To which, she immediately replied, “Ten.” “How many groups, Heaven?” “Two,” she responded, like machinery. A few minutes later, within the same lesson, Ms. Patterson called on Heaven once again to correct the number model written by another student (i.e.,  $2 \times 5 = 10$ ). “What’s wrong with this number model, Heaven?” Again, Heaven immediately responded, “It don’t have a ten.” “And where should the ten be, Heaven?” Ms. Patterson asked. Immediately taking up her cue, Heaven responded, “The ten should be where the five is.” Ms. Patterson echoed her comment, “It should be where the five is,” and wrote on the board:  $2 \times 10 = 20$ . Heaven’s ability to push lessons forward competently and efficiently showed her to be a good mathematics student and often allowed her to fully engage in mathematics lessons. This was Heaven’s typical mode of participation.

### *Heaven as a Reluctant Mathematics Doer*

However, approximately five weeks later, Heaven was despondent and showed no interest in participating with her class. She was hiding in her coat and sitting away from the girls, who had until this time been her best friends. On this day, the class entered the room and began sitting down on the rug. Shawna, Jenique, Mia, and Lanae were sitting at the rear of the rug together. This was a new and conspicuous configuration of the girls. Shawna,

Jenique, Mia, and Lanae lobbied to get some water, but Ms. Patterson refused them. Heaven was sitting on the rug but away from this group of girls. Her head was resting on hand and her eyes were downcast, her mouth was turned down, and her shoulders were hunched as if she could not bear the weight of the beaming fluorescent lights. Unlike the other children who had shed their winter coats, scarves, and hats, she was still wearing a hot pink winter hat and scarf.

Ms. Patterson told the class that they would be doing the Problem of the Day. She dismissed the children to their desks, where they opened their composition notebooks and began working. Heaven had also returned to her desk, laid her head down, and pulled her hot pink coat over her head. Upon seeing Heaven, Ms. Patterson demanded, "Heaven, I need that coat off your head." Heaven immediately took her coat down.

Ms. Patterson turned on the projector and many of the students were looking towards the screen, except Heaven, who had her head down on her desk. Ms. Patterson began the lesson by introducing a four corners problem. (A problem solving strategy for working on storied problems.) Ms. Patterson asked, "If you are ready for me to read, give me a thumbs up." A few students responded, but Heaven made no such effort. Ms. Patterson began to read, "Find the answer. Show your work." To the class she said, "You read." The class repeated in unison, "Find your answer. Show your work. There are twenty-two children in the classroom. Nine children were absent on Monday..." Ms. Patterson continued reading the problem. Heaven lifted her head occasionally, but laid it back down. Ms. Patterson took the class through the problem, emphasizing what information is important and what mathematical operation to use in order to find the answer.

Ms. Patterson gave the children instructions to transition to their Specials class. The class puts on their coats and jackets. Ms. Patterson, "I am looking for the best student." She called on Derell, then Derrick, Joi, Lamaresha, Brittany,..." Waiting to be called upon, Heaven put on her coat, zipped up her jacket, and wrapped her scarf around her face such that you can only see her eyes. Once all the students are in line, Ms. Patterson stated, "Jamal is making the boys' line and Mia has the girls' line. Mia, take the girls out into the hall." Heaven who was in the middle of the line next to Lanae waited until the other girls pass her and positioned herself as last in line. Noticing that Heaven was upset, I sidled up beside her on the walk to Specials class. At that time, she told me that Lanae, Shawna, and Jenique tried to fight her during recess.

#### *Heaven's Campaign using Mathematics*

The children returned from their Specials class and engaged in a short lesson on fact families. After the lesson on fact families, the children were sent to their desks to begin working in their workbooks. Towards the end of the working period, Heaven left her seat and walked over to the table of two girls, Jenique and Lanae.

1	Jenique: 66 takeaway 10 equals 56. 66 takeaway 56 equal 10.
2	(Heaven walks up to the Jenique and Lanae's table.)
3	Lanae: Heaven, what happened?
4	Jenique: Take the work and go. Adios.
5	Heaven: Somebody put pencil shavings on your name tag.
6	Jenique: Who?
7	Heaven: Lanae.
8	Jenique: You did.
9	Lanae: Yea.
10	Jenique: 468. So I got 8. Four blues and 4 yellows. So 468 takeaway 100//
11	Heaven: Girl, that's huh...
12	Jenique: 368
13	Heaven: That's not 368, girl. It's 568. Look, see you add

14 Jenique: It's 568 'cuz you add. I was just playin. It's 468 then you plus another  
15 hundred and that's 568, because you still got the 68.  
16 Heaven: I know. But it's the same thing. (Transcript 11/13)

Heaven attempts to make re-establish contact with Jenique and Lanae (l. 5), but her advances don't seem to gain traction with Jenique, who continues to work on her fact families assignment (l. 10). Then, Heaven engages Jenique in the mathematics work and they discuss the fact family (i.e.,  $468 + 100 = 568$ ) (ll. 11-17). Heaven corrects Jenique's initial response of "368" to "568" (l. 13). Jenique agrees with Heaven's refutation and describes how adding 100 to 468 results in 568 (ll. 14-16). This mathematical exchange secures Heaven's relevance at the worktable and allows the conversation for the girls to continue.

17 Lanae: (faintly)...you talking about my mama and her roommate and that's  
18 why I was like—you's talking about my mama?  
19 Heaven: I wasn't talking about your mama//  
20 Jenique: //Yea, I feel bad, because that ain't funny because my whole cousin.  
21 I'm not going//  
22 Heaven: Why don't y'all talk about somebody else mama. My mama almost  
23 died. My granddaddy. My mama daddy died. Talkin about someone  
24 family that's low.  
25 Jenique: I can't call you no more because—you know why—my granny said  
26 what's going on at school and if I lie to her and Mia told and have to  
27 remember and told her all those stories. So my granny said that I have  
28 to stop talking to her for a while. That was like a week ago and she  
29 was like now you can talk to her if you want, because I am not gone  
30 stop you from talking to your friends. But I was like it's okay.  
31 Heaven: Talk to who?  
32 Jenique: You. My granny be like snap-snap.  
33 Heaven: I really didn't call you anyway cause I know your ah//my mom said  
34 don't call cause your grandma probably mad. I told her you don't call  
35 no more so mama said if she don't call you just don't call her back. If  
36 she call you then just hurry up and answer it. My mama said even if  
37 she gone then go ahead and answer it. She said answer that phone if  
38 you call. I got a new house phone.  
39 Jenique: I don't have your number.

40 Heaven: I gotta give you the number. I'm gonna call your house phone.  
41 Lanae: I can't get on my phone no more.  
42 (Ms. Patterson's voice rises above the class, "Okay, 310. Can everybody give me  
43 five?") (Transcript 11/13)

The girls' discussion shifts to their social problems. They begin by discussing the inappropriateness of "talking about mamas" (ll. 17-22) and then their respective issues with talking on the phone after school (ll. 23-40).

This conversation provides some insight into origins of the girls' conflicts, namely, the perception that Heaven was talking about Lanae's mama. Mathematics was used by Heaven to gain access to the Jenique and Lanae. Heaven's mathematical competence provides a kind of social power, despite her comprised social position. There is no evidence that Heaven walked over to give or receive mathematical help, but to make a social connection with two girls in the high status group. As such, her move to use mathematics may have been reflexive and lacking intent. Regardless, the use of mathematics had the effect of continuing the social connection and achieved Heaven's goal of campaigning for her continued connection to the girls. Unfortunately for Heaven, her campaign to regain her privileged status is met the following day by continued opposition.

#### *Heaven in Chaos*

The following day I entered Ms. Patterson's room in the midst of a bit of chaos. Ms. Patterson was not in the room. The class was filtering in from lunch and recess and sitting on the east rug. Mia was telling a story to the boys on the rug and drinking a Coke. Shawna joined Mia and they began talking about Jenique. In the front of the classroom, at the same time, Heaven walked up to the student teacher, Ms. Sarah, and asked whether she could call her mother. Ms. Sarah apparently gave her permission. Heaven turned away from Ms. Sarah

to leave the classroom, yet Lanae was standing in her way. Lanae approached Heaven and got in her face. Lanae had a stain on her shirt and blamed Heaven. Lanae declared that she was “gonna jump” Heaven for staining her \$40 shirt. Heaven shifted from side to side to evade Lanae and walked out of the room. I called out to Lanae to go sit down, but Lanae instead attempted to leave the room behind Heaven. While I intercepted Lanae, Shawna ran towards the door seemingly to pursue Heaven as well. Officer Johnson, the portly security officer for the elementary building, was now standing in the doorway preventing Shawna from leaving. Shawna screamed to Officer Johnson, “Don’t touch me you fat pig!” I turned to Shawna this time and told her to go sit down. Lanae had taken advantage of the circumstances, given my attention was now on Shawna. Lanae began crawling across the classroom to avoid me. Getting out of the classroom to follow Heaven had become a game. Shawna insisted, “Y’all ain’t our parents! You can’t tell nobody what to do!” Lanae was laughing. Eventually, both Lanae and Shawna returned to the rug.

After a few minutes, Heaven and Jenique entered the classroom a few minutes later. Heaven sat on the rug away from the other girls, as was Jenique, who sat at her desk with her head nestled on her arms. Close to ten minutes passed with the girls sitting about the room like this.

#### *Calm Is Restored and Heaven Is Implicated*

Ms. Patterson walked in and counted, “Here’s what I want: 1, 2, 3, 4. Thank you for not letting me get all the way to five.” The frenetic atmosphere dissipated quickly and was replaced by the usual calm. Most of the class was now seated at the rug. Heaven sat at the back of the rug away from the other girls. She was wearing her hot pink hat again, which was snugly pulled over her head masking her forehead and eyes. Brittany, Mia, Shawna,

and Lanae were clustered together at the front of the rug. “Here’s what we need to talk about. It really hurt my heart that Jamal had to come whisper to me that he was hungry, because of the food throwing is happening in the cafeteria. I understand it’s not your class that is throwing the food, but what has to happen is you guys have to get up from the table and let Officer Johnson know.” Shawna raised her hand swiftly. Ms. Patterson continues, “I don’t want another child to have to be hungry. I had to go all the way to the big building to get him something to eat. It hurts my heart that he didn’t get to eat his food. And he’s literally crying. I am going to hear from you for a few minutes. Now, what happened?” A few children provided their perspective on the food fights at lunch. When it was Lanae’s turn, she offered, “Heaven put some corn in a spoon and started flipping it.” Heaven’s face contorted and her lips part in defiance of what is being said. Ms. Patterson asked, “Oh, so Heaven was a part of it.” Lanae nodded her head and said, “Yea.” The discussion continued. Heaven did not offer a rebuttal, but only rested her head on her hand.

After hearing enough in her fact-finding discussion, Ms. Patterson said, “I’m done with that part of it. I need for you to be responsible and let Officer Johnson know that food throwing is happening. This can’t happen and it’s happening everyday now.” Shawna laid down on her back, seemingly bored by the conversation at this point. “I’m saddened by it. Now, what we have to talk about is fact families again. Some of you will be working in your centers and some of you will be working on fact families because it is important for you to understand how all of those numbers work together.” Ms. Patterson talked about her expectations for the children’s behavior during Specials and then began dismissing students from the rug one by one to form a line at the door. The class bundled themselves in their coats and scarves for the cold and left for the Specials class. The first half-hour of the mathematics

block was unexpectedly consumed by finding lunch for Jamal and discussing food fights at lunch.

### *An Unexpected Visitor*

While the class was in the library for Specials, Heaven's mom unexpectedly showed up at the classroom door with stroller in hand and Heaven's baby sister tightly bundled in a coat. Ms. Patterson welcomed Heaven's mother into the room and introduced the student teacher and me. They candidly discussed the issues with the girls. Heaven left that afternoon with her mother, who was seemingly frustrated by the situation between the girls and the lack of communication from the school administration.

Although Heaven made several attempts to continue her friendship with Mia, Jenique, and Lanae, she was essentially ostracized from the group. For the remaining weeks in the semester, Heaven was more subdued during lessons and tended to be less involved in the whole class activities.

### **Thinking about Heaven's Portrait**

Over the first semester, Heaven went from being a visibly competent student in the classroom community with substantial social support from her network of friends to a more modest participant with little to no social support. Over time, Heaven was able to establish new relational ties; however, the girls who comprised her social network in the following semester were of lower status. Heaven's ostracism did not prevent her from campaigning to maintain her social status.

Similar to her move in approaching Jenique and Lanae, Heaven was able to use her mathematical competence and strong mathematics identity in some instances to gain access to the high status social group. The episode (ll. 1-41) serves as a useful example of



the intermingling of emergent goals in mathematics activity. As Heaven approaches the group, her primary goal is social—to rectify her isolation from these high status girls. Jenique and Lanae were pursuing the mathematical and academic goal of completing their workbook page. Once Heaven’s bid for inclusion is effectively ignored, she takes up Jenique and Lanae’s mathematical goal of working through a fact family problem. She helps to correct Jenique’s mathematical work, which gives her relevance and place and mediates her status of liminality. From this point, her original goal—her social goal—is taken up by Lanae and allows her to renegotiate her status with respect to the other girls.

The second episode is wrought with conflict and tension between the girls, as well as within the class. During Ms. Patterson’s fact-finding discussion, Lanae implicates Heaven as a “food popper” or one of the children throwing food during lunch. Heaven does dispute this positioning, but remains silent and withdrawn. Heaven left class early with her mother this day, effectively removing herself from the classroom community and taking up the position as an outsider, at least temporarily. In this case, it is worth accounting for the forces that are pushing Heaven out of the community of practice, none of which are mathematical in nature. First, Heaven is physically threatened by Lanae, she is labeled a “food popper,” which is contrary to her academic identity of being a perfect student, in addition to her mother visiting the classroom and pulling her out of class for the day. Compounded by the previous day, this series of forces produce a trajectory that moved Heaven out of the classroom community on that day and resulted in more modest forms of participation on subsequent days. Again, Heaven did not recede into social exclusion gently. She continued to vie for relevance, but by the end of the year described herself as someone

who liked to work alone. This was a decidedly different stance than her comments at the beginning of the year, which indicated she enjoyed working with Mia, Jenique, and Lanae.

### **Shawna: A Portrait of Campaigning on an Inbound Trajectory**

Shawna was a bully. That is, she was considered a bully by many of her peers and even described herself as someone who was not nice and “mess[ed] with people.” Shawna was tall like some of the other girls, but she was also chubby. Her relative size allowed her to physically intimidate her classmates at times. Shawna had a round chubby face that often measured her surroundings with a disapproving scowl. She often wore cornrows with beads dangling from the ends that crowned her flawless ebony skin. Shawna almost never wore her school uniform. This is not say that her attire was unregimented. Her dress regularly consisted of jeans, a t-shirt, and tennis shoes. Shawna’s demeanor vacillated between a grumpiness to exuberant babyishness. Shawna attended school regularly, but would often not be present during class—cordoned off from her classmates in an empty classroom or principal’s office for her latest bullying tactic or altercation. Over the course of the year, Shawna was suspended twice. Yet, when she was in class, the mathematics lessons did not pose much of a challenge to her academically. She often sat separated from her classmates looked on with a disinterested gaze and answered most questions with relative ease. The following day, which I describe next is a good example of Shawna’s disinterest, but general competence.

#### *Shawna Enters Late and Gets Grouped with Two Boys’ Bad Behavior*

It was around 2:05 PM, the last hour of the school day—the mathematics block. The children were sitting on the east rug facing the whiteboard with their toolkits, plastic Ziploc bags, in their laps. Shawna was not in the room. Ms. Patterson asked the children to pull out

their clocks, which are composed of a square piece of white cardstock with two black moveable hands. Ms. Patterson then asked the class, "What's on a clock?" and the class responded with numbers, minute hand, and hour hand. The class discussed which hand—the big one or the little one—is the minute versus hour hand.

Ms. Patterson informed the class that they are going to make different times using their clocks. She asked, "When does school begin?" The class chimed, "8 o'clock." Ms. Patterson then asked for the children to make that time on their clocks. Several students moved the hands on their clocks and then held their clock into the air. Ms. Patterson began chastising the class. "I have about 50% of my class participating. I need 100% participation. That means I need every clock in the air. Every clock. I still need two more clocks in the air."

With the lesson in progress, Shawna walked lazily into the classroom. She was wearing a purple tank top, blue jeans, and skinny, hot pink belt. The class was sitting on the rug, but she went to her desk and plopped down in her chair, slowly pulled out her clock of the plastic bag and disinterestedly turned the hands. Ms. Patterson continued, "Here's what's gonna happen. I have to stop my lesson and the reason that I have to stop my lesson is 'casue I have two children distracting other children's learning. Now, I hope that I don't have to tell those children who they are." Several of the children, who made up the front row of the rug, began looking back to see who the culprits could be. Ms. Patterson continued, "I'm going to give them time to move away from each other. I am going to count to five. One, two, three..." Jenique stood up and began moving away from Mia. "You can go back and sit down, because it is not you." Jenique returned to her seat. Mia then stood and began moving, "It's not you, Mia. I'm going to tell them, because they aren't moving." Heaven pointed and said, "It's Arthur and John." To which Arthur immediately protested,

as he stood, proclaiming he wasn't talking. He moved to the other side of the rug away from John. "Okay, I think we're ready. I'll wait for Jonathan to get to the rug and for Shawna to get to the rug. I'm gonna wait for you guys." Jonathan (different from John), sat at a worktable, rose immediately and moved to the rug. Shawna, who was fanning herself with her clock, stopped, sighed, and slowly put her clock back into the Ziploc bag. She sealed the bag slowly, stood, pushed her chair under the desk, and moved to the east rug. "A few more seconds, Shawna," Ms. Patterson says. The timing of Shawna's entry into the class occurs when Ms. Patterson is admonishing two boys for playing, which results in her resistant behavior being grouped with the boys "distracting" behavior.

#### *Waiting for Shawna's Clock*

"Okay, let's keep moving. Here's the next time. Let's put 6 o'clock on our clocks." The children begin moving the hands of their clocks and then raising them into the air. "Let's see," Ms. Patterson says. Shawna now on the rug has taken her clock out of her toolkit bag and has begun twirling the hands indiscriminately. "I'm waiting on one person to hold their clock up." With their clocks held up in the air, the children in the front row look behind them and several voices chime, "Shawna, Shawna." Ms. Patterson corrects the class, "You don't have to call names. Ms. Patterson takes care of that. I'm just waiting for her."

Shawna begins manipulating her clock. A child whispers, "Shawna," chiding her to put her clock in the air. Shawna then lifts it in the air, as most of the class looks only at her. Ms. Patterson then says, "Thank you. You can put your clocks down," and the children release their arms, which have been suspended in the air for several seconds. Ms. Patterson continues with the lesson breaking the clock into four sections to discuss the time as "quarter past." Clocks are popping up into the air and Ms. Patterson begins confirming

students with correct clocks and re-instructing children whose clocks show incorrect times. Shawna begins complaining that John is hitting her.

Once Shawna joined the other children on the rug, she continued to show resistance to the activity by not configuring her clock to show six o'clock, and holding it up in the air, as Ms. Patterson requested. Her resistance was met by pressure not only from Ms. Patterson but the class, when several students whispered her name coaxing her to comply.

### *Shawna Gets Put Out*

"I still hear talking and I asked that the clocks be down. Shawna, I need you to move," Ms. Patterson directed losing her patience. Under her breath, Shawna said, "Shut up talking to me, Ms. Patterson." Ms. Patterson immediately paused and changed her tone, "Okay, we are gonna stop for minute, because I have to take care of something and when I have to take care of something during my lesson, that's a problem. That's a problem, because you didn't come to school to learn, obviously. And if you didn't come to school to learn, I'm going to politely escort you to another room. So, I need Shawna and John to stand up, because you are going to be escorted out of here." John protested, "She kept on kicking me!" Ms. Patterson then insisted, "I need you to stand." John got up and stormed out of the room.

"And here's what I need the rest of you to do for Ms. Patterson," she said. Ms. Patterson looked around the rug, "Go to your seats, turn to your journal page one point four. Leave your toolkits on the rug for now. Go to one point four in your journals. Let's go. I'm going to count to five. One, two,...yes, you may work in your nooks. Do numbers one, two, and three and stop for me."

With the exception of Shawna, who continued to sit on the rug, the class went to their desks. The metal legs of the chairs were clanging on the desks, as children pulled out their

chairs and began sitting. Ms. Patterson read the direction, but stopped again, "Oh, we're not ready. Put your finger on number one. Now, please put September 25<sup>th</sup> on the top of your book page and the time is what?" A child offered, "A quarter past..." Ms. Patterson revoiced the statement, "A quarter past..." begging for an answer. The children began shouting out answers, " Three," "Four," "Two."

Walking towards Shawna, Ms. Patterson confirmed, "A quarter past two, so you should put 2:15." Ms. Patterson returned her attention to Shawna. "C'mon Shawna, let's go, c'mon." She pointed towards the door with a dry erase marker. Shawna hadn't left her place on the rug. Shawna rose without a word and sauntered toward the door, twirling her jacket in her hand. Ms. Patterson walked out the door and escorted Shawna into the empty neighboring classroom.

During this episode, it is worth noting that Shawna was a low-status girl with few relational ties. As such, there were no strong relationships anchoring her participation to the activity. The lack of positive social relationships (or anchors) to the activity created the conditions for Shawna's marginal participation, despite Shawna's mathematical competence in working with the clock. The social relationships between the other girls created particular social structures for connecting to the classroom activity, such as arriving to class on time, sitting together, and responding to Ms. Patterson in unison with the rest of the class. The absence of those social structures or being on the outside of those relationships left Shawna open to being constructed by the unfolding of events within a particular moment. Unfortunately for Shawna, this meant that her resistance to the girls was perhaps construed, along with the boys who were playing, as resistance to learning about telling time.

Despite her competence in mathematics, Shawna continued to participate at the periphery of the classroom community. A week or so later, the class was engaged in a lesson on repeated addition, where Shawna was again sitting away from the class—at her desk, listening as Ms. Patterson reintroduced the Circles and Stars activity.

Ms. Patterson drew three large circles on the board and pointed to the space between asks, “What operation do I need to put here?” Lamaresha responded, “plusses.” Ms. Patterson then discussed the words “product” and “sum.” Ms. Patterson continued with her drawing. She completed her figure by drawing two addition signs between each circle, an equals sign, and the number 15. She turned to the students and asked, “How many stars do I need?” Several students raised their hands, including Heaven and Jenique. Ms. Patterson called on Heaven, “Heaven is ready to tell me.” “How many, Heaven?” Heaven responded with ease, “Five, plus five, plus five.” Corroborating Heaven’s response, Ms. Patterson drew five stars inside the circles and then asked the students to skip count by five. Chorally, the class chimed, “5, 10, 15.” Ms. Patterson noted that we have “three sets of five” or “three groups of five. Let’s try one more.” Ms. Patterson then drew four circles with addition signs between, an equals sign, and twenty-four.

Jenique waved her hand, along with Jamal and Patrick. This time Ms. Patterson acknowledged Jenique, “Jenique is really eager. Shawna was eager. Jamal was eager. I want to hear from Patrick.” Patrick suggested five. The class skip-counted by 5 ending on 20. Nothing was said by Ms. Patterson, but it was clear to the class that the ending number was not 24. Ms. Patterson moved on, “Let’s hear from Jenique.” Jenique responded, “Ten.” Ms. Patterson confirmed her response, “So you want to put ten stars?” Jenique sat on her haunches adjusting herself to see the easel. “Yea,” Jenique responded. Without drawing the

stars, Ms. Patterson asked the class to now count by tens using the circles as markers. The class chimed, “10, 20, 30, 40.” Jenique interjected, “No, y’all ain’t supposed to count like that. Y’all didn’t let me finish.” Jenique began to smile realizing her suggested answer is incorrect, and looked away sheepishly. Ms. Patterson responded, “No, you said ten stars, so I need to move on. Shawna.”

*Shawna Answers Repeated Addition Question Incorrectly, Is Admonished by Ms. Patterson, then Redeemed*

Shawna provided her answer, “ Five, five, five, four,” to which Jonathon immediately rejected. “No, that’s nineteen,” he said. On the rug, Mia counted on her hands and began waving her arm so that Ms. Patterson would recognize her. Shawna quickly revised her answer and offered, “Put five, five, five, nine.” Ms. Patterson took a minor pause and then said, “I need to have a quick conversation with Shawna. Shawna, here’s what we decided earlier and you might not know because you were eager to do ten important sentences while we are working on math. So here’s what we talked about repeated addition.” Ms. Patterson explained the conditions for repeated addition. “ Do you want to try again Shawna?” Ms. Patterson asked. Shawna was silent for a moment, which other students filled with excitement and hand waving. Ms. Patterson asked the class to put down their hands. Shawna responded, “Ooooh,” recognizing the answer, “it’s six, six, six, six.” In apparent frustration, Mia dropped her arm and said, “That’s what I was going to say.” Ms. Patterson turned to Mia, “Mia what were you going to say?” Mia responded, “Six, six, six, six.”

Heaven correctly answered the repeated addition question with ease, whereas Jenique struggles to answer a similar question. Jenique attempted to revise her answer, but the opportunity to re-engage with the problem was foreclosed by Ms. Patterson. Shawna also



initially struggled to answer the repeated addition problem posed by Ms. Patterson, however this incorrect answer created an opportunity for Ms. Patterson to do two things. First, Shawna's incorrect answer allowed Ms. Patterson to admonish Shawna for doing other work and being separate from the class. Secondly, Shawna's incorrect answer with different numbers allowed Ms. Patterson to emphasize that repeated addition required using the same number. When Shawna was given this new opportunity, she correctly answered the question. While Shawna was thinking, Mia was eagerly waving her hand to answer the repeated addition question. Mia seemed a bit frustrated when Shawna correctly answered the problem. Ms. Patterson acknowledged this frustration and gave Mia an opportunity to share the same answer, which effectively granted Mia credit for figuring out the problem and only indirectly acknowledged that Shawna also came up with the correct answer.

The other girls reveal that opportunities are created for the girls differentially. On the one hand, correct mathematical answers created an opportunity for positive recognition, such as in Heaven's case, but incorrect mathematical answers foreclosed opportunities for positive recognition for Jenique. On the other hand, an incorrect mathematical answer coupled with behavior not aligned with the classroom norms created an opportunity for Shawna to be recognized for her failure to follow instructions, but also came with an opportunity to re-engage with the mathematics.

Of course, the girls' social status was not determinative of how opportunities unfolded for them in Ms. Patterson's class. However, the girls' inclination to offer answers, conform to social norms, and garner recognition is mediated by their social relations. For example, as a low status girl, Shawna was not protected by her social status when incorrectly

answering a question, but this is less consequential for Shawna given her relatively strong mathematics identity. Shawna provided two incorrect answers in relatively quick succession, before excitedly providing the correct answer. Her engagement with the problem seemed less about redeeming herself as a mathematics knower, but as a student who can pay attention, follow instructions, and, generally, adhere to classroom norms. In this case, Shawna's strong mathematics identity and competence seemed to do reparative work for her as a student.

For several weeks, Shawna's participation patterns and social status were relatively unchanged. Shawna continued to participate at the margins from a low status position until the conflict started within the high status social group. The day that relations were highly strained between Heaven and the high status social group, Shawna was repositioned to Jenique and Lanae as friends and workmates. The following transcript picks up with Shawna, Lanae, and Jenique working on their fact family assignment, which becomes a platform for building new relationships.

44	Jenique:	Okay, let's talk about our work now for the camera//for the
45		thingie.
46	Shawna:	Okay, y'all. I'm on page 27. And this says 3, 9, 12. Three plus 9
47		equals 12, nine plus 3 equals 12.
48	Chorus:	12 takeaway 9 equals//
49	Other Girls:	3
50	Lanae:	3
51	Chorus:	12 takeway 3 equals 9.
52	Shawna:	7, 8, 15
53	Shawna:	7 + 8 equals 15
54	Chorus:	8 + 7 equals 15
55	Shawna:	15 takeaway 7 equals 8//
56	Other girls:	//7equals 8
57	Shawna:	15 takeaway 8 equals 7. Fill//find the missing numbers in each
58		fact family. 7 plus 5 =12. 5+7 =12; 12 takeaway 5 equals 7; 12
59		takeaway 7 equals 5. [pause 3 seconds] 6 + 7 = 13, 7+6 = 13. 13 - 7
60		= 6; 13 - 6 = 7. Write a reled [sic] subtract fact for each addition

61                               problem.  $8 + 4 = 12$  and so they said a released [sic] subtract for  
 62                               each addition.  
 63       (Lanae and Jenique are whispering.)  
 64       Shawna:  $8 + 9 = 18$ ;  $8 + 9 = 17$ . Write an addition fact for each addition family.  
 65       Jenique: I ain't gone say nothing cuz I know she ain't talkin to me.  
 66       Shawna: 14 takeway 5 equal 9  
 67       Jenique: You tryin to do that one. Huh. That one ain't easy. See, you gotta do six  
 68                               takeway 15 equal 9. Five takeaway fourteen equals 9. Oh, how about, I  
 69                               got one. How about Fifteen takeaway 9? Yea, fifteen takeaway 9. Time  
 70                               to go home yall. (Transcript 11/14)

The first half of the girls' discussion is exclusively mathematical (ll. 44-68). The following transcript is perhaps unremarkable with respect to the mathematical thinking. The girls are working through a rudimentary worksheet on fact families. Essentially, the assignment calls for rewriting addition and subtract facts into different mathematical sentences. Nevertheless, there are two interesting aspects in this exchange: (1) Shawna is clearly the most computationally fluent among the three girls—her voice rings out loudest in the audio recording and the other girls fade out when transitioning to subtraction facts; and (2) Shawna is deeply engaged in the activity. This scene stands in sharp contrast from Shawna's participation in whole group, generally, and working with other groups. In this example, the mathematics activity provides an opportunity for Shawna to mitigate her relatively isolated social status. Her mathematics operates as a tool for social cohesion.

69       Shawna: Time to go home y'all. Jenique, where you live at?  
 70       Jenique: Huh?  
 71       Shawna: Where you live at?  
 72       Jenique: I live down that block s'kraight ahead. You gotta go s'kraight ahead  
 73                               across that big street then go//  
 74       Shawna: Down the street. I gotta go straight?  
 75       Jenique: I don't live down that block. Don't you know when I always walk this  
 76                               way.  
 77       Shawna: Down Oliver (street name).  
 78       Jenique: Yea. I live all the way down there.  
 79       Shawna: By the pond?  
 80       Jenique: I'll show you after school.  
 81       Shawna: Okayyyy.

As the assignment draws to a close and the school day ends, the conversation among the girls shifts to their personal lives (ll. 69-83). Shawna takes advantage of this learning opportunity where she is being included to establish social rapport with Jenique, a member of the clique that she wishes to join. These events foreshadow a new order in the social network in which Heaven is no longer a member of the high status social cluster and where Shawna was a newly christened member of this group.

### **Thinking about Shawna's Portrait**

The changes in the girls' social relationships created an opportunity for Shawna to pursue an inbound trajectory. As evidenced by her portrait, Shawna was squarely situated at the classroom periphery both physically and via participation. Initially, Shawna lacked any social anchors, like friends, to tether her to the classroom community in a productive way. Shawna resisted the classroom norms and participated in relatively passive ways. The last episode within her portrait reveals an entirely difference stance and connection to the classroom activity. Shawna is fully engaged. In addition to Shawna being tied to the mathematical activity, she also is engaged in the social work of solidifying her relationship to and with the other girls. Once again, the girls' mathematical goals are intermingled with their social goals of connection. In fact, the girls' mathematical goals seem to create space for their social goals. The sing-songy manner in which the girls engaged with the activity functioned as a form of play and generated goodwill between the girls, which by the end of the assignment translated into a means for getting to know more about each other's personal lives. In this case, Shawna learned about where Jenique lived. Shawna's portrait also reminds us that the forces that are mediating participation and engagement seem

linked to their social relationships, more than their mathematical competence. Shawna's mathematical competence does social work for her in at least two ways. First, Shawna's ability to be able to perform the repeated addition problem helped to redeem her as a student, who was able to listen, take instruction, and respond correctly. That is, her mathematical competence helped to mediate her initial positioning as a student, who was not paying attention and working on the wrong assignment. Secondly, her mathematical competence provided an opportunity to be valued within in her small group with two high status girls. Shawna was able to parlay her mathematical competence into social capital within the classroom community, as well as within her desired social group.

### **Brittany & Heaven: A Portrait of Free-riding versus Campaigning**

Brittany was an old-timer in third grade. This was her second time in 3rd grade and Ms. Patterson's class. Brittany capitalized on her previous experience. At the beginning of the year, she often would wear Ms. Patterson's keys, which dangled from a lanyard around her neck. She would also serve as the "caboose," the person at the end of the line, who is responsible to turn the lights off in the classroom. Brittany took great pride in being someone who helped Ms. Patterson. Brittany was a tall, dark-brown skinned girl with long thick braids that she usually wore in plaits. Her hair is almost always perfectly parted and braided to reveal the length of her natural hair. She dutifully wore her uniform and often adorns herself with little flourishes, like headbands or funky, colorful shoes.

The other girls did not mention Brittany until the spring, when she became friends with Mia, Jenique, and Lanae. Mia had a very positive view of Brittany as someone who sought out the teacher's help when there are disputes between the girls and avoided drama. Jenique seemed to accept Brittany as a part of the group, but only out of obligation—"I

don't know, Brittany?...We never did do stuff with her, so I think I had to add Brittany." Two other girls, Lamaresha and Heaven, held relatively negative views of Brittany after she joined the high-status friendship group, describing her as phony and a drama-maker.

*Brittany Cooperates with Heaven*

The children return from Specials class and begin reviewing compare/contrast as a literacy skill. Ms. Patterson tells the children they will be comparing and contrasting area and perimeter. She releases the students from the south rug to look up area and perimeter in their reference books at their desks. The transcript begins as Heaven and Brittany, reading partners, sharing what they have learned about area and perimeter from their reference books.

84           Brittany:     ...What I learned about area is sometimes we want to find the  
85                       surface on the inside. Sometimes we gotta//have to know the amount  
86                       inside the circle— that's inside the shape. The amount of surface  
87                       inside the shape is called the area of the shape.  
88           Heaven:     What I learned about area is that sometimes we want to know the  
89                       amount of the surface of the area and then we gotta count. One  
90                       way to find the area of the shape is to count the number of the  
91                       squares that cover the inside of the shape. And what I learned  
92                       about perimeter is that perimeter is//  
93           Ms. Patterson:   //Heaven, who are you having a conversation with?  
94           Heaven:     Brittany.  
95           Ms. Patterson: Very good so guys are discussing it.  
96           Heaven:     And what I learned about perimeter is the distance around the  
97                       shape. Area is the amount surface inside a shape, so the perimeter  
98                       is like the surf//the the distance AROUND the shape.  
99           Brittany:     What I learned about perimeter is you have to count the squares in  
100                       the area  
101           Heaven:     Girl, that's area//  
102           Brittany:     I mean  
103           Heaven:     No, that's area. That example is talking about area  
104           Brittany:     I know but  
105           Heaven:     At the bottom is area.  
106           Brittany:     Each square is//  
107           Heaven:     // That's some more area. It's on page 156.

108           Brittany:       Okay, well, sometimes I want to know the distance around the  
109                            shape. The distance around the shape is called the perimeter of the  
110                            shape. To measure the perimeter, we will use units...[inaudible]  
111           Heaven:       What I learned about perimeter is that the distance at [inaudible].  
112                            The other thing I read about perimeter is that Jennifer rode her  
113                            bike around the edge of the lake, so the distance around the lake is  
114                            2.3 miles.  
115           Ms. Patterson: Class, class, class.  
116           Students:       Yes, yes, yes. (Transcript 02/13)

Initially, Brittany and Heaven are reciting the text from their reference books to one another and are not necessarily engaged in dialogue in which they build on the previous girl's statement (ll. 84-94). However, when Brittany mistakenly associates perimeter with counting squares, Heaven corrects her and helps Brittany to identify the correct page number for perimeter (ll. 107). Once Brittany corrected her recitation of perimeter, the girls continued their exchange (ll. 108-113). At this time, Heaven was a member of a lower status social group and Brittany was a member of a high status social group; however, both girls seem to be cooperating during the activity, despite their differences in status.

Although there is no evidence of problems between these two girls in this example, Brittany describes Heaven as someone she didn't like to work with in her last interview. In Brittany's eyes, "all she [Heaven] do is talk about drama." This examples marks a "new" normal for the girls, at least for Brittany and Heaven, in which they can work cooperatively without the presence of strong relational ties.

About a month later, Brittany and Heaven are working together again, although this time the girls are also working with Jenique, Mia, and a new student, Leslie. Ms. Patterson introduced the Leslie to the girls, as they are working on their mathematics assignment. During this episode, Heaven and Brittany sing and rap about loving mathematics. Mia's talk

is focused on getting Ms. Patterson's attention, whereas Jenique provides on-going commentary unrelated to the assignment.

116 Ms. Patterson: Okay, show her [Leslie] how to write her name, date, time, and all  
117 that.  
118 Heaven: You write your name. You//  
119 (Brittany begins speaking.)  
120 Heaven: //Brittany. You write your name right there, you write the date,  
121 and you write the time and that's when you get to work.  
122 Jenique: Yea, that's when you work on your paper. That's when you work  
123 on your [inaudible]  
124 Girls: OOOoooh.  
125 (Approximately 27 seconds passes, as the recorder is stopped.) (Transcript  
126 05/15)

The transcript begins with Ms. Patterson introducing Leslie, the new girl, to group (l. 116). Heaven is the first to respond and begins telling Leslie how to properly head her paper, but is interrupted by Brittany (ll. 119). Jenique begins to make what sounds like a salacious comment, which is followed by a chorus of "oooooh" and the recorder being stopped for about 27 seconds (ll. 125). Seemingly more aware of the recorder, Heaven begins rapping about loving to do mathematics and is accompanied by Brittany.

126 Jenique: It was like that. I'm gone take my time.  
127 Heaven: I love the math that I'm doooing, I love it. I love it. (singing)  
128 Heaven : Ah, I love my math because I do all my fractions. I do my division. I'ma  
129 do it like that. (rapping)  
130 Brittany: I do my subtraction. (rapping)  
131 (Girls continue rapping.)  
132 Brittany: I'm doing my work  
133 Mia (to Ms. Patterson): Grandma//blppppt...I called her grandma.  
134 (Heaven singing continues.)  
135 Brittany: I call her mom sometimes. There are sunflower seeds on the floor  
136 from yesterday.  
137 Jenique: I thought you brought the hot ones. (Transcript 05/15)



The rapping by Heaven and Brittany (ll. 127-132) is interrupted by Mia's request for Ms. Patterson in which she inadvertently refers to her as grandma (l. 133). Brittany identifies with Mia's mistake, saying that she has called Ms. Patterson, "Mom," before too (l. 135).

139           Brittany: I love my fractions. I love my division. Yea I do. But my  
 140                           multiplication// (rapping)  
 141           (Heaven begins beat boxing.)  
 142           Heaven: I can do my math. (rapping)  
 143           (Brittany begins beat boxing.)  
 144           Heaven: I put in your face. I get an "A" in math. A "B" in music. But I don't really  
 145                           care// (rapping):  
 146           Brittany: Her baby daddy  
 147           Heaven: Brittany is saying nasty things. (Speaks into the recorder.)  
 148           Brittany: You said that. Lie on me again. I'll pop the [indiscernible] out your  
 149                           nose.  
 150           Jenique: I want to see this. Like really gonna do nothing Brittany. (Transcript  
 151                           05/15)

Heaven and Brittany continue singing, rapping, and beatboxing (ll. 139-145). After Brittany makes reference to "baby daddy," Heaven again particularly aware of the recorder speaks directly into the microphone identifying Brittany as the girl, who is saying nasty things (l. 146). Brittany responds by threatening Heaven (l. 148), but Jenique scoffs at Brittany's threat (l. 149), insinuating that Brittany is not a fighter.

150           Mia:        You gotta put who, Ms. Patterson?  
 151           (Ms. Patterson talks to Mia.)  
 152           Jenique: Is this right?  
 153           Brittany: ' Cuz she wratched...This is what it say. What is the missing factor? Fill  
 154                           in the factor for the missing. Six...  
 155           Jenique: Why you talkin'?  
 156           Brittany: I'm doing my math.  
 157           Heaven: There go Lanae little sister.  
 158           Jenique: She look just like her.  
 159           Brittany: [Indiscernible] that's a shame.  
 160           Jenique: Yea, her name is [indiscernible].  
 161           Heaven: Girl, where did you get that pencil from at?

162                   Brittany: Girl, this my pencil.  
163                   Heaven (to the new girl): What's your name?  
164                   Leslie: Leslie. (Transcript 05/15)

Mia once again makes an appeal to Ms. Patterson for help (l. 150) and the girls' conversation briefly pivots to the assignment (ll. 152-156), before returning to Lanae and her little sisiter (ll. 157). The conversation ends with Heaven asking the new girl her name (ll. 164).

This conversation is filled with attention-seeking moves. For example, Heaven and Brittany's rapping is happening concurrently, but not necessarily collaboratively. The girls attempt to outdo one another with each verse. Jenique makes salacious comments (ll. 122-123) that cannot be understood within the immediate context of the girls' conversation and have a fair amount of shock value. It seems the girls are performing for Leslie, as the new girl, but also for each other as they negotiate status—who is fun, provocative?

The moment in which Brittany threatens Heaven also demarcates their relationship as tenuous. Jenique considers Brittany's threat to be empty, which in this context seems to be an insult levied upon Brittany. This seemingly congenial exchange is wrought with passive aggressive moves towards inclusion and relevance in the working group.

In this context, mathematics was treated both as backdrop to the social interaction, but also as an object of affection for the rapping girls. Heaven says, "*I love the math that I'm doooing, I love it. I love it,*" and later Brittany responds, "*I love my fractions. I love my division. Yea I do.*" In latter case, mathematics was the object that was threaded through Heaven and Brittany's rap. While mathematics served as the object of the assignment for the class, it also worked abstractly as a display of the girls' rap skill and knowledge of different mathematical topics.

### **Thinking about Brittany's Portrait**

Brittany wanted to help others. She also wanted everyone to get along with one another. Brittany was a member of the high status social cluster but held little power. She was largely an observer of the social drama and was inclined to feel sympathy for those who were being bullied or excluded. Brittany's amiable disposition and stylish dress made her an easy addition to the high status social cluster. As a repeating third grader, Brittany did not see herself as a particularly good mathematics student, but believed that she had improved from last year, which was the way in which she measured her success. In whole class discussions, Brittany was asked to do menial tasks like write on the board or repeat another student's statement. She was rarely if ever positioned as an expert or oldtimer with respect to mathematics, but Ms. Patterson would often use Brittany as an example of good academic behavior. In small group work, Brittany served as a useful partner or member. Brittany's easy-going nature is revealed in small group work, where she serves as a reliable partner in conversation. She asks and answers questions—social or mathematical—and maintains a positive and playful tone with the other girls, even when her identity as a good mathematics student or a tough girl is being challenged.

### **Mia: A Portrait of Resisting in High Status**

Mia was the model student in her class. She is tall and lanky light-brown skinned girl with long hair that she usually wears in plaits. Her hair is meticulously parted and neatly braided. While Mia always wore her uniform, she usually was also adorned in something pink or sparkling or pink and sparkling. Her nails were sometimes painted and she also occasionally wears lip-gloss, which she applied with the accuracy of a third-grader, so her lips and outer mouth sometimes appeared shiny. Mia described her morning routine with great detail.

Mia: I go her [my mother's] house to get my clothes. So that where I got this from. After that – wait, first I wash up, though. Yeah. Then put my clothes. Then I put my perfume on. If I have time I like to polish my nails. And get my lip gloss. [laughs] And sometimes I just do like this with a towel. [Mia flutters her eyelashes.] A wet towel, just like . . .Right. Yeah. (Interview MOY)

Mia's stylish dress and meticulous neatness projected an elevated socioeconomic status to her peers. Despite the flamboyant girlishness of her attire, Mia was very quiet and soft-spoken. She was a serious student in that she focused on her work or Ms. Patterson during class. When comfortable, Mia could be very silly breaking into a dance and song or telling silly stories.

Quite early in the academic year Mia was seen as a strong mathematics student. The following shows Mia's venerated position in the classroom community.

#### *Mia Partitions a Collection*

During the equipartitioning lesson, after Heaven had broken up a collection of erasers, Ms. Patterson called on Mia to partition the same collection into different sets. Ms. Patterson said, "I want to see Mia break that up into different groups. It can be done a different way." Mia rose to her knees and began pulling erasers from one of the groups of ten and makes five groups of two. After Mia was positioned in front of the table, Ms. Patterson told the class that they can move towards the table, but "Don't disrespect what she is doing. Give her room to think." Mia moved the erasers from the second group of ten one at a time into the five groups.

"How many groups does she have?" Ms. Patterson asked. A chorus of answers rang out: "four," "six," "five..." Ms. Patterson stated, "She has five groups of four." The class chimes in on the last word, "four." Ms. Patterson then asked, "Does she still have twenty erasers?"

The class chorally responded, “Yes.” Ms. Patterson then asked, “What is our number model?” Several students speak out. Among the chorus of answers was Mia who has found her voice and said loudly, “Five times four,” with Brittany repeating, “Five times four equals twenty.”

*Lanae Counts a Collection, Joi Struggles to Partition a Collection, and Mia Saves the Day*

The class moved to the next table. On this table, there was a pile of golden paper trophies. Ms. Patterson asked Lanae to count the trophies. The class stood around the table quietly watching her count. Ms. Patterson called Joi up to make equal groups. Joi began moving the trophies into indistinct piles. She was counting silently to herself. After several seconds, Ms. Patterson said, “We are waiting Joi to break these up into groups, but it takes time. Joi, do you want some help?” Joi nodded. Without hesitation, Ms. Patterson said, “Okay, Mia.” Her words were met by an immediate sucking up teeth and long-winded sighs from the children. Someone uttered, “Why does Mia get to go again?” Ms. Patterson asked Joi, “Do you want Mia’s help?” She nodded. Mia walked up to the table and immediately began making groups. After Mia is done with partitioning the trophies into groups, Ms. Patterson says, “Wow. So Mia how many are in each group?” Mia responded immediately, “Four.”

*Mia Explains Her Thinking*

Ms. Patterson then asked for Mia to share her thinking. Mia said, “Well, I just...I just thought about it. I just did this and then I first I was gonna [inaudible] but then I did this cause I was close to it.” Ms. Patterson responded, “Since you were close tooooo...” “Four,” Mia said to finish Ms. Patterson’s statement. Ms. Patterson said, “So you were kinda

manipulating the trophies to see if you were gonna do what?" Mia responded, "Four times six." Ms. Patterson contextualized Mia's answer, "So, in your mind, you were thinking four times six and is that what you have here?" The ten-minute bell rang at this moment and Mia nodded, as she recounted the groups. Ms. Patterson then asked, "So tell me how many groups you have." "Six groups of four," Mia said. To which Ms. Patterson asked, "So what's your number story?" Without hesitating, Mia stated "Six times four." Now, Ms. Patterson turned to the class, "Do we agree with Mia?" A few students clapped and one of the boys put a big thumbs up. Ms. Patterson then said, "I wanted to really explain why she did it this way and she did. She explained to me that it was getting close to that and it will work. So do we see how we can break them up into equal groups?"

Ms. Patterson directed the students to another table with a collection. The class moved to this last table with only a few minutes remaining in the class. On this table, there were a pile of toy soldiers. Ms. Patterson told the class immediately that Jamal would be partitioning this pile of objects and then asked Darrell to count. Instead of having Darrell work on itemizing each toy soldier, Ms. Patterson pulled one toy soldier at a time and told Darrell to count aloud. Shawna was leaning with her elbows on the table watching Darrell count. "One, two, ...twenty-eight."

#### *Shawna Gets Frustrated and Leaves for the Bathroom*

As soon as Darrell was done, Shawna immediately sits down, pursed her lips to make a bubble, locked eyes on Ms. Patterson, and shots her arm in the air to volunteer to partition the toy soldiers. Ms. Patterson called on Jamal to partition the toy soldiers, not acknowledging any other student. Shawna released her arm dramatically saying, "Ugh."

Jamal made his way to the table reaching over Shawna and brusquely saying, "Excuse me." Shawna frowned and began twirling one of her braids, not moving to allow Jamal access to the table of toy soldiers. Jamal began breaking the soliders into groups. Shawna then got up and left the room to go get some water. After Jamal finished partitioning the toy soldiers, Jamal described his collection as, "Seven groups of four." When Ms. Patterson asked him to explain his thinking, he said, "Because when you said twenty-eight, I thought of putting them into groups of four." Ms. Patterson asked, "So how did you know to use groups of four."

#### *Building on Mia's Ideas*

Jamal replied, "Because I knew that was an even number like twenty-four and twenty-eight is just plus four. So, I did the same one like Mia, who had twenty-four." In a dramatic tone, Ms. Patterson said, "So you just built off of Mia. How awesome is that! Great thinking! Alright 310, you did an awesome job! Give your brain a kiss!".

While several other girls are mentioned, Mia clearly took center stage. During the activity, Mia or her ideas were invoked as an important contribution to understanding the mathematics. At the first table, Mia competently partitioned the collection of stars and recites the corresponding number model. Mia "helps" Joi, who struggled to equally partition a collection of twenty-four paper trophies, by creating six groups of four at the second table. Although Mia's help was met by disillusioned peers (i.e., "Why does Mia get to go again?"), Ms. Patterson provided gushing accolades to Mia for attempting to provide an explanation of her partitioning strategy. At the third and last table, Mia's strategy of creating groups of four was cited by Jamal, which Ms. Patterson described as "awesome."

During this activity, Mia was more than a mere participant. She became an expert. This episode was an example of the affirming learning opportunities that Mia experienced in Ms. Patterson's class. In her interview, Mia said that she enjoyed being positioned as the expert: "[It makes me feel] happy and smart, like I'm the only person in the room that gets it. I just feel by myself, like I'm the smart one."

Mia did not just take center stage, but she took the stage as the model student and a particular kind of girl. A girl with a hyper-feminine gender identity presented through girlish, middle-class accouterments. Mia's hair was plaited in long, thick braids. She was wearing her uniform. She wore shiny pink lip-gloss and her wrists are adorned with bracelets that match her shiny, hot pink belt. During this lesson, Heaven and Brittany also contributed, but they do not receive similar recognition. For example, Heaven partitioned the erasers at the first table into two groups of ten and helped a student write the correct number model as " $2 * 10 = 20$ ." Brittany also contributed with a minor task of by writing "2 groups of 10" on the whiteboard. However, Ms. Patterson did not acknowledge Heaven and Brittany acts nor their thinking in any substantive way. Also, at the end of class, Shawna attempted perform as the model student, hoping to be called on to partition the collection into equal groups. Shawna made her bubble, a key sign in Ms. Patterson's class that she was ready to participate. After Jamal was selected to partition the collection of toy soldiers, Shawna released her bubble, sighed in disgust, and then proceeded to block Jamal's access to the table. Perhaps bored with the activity, Shawna asked for permission to go to the restroom, effectively removing herself from the mathematics activity. The design of this activity forced most of the children for the majority of the time, with the exception of Mia, into peripheral participation. Heaven, Brittany, and Shawna were participants at the



periphery through most of the activity, quietly looking on as Mia and other students worked on partitioning the collection. However, Shawna extricates herself from the periphery by taking a bathroom break.

Mia's venerated position continued through the entire academic year. Ms. Patterson often invoked Mia as the model student when she wanted to correct other students' behavior. For example, during one lesson, Ms. Patterson physically used Mia's presence to correct a group of boys' behavior.

#### *Mia as Someone the Boys Won't Mess With*

Ms. Patterson had the students huddled on the rug discussing area and perimeter when one of the boys made a farting sound. Ms. Patterson stopped immediately and assigned new seats to the students on the rug. Ms. Patterson directed Mia to the back of the rug where most of the boys were sitting and two other boys to the front. Brittany asked, "Can I move?" Ms. Patterson responded to Brittany, "No, he's not going to mess with Mia. I'm not worried about it."

This is a small episode. Ms. Patterson told Mia to sit amidst a group of boys who are making farting sounds. Ms. Patterson rationalized this decision to move Mia, because she was someone that Jacob, the culprit in this case, would not mess with. Once again, Mia occupied an exalted position, a position in which boys do not mess with her.

#### **Thinking about Mia's Portrait**

Mia had power. She had social power with respect to her status, which was solidified through racial power via her phenotype, skin color, and long hair. She had academic and mathematical power that was often recognized by Ms. Patterson in whole class settings. Yet, Mia was largely invisible within the girls' small groups. Within the provided vignettes

and classroom transcripts, she never engaged the other girls in conversation that was unrelated to the assignment. Her identity as the model student was fully reconciled with her social status, as well as her other identities. I would suggest that Mia's "invisibility" was a result of the reconciliation between her statuses and identities. In other words, there was little negotiation between the girls with respect to who Mia was, namely, the model student, and what her status was within the girls' social network. Further, Mia's silence in many cases and exclusive focus on her work in other cases within small group work was also a sign of her resistance to the girls' social interactions and norms. Unlike her friend Jenique, who became more grounded within the high status cluster, Mia saw the high status cluster as the source of the problems in the class. As previously mentioned, Mia by the end of the year was structurally in a liminal position operating as a broker between the high and low status social groups. This position was largely Mia's resistance and purposeful selection of workmates that included low status students.

### **Lamaresha: A Portrait of Resisting in Low Status**

Lamaresha was a very bright and energetic little girl and, by little, I mean in small in stature. She was shorter than her peers, but this did not stop her from expressing herself. In fact, her small stature was likely the reason she tended to be very vocal—Lamaresha wanted to be heard. She talked loud and fast. She was never without a biting quip. Her fast talk was matched by her constant movement and tomboyish comportment. Lamaresha had full cheeks, a button nose, and long curly eyelashes. She had deep brown skin and easy broad smile with two large front teeth. Lamaresha's hair was rarely combed. Her semi-permed (i.e., straightened) hair was often pulled tautly, although unsuccessfully, into a struggling ponytails. Some part of her hair was always wildly sticking out, defying the

rubberband. Her shirts and jackets were typically dingy and stained. Sometimes she wore pants that were too big, so she was constantly pulling her pants up to meet her waist or stepping on the cuffs because the pant legs were too long. The first few days that I visited I noticed that she wore broken plastic flip-flops to school, which she attempted to repair with a stapler. Lamaresha's impoverished dress projected a lower socioeconomic status than her peers. In another example, on a field trip at the zoo, I captured Lamaresha's lunch in a reflective memo:

I looked up to see Lamaresha squeezing the contents of a plastic baggie in her mouth. I called her over to ask what she was eating and she said cookies. But they were not cookies, they were cookie crumbs. The other plastic baggie that constituted her lunch contained potato chip crumbs. Seeing this, I offered Lamaresha my granola bar, which she gladly grabbed. Other students, who had eaten sandwiches, fruit cups, chips, etc., asked for some of her granola bar, which she gladly shared. (Reflective Memo 09/05)

Although Lamaresha exuded a strong positive sense of self and saw herself as highly integrated into classroom life, her peers rarely mentioned her. At the beginning of the year, Lamaresha could always be heard above the rest of the class when Ms. Patterson solicited answers from the group.

#### *Lamaresha Readily Responds*

When Ms. Patterson introduced multiplication as repeated addition in the "Circles and Stars" activity, she drew three large circles on the board and pointed at the space between the circles. Ms. Patterson then asked, "What operation do I need to put here?" Lamaresha said, "plusses." Ms. Patterson then introduced the word "product" and the "sum." Ms. Patterson had drawn three circles with addition signs between, an equals sign, and the number 15. She then asked the class, "How many stars do I need?" After Heaven answered five, Ms. Patterson posed a new repeated addition problem.

*Lamaresha Responds Readily Again*

This time Ms. Patterson drew four circles with addition signs between, and equals sign, and the number 24. After arriving at the answer of six stars for each circle, The class begins skip counting by six. Ms. Patterson then asks the class to write the sum,  $6+6+6+6$ , as a multiplication fact. Several students raised their hand, including Lamaresha. Ms. Patterson asked whether she should write " $6 * 4$ " or " $4 * 6$ ." Without being called upon, Lamaresha called out, "Six times four, because you put the bigger number in front." Ms. Patterson sat down on a table. "Now, Lamaresha said that the bigger number goes in front. I want to know why she thinks that. Why does the bigger number have to go in front?" Lamaresha, the Key Holder for the day, begins smiling and twirling Ms. Patterson's keys, surmising from Ms. Patterson's questioning that she has responded with the wrong answer. Ms. Patterson asked, "If it's a turnaround fact, why does the bigger number have to go in front?" Lamaresha defended her initial answer by stating, "Whatdoyoucallit, the bigger number be in the front of the smallest number." Ms. Patterson then asked, "So are you saying that these would be the same answer?" Lamaresha nodded her head in agreement. "So these would be the same answer. So does it matter whether the bigger number goes in the front?" Ms. Patterson said. Lamaresha smiled and shook her head, indicating "no". Here, Lamaresha acknowledged that multiplication is commutative, meaning that  $4 * 6 = 6 * 4$ .

However, after acknowledging that multiplication is commutative, Ms. Patterson argued that the order of the multiplication problem is important. Ms. Patterson went on, "Well, in this case, it does, it does matter." Ms. Patterson continued her explanation that the "groups of" language indicates how to write the multiplication with the number of groups as the first value (i.e., multiplier) and the number of items in the group as the second value (i.e., the multiplicand). Ms. Patterson said, "We have the four groups of six." Ms. Patterson

pointed to “4\*6” and “6\*4” written on the board and asked, “So, we have these. Which one is the right answer?” Lamaresha shouted, “Four times six! I knew it!”

Lamaresha’s participation is marked by a scholastic zeal. She shouted her answers during chorale response and she often was the first to raise her hand and then wave her fingers in uncontrollable eagerness. Being the first and loudest seemed important to her performance as a student. However, what seemed less important was responding with a correct answer. As such, Lamaresha had a tendency to shout out a response (or many responses) hoping that her answer would be recognized and then, if it was recognized and asked for justification, she would attempt to justify her response. Her exchange with Ms. Patterson revealed this pattern. For Lamaresha, she was right because she engaged in the performance. In her last interview, Lamaresha described how to show you are good at mathematics:

- Maisie: So is it important to show your teachers that you're good in math class?
- Lamaresha: Yes.
- Maisie: It is? Okay, so how do you show them that you're good at math?
- Lamaresha: You have to try to—I really do like math— but you have to act like you like math and try to see if you can write the math problem down. You have to try to write it in words to see if you could figure it out. Try to make your head...try to do it in your head.
- Maisie: Is it important to raise your hand during math lessons or can you just kind of layback? Is that important?
- Lamaresha: Shakes her head no.
- Maisie: Not really. (Interview EOY)

While raising her hand was not necessarily part of the performance or her “acting like she liked math,” other practices were important, like writing down the problem in words and figuring out the answer in our head. In the above episode, Lamaresha declared that she knew the answer was “4 \*6,” even though she began with a different response. That is, her enthusiasm and eagerness often subsumed the mathematical content or question. I

interpreted Lamaresha's boasts of "knowing" with performances of "doing." That is, knowing was no different than being fully engaged and responsive to Ms. Patterson whether those responses are right or wrong. In other words, Lamaresha's positive mathematics identity was enacted as a vigorous participant in mathematics class, not necessarily content knowledge. I would argue further that Lamaresha's enthusiasm was a structural response to her low status among the girls in the class. In order to gain access and recognition—although not from her peers, she boisterously performed her mathematics identity before the audience of Ms. Patterson.

*Lamaresha Suggests a Practical Way to Find Area*

Several months later, Lamaresha exhibited the same exuberant participation. This time Ms. Patterson called on her to explain a way to find area. Ms. Patterson asked, "Here's my question to Lamaresha. What do you do if there are no squares [like in the book]?" Lamaresha responded enthusiastically, "You can use the squares on the floor." Ms. Patterson repeated her comment and then questioned, "But usually those squares are going to be one square unit. It could be one square foot, one square yard, but what if we are measuring something really big?" Ms. Patterson then called on Jamal, who stated, "You can turn it into a multiplication fact." Ms. Patterson in an excited tone emphasized Jamal's statement. "Yes, absolutely, did you hear Jamal? He said you can make it into a multiplication fact. Because sometimes there's won't be any squares on the inside. Jamal said that you could use a multiplication fact and that's absolutely right."

Lamaresha's suggestion of measuring area with square units on the classroom floor was acknowledged by Ms. Patterson, but used solely as a pivot to solicit the desired response of multiplication. That is, Lamaresha's enthusiasm was often foreclosed by an undesired

response. Rarely did Lamaresha hold the floor of mathematical discussions and it seemed not for a lack of wanting to be recognized, but a lack of mathematical competence.

### **Thinking about Lamaresha's Portrait**

Lamaresha was the perplexing case of a highly engaged student, who does not show measurable gains, as reported on standardized measures, but also does not shift a great deal in her engagement within the mathematical practices of the classroom. How could this be, given that Lamaresha was easily and consistently, the loudest and most excited student in Ms. Patterson's class? Simply put, Lamaresha was more concerned about the performance than the practice. The performance of being a good student included responding chorally, raising one's hand, passing out pencils to classmates, but the performance of being an enthusiastic student was not substantively connected to doing mathematics. On several occasions, Lamaresha would claim credit for an answer to which she had incorrectly responded. It seems that Lamaresha felt she could perform her way to the correct answer versus work towards a response through mathematical reasoning.

I also should note that Lamaresha was a low-status girl and was never a part of the high status cluster. Her exclusion from these high status girls seemed to be of little concern to her. She actively resisted what she considered the antics of the high status group and their phoniness. Although not included in the portrait, I should note that towards the end of the year Lamaresha became withdrawn and spent a great deal of her time working on an the classroom computer or Ms. Patterson's smartphone. Lamaresha was desperately seeking recognition from Ms. Patterson, and when she wasn't able to secure recognition from her teacher or among her peers, Lamaresha sought the recognition via an academic website, which would competitively rank students and classes. Furthermore, the academic website

rewarded a relentless enthusiasm that Lamaresha exhibited. She could answer questions again and again and eventually be rewarded once she obtained the correct answer. I believe that Lamaresha's lack of social support among her peers created a vacuum for recognition. This related to Lamaresha's aggressive involvement in class. When Ms. Patterson did not meet Lamaresha's needs to be recognized as a good student, she turned to working on the computer. The lack of recognition within her class—perhaps due to some issues of mathematical competence, but also in relation to her low social status—created an irreconcilable tension between how Lamaresha saw herself as a mathematics student and how she was viewed by her teacher and classmates.

### **Jenique: A Portrait of Enforcing**

Jenique believed in having manners. She was the enforcer of decorum among the girls. People's behavior, children and adults alike, was important to her. When discussing her career aspirations, she described wanting to be a teacher (and then a nurse or doctor) for the following reason.

Jenique: Because it's like I don't want to take people to jail if I be a police officer or a parole officer. I just want you to use your manners. If you don't use your manners, you are going to have to go...Say I'm somebody on the street like I'm not trying to be mean, but I'm not going to tell you to move. It's "excuse me" and I want you to use your manners. (Interview BOY)

Jenique had a lovely round face and dimples when she smiled. She wore her hair in plaits with barettes dangling from the ends, or at other times in long, thick braids with hair extensions intertwined. Jenique was average height and stocky. She had chubby arms, legs, and a round mid-section. She had medium-brown skin that was always lotioned and shiny.



Jenique was always in uniform. She would often wear white tops with blue bottoms—pants or skirts. Jenique was very outgoing. She liked to talk. Her interviews tended to take the most time among the girls. She would recount personal stories of herself and family members. She seemed very attuned to adult topics and would often tell stories and incorporate meanings that were very mature.

By the second semester, the girls' new social groups had crystallized. Jenique, Shawna, Mia, and Brittany were sitting together at a table as Ms. Patterson began her lesson on probability. Ms. Patterson asked the class a series of introductory questions to which several students called out answers. Jenique was particularly annoyed because Ms. Patterson recognized Lamaresha over Mia. Jenique launched into a full complaint to Mia, "She [referring to Lamaresha] got that after you. I hate shouting out answers. Ooooh, she be...I was tryin' to get her to pick you." Jenique showed full support for Mia. Jenique was less concerned about her own opportunities to be recognized. Her focus was on Mia. This was unique vocalization of tribalism within the girls group, i.e., preferring the members of their social group to be recognized in class. While the girls often worked in their friendship groups, they rarely vocalized in versus out-group status. This was a clear indication of how well-formed the groups had become.

A few seconds later, Jenique turns her attention to Heaven, who is an outsider to their group. In mid-sentence, Jenique stopped her response to a question that Ms. Patterson posed to evaluate Heaven's behavior in a neighboring work group.

- 165 Jenique: 100 per...What's Heaven doing?  
166 Shawna: I like Anthony who you like?  
167 Jenique: Where ole' Heaven's ass at? She tryin' to [inaudible]  
168 Brittany: That's your best friend?

169 Jenique: I gotta go to the potty.  
170 Shawna: You better put that potty hand up. (Transcript 03/01)

During these turns of talk, the probability lesson was still in progress. Ms. Patterson was talking through the likelihood of different events. However, at this table, Jenique was clearly marking Heaven's status as an outsider to the group (ll 165 & 167). Jenique's invocation of Heaven's name is not to show care or concern, but a tactic of exclusion. It's unclear to whom Brittany is asking, "That's your best friend?" (l. 168). Nevertheless, the question was rhetorical and used to disavow Heaven's status as a worthy friend.

From this point on the girls were engaged in casual exchanges about the probability activity in which they are counting M&Ms. The girls worked on counting the different colors of M&Ms and graphing them. Mia, who was generally quiet and unresponsive to casual conversation during small group, complained that she did not have adequate workspace. Yet, none of the girls responded (at least verbally) to her request. After a few minutes of attending only to the probability activity, the girls conversation shifted to the social relationships.

170 Jenique: So you got two bffs?  
171 Brittany: Who?  
172 Jenique: Lanae and Mia?  
173 Brittany: No, I ain't got two bffs.  
174 Jenique: So who your bff?  
175 Brittany: /Shawna (in unison): Lanae.  
176 Shawna: Jinx.  
177 Jenique: [indiscernible] Lanae. And you said Lanae. Arthur irritatin'. How  
178 many times we gone tell him to be quiet today?  
179 Shawna: //irritating boy//  
180 Brittany: Ms. Patterson gotta tell him four or five times to be quiet. Arthur, be  
181 quiet. (Transcript 03/01)

Lanae was not present in class today, which apparently provided an opportunity for Jenique to discuss her social standing and relationship to other girls. Brittany claimed

Lanae as her best friend (l. 175). Jenique commented on Lanae, but this portion of the audio recording was indiscernible (l. 177). The conversation quickly moved from Brittany's best friend to Arthur—a boy, who the girls agree, was irritating. Regardless of how Brittany and Lanae are being positioned as friends within the social group, a key point here was that the probability activity was good a time as any other to clarify the mapping of the social group. The girls returned to their previous banter related to the activity without missing a step.

182 Jenique: All you do is color underneath the rows like this.//  
 183 Shawna: No.  
 184 Brittany: Yes, you do. You gotta count 'em like this.  
 185 Shawna: I know what I was doin'.  
 186 Brittany: You better hurry up.  
 187 Jenique: I don't need no help.  
 188 Brittany: She don't need no help Ms. Patterson. She just don't understand what  
 189 to do.  
 190 Shawna: She said I knew what to do,, oop.  
 191 Brittany: She's gonna say, "Y'all couldn't help her?" I'm gonna say, "Yup." I got  
 192 like one green, one brown, one//  
 193 Jenique: You got one of everything.  
 194 (Ms. Patterson tells the class they have three more minutes to finish graphing.)  
 195 Brittany: Three more minutes in the house...  
 196 Mia: She gave us all of these and then [indiscernible.]  
 197 Brittany: Ms. Patterson said we were arguing over markers.  
 198 Jenique: These feel sticky now.  
 199 Brittany: What?  
 200 Jenique: These M&Ms.  
 201 Brittany: Get your M&Ms off there.  
 202 Jenique: I love them chocolate M&Ms.  
 203 Brittany: Ooh, they be so high.  
 204 Shawna: I wish I could go to a chocolate factory.  
 205 Mia: That's what she told me.  
 206 Brittany: Oooo, I colored that orange. I messed up, Ms. Sarah.  
 207 Shawna: I did good, Ms. Sarah.  
 208 Ms. Sarah: Where's your yellow.  
 209 Shawna: Girl, you need glasses. Where your glasses at girl?  
 210 Brittany: I messed up though.  
 211 Jenique: I didn't mess up.  
 212 Mia: I need blue.  
 213 Shawna: Ms. Patterson, I'm done.  
 214 Jenique: Two browns. Ohh, my granny used to eat the peanut ones.

215           Brittany: Ain't the peanuts good.  
 216           Jenique: Oh, yea. Girl, that's blue.  
 217           Shawna: This is purple. This is purple kinda pink.  
 218           Brittany: You and Jenique need your glasses.  
 219           Shawna: Ms. Patterson, what do we do now?  
 220           Brittany: I messed up.  
 221           Jenique: I need green. There's two greens. Gimme a green. I need a green.  
 222           Brittany: One, two, three, four. (Transcript 03/01)

The graphing portion of the activity was coming to a close and some of the girls began to finish. The conversation comprised mostly “filler”—talk that filled the silence, but this did not mean that the girls’ comments were inconsequential. This on-going chatter continued the social connection between the girls and the activity, created engagement and propelled them to finish the assignment. Shawna, who seems to be the first one to finish, announced her accomplishment to Ms. Patterson and the student teacher (ll. 207; 213; & 219). In this case, Shawna’s inclusion into the girls group had worked to also integrate her as a willing and compliant member of the classroom community—“Ms. Patterson, what do we do now?” (l. 219).

The conversation ended with the girls discussing another third grade teacher, who some of the girls visit during the week to work on enrichment topics in mathematics.

223           Shawna: We didn't go to Ms. Jenks class this whole week.  
 224           Brittany: Yay, we didn't go to Ms. Jenks claaaas.  
 225           Jenique: You don't never go to Ms. Jenks.  
 226           Brittany: I do go to her class.  
 227           Shawna: Not really. Only we do.  
 228           Mia: This table ain't big enough.  
 229           Shawna: I was putting my marker up. (Transcript 03/01)

Ms. Jenks was the other third grade teacher—a young, white woman, who tended to take a harsh tone with the children. She and Ms. Patterson often traded small groups of children to work on different topics. Ms. Patterson generally taught the low competence

mathematics students, whereas Ms. Jenks taught the high competence students. Many of the children did not care for Ms. Jenks. Shawna's reference to missing her class was celebratory (l. 223). Brittany attempted to include herself in the revelatory (l. 224), but she is quickly corrected by Jenique (ll. 225). Brittany tried a second time to make claim to attending Ms. Jenks's class, which is a sign of being a good mathematics student (l. 226), but Shawna endorsed Jenique's claim that Brittany was not a member of this special group of mathematics students (l. 227).

Throughout the probability activity, much of the girls' talk related to the rudimentary mathematical aspects of the activity as well as the materials and workspace. However, interspersed in their talk were shows of support, discussions of social relationships, casual comments that kept the conversation going, and at the very end, a reference to the mathematical hierarchy within the class.

#### *An Ad Hoc Activity*

Two days later, Ms. Patterson introduced a fraction activity to pass a bit of time, as only half of the class had returned from Specials class. Ms. Patterson poured pattern blocks from buckets on the students' desks. Ms. Patterson then asked the children to group three-fourths of sixteen. The children began arranging the blocks. Ms. Patterson asked, "What is the denominator?" One of the boys said, "Four." "So we need to have four groups of something," Ms. Patterson responded. Jonathan shouted, "Four groups of four." Ms. Patterson then asked, "Four groups of four. Why did you say that Jonathan?" Jonathan replied, "Because four times four equals sixteen." Ms. Patterson then inquired, "Then you're going to tell me what three-fourths are?" Jonathan eventually came up with the answer of 12.

### *Second Half of the Class Returns*

At this time, the rest of the class arrived at the door. Ms. Patterson chastised the children for not following instructions when returning from Specials class. Ms. Patterson directed the latecomers to pick up pattern shapes. Leslie and Heaven found a table and sat together with Jamal. Jenique and Brittany joined Mia and Lanae. The children were working on a new problem with the pattern blocks; they were finding four-fifths of twenty.

### *Leslie and Aliyah Fight*

While the class was engaged in this problem, Aliyah walked over to Leslie, leaned over, and said something. Leslie pushed Aliyah back. Aliyah then pushed Leslie, who then got up and grabbed Aliyah's shirt by collar. Aliyah grabbed Leslie and they began tussling. A few of the girls screamed. Ms. Patterson wrapped Aliyah in one arm and held out her other arm to fend off Leslie. She said sternly and loudly, "Wait a minute, wait a minute!"

Leslie immediately retreated to her desk. The children began laughing. Jonathan got up and began dancing and singing "I Feel Good," the James Brown song. Ms. Patterson escorted the girls out of the classroom. After the initial shock, some of the children began clapping and laughing. Ms. Patterson came back into the room with Leslie and calm immediately returned with Ms. Patterson's presence. Aliyah did not return immediately.

The last visits to Ms. Patterson's class were clearly influenced by the tumult of the end of the year festivities. The class began with only half of the children in the room. Ms. Patterson improvised while half of her class was missing by using pattern blocks to occupy the time. Just as the class is about to find a rhythm of normalcy and purpose, Leslie and Aliyah began a pushing, shoving, and swinging their hands at one another. Ms. Patterson was quick to break up the fight, but the class already energized by the impending summer break is now brimming with the excitement of a fight having just taken place during class.

As Lamaresha noted in an interview, “Sometimes a fight can be fun. At school everything be usually boring and somebody be in a fight...And you could talk about something when you get home after school. You can say, ‘Girl, there was a fight today.’ (Lamaresha EOY Interview).

Of course, Ms. Patterson’s return restored some of the calm, but the class returned to figuring out what was four-fifths of twenty with an unsettling feeling hanging in the air. The transcript below picks up at this point.

- 230 Mia: Okay so what’s the other half? She//she said//what’s that//she  
231 said//she said//you said twenty// She said four-fifths of twenty. So,  
232 one, two, five, ten, fifteen, twenty. So what’s four fifths of twenty?  
233 Lanae: Aniya beat dat ass. You saw she punch that new girl.  
234 Jenique: Heaven made her do it.  
235 Lanae: I don’t care what nobody say about me. I don’t even care. Me and Mia  
236 was doin’ our work. I don’t give a [indiscernible].  
237 (There is indistinct chatter.)  
238 Brittany: Four-fifths. She said four fifths.  
239 Jenique: That’s twenty?  
240 Mia: Five, ten fifteen twenty.  
241 Lanae: Five, ten fifteen twenty. Five, ten fifteen twenty. Five, ten fifteen  
242 twenty.  
243 Brittany: I want to get the drama out of this.  
244 Mia: Ms. Patterson, we need help over here. (Transcript 05/17)

Mia, throughout the exchange, only referred to the math problem (ll. 230-232; 240; and 243). Brittany attempted to support Mia doing the problem, while weighing into the social discussion by wishing for less drama in the class (ll. 238 & 242). Jenique was unequivocal and blamed the fight on Heaven (l. 234), whereas Lanae proclaimed she was above fighting and was only interested in doing her work (ll. 235-236). Here the mathematics was merely a backdrop to social stage in which the fight took place. Further, Heaven, who only two days ago, was laughing, singing, and rapping with the other girls had been implicated by Jenique as the mastermind of this recent drama.

### **Thinking about Jenique's Portrait**

While Jenique was the enforcer of social status, she also believed herself to be one of the weaker mathematics students. This juxtaposition of high social status but a compromised mathematics identity created tensions for Jenique, which left her susceptible to mathematics being used as a social tool for her engagement. That is, Heaven and Shawna, respectively, were able to engage Jenique socially by first connecting through mathematical conversation.

While Jenique does not consider herself to be a strong mathematics student and occasionally answered questions incorrectly that Ms. Patterson posed, her performance during mathematics lessons was relatively consistent. In contrast to Mia, Jenique was only marginally visible during whole class discussions, but particularly vocal within small group work.

While there is no mathematics doing or working in the last episode, the chaos at the beginning of the class and the subsequent lecture on the east rug is highly relevant to mathematics learning and participation. The management of these social issues occurred during the mathematics block of class. The time and space, which is generally occupied by mathematics content and practices, was shared in this instance (and several others) by lectures on children's behavior and relational issues between students. In other words, mathematics learning was not separate and distinct from unfolding social drama. The children saw the relational work as part of their mathematics work.



## **X. DISCUSSION**

In this final chapter, I begin by highlighting key findings from the girls' portraits. I then broaden this discussion to address the implications for this work has in my thinking about mathematics educational research. I conclude the chapter by describing both the limitations and significance of the study.

### **Key Findings: The Collection of Portraits**

I begin my key findings with four ways *not* to interpret the analysis or portraits of this study.

- (1) This study is not an explanation of mathematical failure or success in terms of outcomes, rather this is a study of processes of learning and development.
- (2) This study does not suggest that micro- and meso-level forces of the girls' peer group are more consequential than macro-level forces, such as school closing.
- (3) This study is not a study of young Black girls' social dysfunction, although tension and conflict drive the plot of the girls' narratives. The space between moments of tension is filled with nurturing and caring.
- (4) This study does not suggest that teachers are inconsequential to positioning of girls within the classroom and the functioning of the social groups. Ms. Patterson is a key participant of the study. As the teacher, she (along with the other students in the class) constructed the classroom community. However, this study centers the experiences of the girls and,

accordingly, treats the person of Ms. Patterson as more structural than personal.

Given the above caveats, I provide several key points of the present study.

### *The Role of Social Groups*

Social groups provided a variety of resources, as well as impediments, to mathematics learning and participation. For example, social groups served as social anchors that led to compliance with classroom norms, such as chorale responses to teacher questions, reading along, and answering questions. Social groups also provided supports, such as peer recognition or visibility. Relational ties or an elevated social status rendered competence in mathematics visible and increased the likelihood (irrespective of ability) of assessing a friend as competent. This means that children may tend to recognize and evaluate competence of children, who are members of their social group. Moreover, young children's assessments of mathematics doing and knowing may have little to do with mathematical competence. On the one hand, this can be beneficial in the sense that children of varying levels of competence have access to authentic (or deeply felt) social support. On the other hand, it is problematic when children are being recognized without performing competently.

### *The Power of Mathematical Competence*

While mathematical competence was not necessarily recognized by girls who were no longer peers, mathematical competence held particular benefits for the girls socially and academically. For example, both Heaven and Shawna used their mathematical competence as a lever for social entry. Mathematical competence

provided access to building social relationships with high status girls who were less competent mathematically. Mathematical competence also served as a mechanism for repair of academic identity. For example, Shawna could use her mathematical acumen to mediate her position as a “bad” student who was not paying attention. In this sense, Shawna could repair her academic identity by answering Ms. Patterson’s quickly and correctly.

### *The Power of Social Status*

Social status held benefits in terms of ensuring belonging within the social group; however, social status was not a sufficient resource to improve one’s mathematical competence within the classroom community. In other words, social status provided opportunities for girls’ to move to full participation by granting access to social groups and maintaining a sense of belonging. Yet, more opportunities to participate fully did not guarantee skill attainment. So, while having an elevated social status could improve (although not ensure) the chances of developing mathematical competence, a marginalized social status certainly degraded the chances of developing mathematical competence. In this case, a marginalized social status foreclosed opportunities to participate fully, which relegated children to modest forms of participation and denied them the resources incumbent to being a social member of the community of practice that engendered mathematical competence.

### *Strategic Participation*

The girls used different strategies for participating in the classroom community and their social group, based on their social status. For example, while both Mia and

Lamaresha used resistance within the social figured world, Mia employed silence as her primary strategy for participating (unless called upon by Ms. Patterson), whereas Lamaresha used voice. Lamaresha's voice, i.e., her outward and enthusiastic performance of self, was in many ways a natural response to her compromised status and lack of visibility,

#### *Periodicity of Social and Mathematical Figured Worlds*

The girls' social network went through several periods of change, including formation, maintenance, and reformation. These periods of social reformation produced the conditions for the girls to renegotiate their positions in the network, but also within the learning community. While periods of maintenance indicated stability within the social network and classroom community, periods of reformation indicated periods of instability and tensions that entered into the girls' mathematical activities. This alludes to a larger point that the girls' social worlds moved in cycles and phases and that learning occurred in each phase, although the organization and interactive nature of the learning corresponded to the social dynamics.

#### *School Mathematics as the Confluence of Figured Worlds*

School mathematics was produced through and by the girls' social and mathematical figured worlds. For the girls in Ms. Patterson's class, school mathematics included their text of Everyday Math™, the person of Ms. Patterson, the "drama" after recess and lunch, the conflict of friendship, etc. During their end of year interviews, each of the girls responded that disagreements in mathematics were to be avoided. They conflated interpersonal disagreements with

disagreements about mathematical ideas. This is not to suggest that the girls have impoverished ideas about mathematics, rather it suggests that their views of mathematical argumentation are bound up and mediated by the social dynamics of their peer groups, classrooms, and school.

More to this point, the girls' mathematical and social goals were emergent within classroom activity. Within an activity, the girls were constructing mathematics while they were maintaining and renegotiating their friendships. These activities of mathematics learning and friendship-making were circumscribed by one another. Said simply, school mathematics and mathematical activities are products of children's social and mathematical figured worlds.

#### *Black Girl Politics in the Mathematics Classroom*

Being a particular kind of Black girl was a political act within the context of mathematics learning. For example, being a physically aggressive Black girl, who was tomboyish, like Shawna, created obstacles to mathematics participation. Being overtly feminine, quiet, and passive created a different set of opportunities to participate for Mia. Heaven's politics related to her refusal to make amends with Lanae. This resulted in her ostracism from her initial group of friends. In Heaven's case, being assertive and defying the group norms denied her access to social resources of the group most of the time. However, Heaven and Shawna were successful in finding moments to campaign for inclusion in the high status social group.

Through the interviews, Lamaresha exhibited the clearest politics towards the prevailing conceptions of Black girlhood established by the high status group and

openly refuted the values and habits. This, of course, was not without its consequences. Lamaresha often worked alone or with low status girls, who were not the most competent mathematics students. Only occasionally would Lamaresha be pulled into participation with a competent student of high status, like Mia. In terms of learning, Lamaresha's isolation from the high status group had repercussions for her ability to be recognized by her peers as a full participant in the classroom community.

It is important to note that the politics of Black girlhood fell aligned with particular performances of race, gender, and class. In other words, the politics of Black girlhood were shaped by the larger discourses of what does it mean to be a pretty, likeable Black girl. The intersection of markers of gender, race, and class, like skin tone, hair length, girlish accouterments, new clothes, ways of dancing, wearing make-up, newly combed hair, etc., multiplied to create political privileges for some girls and disadvantages for others. This privilege was used to garner recognition and respect in various activities, including mathematics learning, particularly, in small groups.

#### *A Note on Positive Mathematics Identities*

All of the girls have relatively positive mathematics identities. That is, the girls identify with mathematics as a discipline. In general, the girls see themselves and other Black children as capable doers of mathematics. It should not be surprising that Black girls begin school enjoying mathematics and seeing themselves as good mathematics students.

The girls also show vulnerabilities within the mathematics identities that were exploited in Ms. Patterson's class and potentially future mathematics classes. For example, Lamaresha's belief that mathematics ability is naturalized has particular repercussions for her participation. She has a proclivity to shout out the first answer that comes to mind, which has positioned her as a less than competent mathematics student as the year progressed and problems required more complex thinking versus immediate answers. While she cited mathematics as her favorite subject, Lamaresha hedged in her final interview, stating that the numbers were getting too big and the mathematics was getting hard, which she did not like. Over time, this belief in natural ability may hamper Lamaresha's affinity for the subject and result in her withdrawal from the subject if she does not move to a more effort-based attitude.

Mia, as another example, shows different vulnerabilities. Mia's connection to mathematics is purely academic. She bases her competence, reasons for exhibiting competence, and the importance on mathematics on grades and expected school-based behaviors. This suggests as Mia's academic goals become clear (perhaps pursuing the arts or singing if her career goals persist), then she will likely lose meaningful connections to the subject and seeking to identify as a mathematics person.

Jenique seems to be the most vulnerable of the girls in terms of actualizing a robust and positive mathematics identity. She does not consider herself to be a particularly good mathematics student and her believes her peers, as well as Ms. Patterson, do not consider her to be a particularly strong mathematics student. Her

basis for assessing her mathematical competence as well as exhibiting mathematical competence are connected to her social relationships. She does not want to be perceived negatively by her peers and seems to know she is doing well based on their verbal feedback. This creates particular social risks for Jenique in this and future mathematics classes.

However, all of the girls seem to share the vulnerability of conceptualizing mathematics in terms of rote methods and teacher-provided algorithms. Further, all but one of the girls, Heaven, sees mathematical authority and answer-checking as an externally established, e.g., verified by teacher or calculator. Another potentially problematic marker in the girls' developing mathematics identities was their reluctance to engage in mathematical argumentation. All of the girls described resolving mathematical difference by comparing and checking answers and avoiding conflict by all means. Again, except for Heaven, the girls didn't articulate a conceptualization of a solution or anything between a posed mathematical problem and an answer.

So, while the girls maintained relatively positive dispositions towards mathematics as a school subject and saw themselves as competent mathematics doers in Ms. Patterson's class, the girls' emergent identities didn't support engaging with mathematics as a discipline. Among the girls there was little evidence of conceptual agency or a sense of mathematical authority and autonomy. This suggests that positive mathematics identities are necessary, but insufficient to promoting trajectories of participation that manifest into skill attainment or conceptual knowledge.



## Implications of the Study

### *Learning as Complex*

The present study is an account of mathematics learning as a complex process, which is structured by a social hierarchy, classroom activities, sociomathematical norms, and friendship dynamics as an example of just a few of the intervening processes. This depiction of mathematics learning stands in deep contrast to a prominent view—a cognitivist view—in mathematics education research, where learning is construed as an “individual, psychological phenomenon” that “naturalize[s] and underwrite[s] divisions of social inequality in our society” (Lave, 1996, p. 149). A complex view of learning that includes children’s personal histories, strategies of participation, embodied actions, and relational demands, is a necessary complement to the complex practice of mathematics teaching. That is to say, just as teaching is understood as a complex set of processes riddled with dilemmas (Ball, 1993), there is a need for construing *mathematics learning* for elementary-aged children and beyond as a complex set of processes riddled with dilemmas and contradictions. Without this perspective, the field of mathematics education research is left scapegoating the most vulnerable of children by implicating them as failures of receiving good teaching, instead of acknowledging the deep social complexity that eight and nine-year olds must navigate.

### *Images of Mathematics Classrooms and Mathematical Chauvinism*

Many images of mathematics classrooms, particularly model or ideal mathematics classrooms, are presented as orderly, exclusively mathematical, and primarily individualistic (e.g., Lampert, 2001). For example, in these images of classrooms, children do not present behavioral challenges, the only topics of

discussion are mathematics content and practices, and typically only individual children are considered at any given time. In contrast to these ideal images are the problematic mathematics classrooms. These mathematics classrooms are presented as disorderly and mathematically dubious, wherein the learners' personal lives and outside identities consume the serious "business" of mathematics learning. The present study of the girls in Ms. Patterson's class show that mathematics can be disorderly, partially mathematical and social, and fundamentally communal.

For example, Ms. Patterson's class did not feign to be an orderly space. As previously mentioned, boys and girls would lie on the floor, sit under desks, stand on top of desks, take off their shoes, etc. The children in the classroom were free to use their bodies and associate with others in ways that they felt comfortable. Of course, there were times that Ms. Patterson called for order, but more often the children were situated at the east rug or their desks in ways that don't align with pristine images of children learning—sitting upright at their desks.

Further, Ms. Patterson consistently addressed behavioral challenges in the mathematics classroom. The east rug and the opening minutes of mathematics class became a space-time of reconciliation between the girls, but also for the entire class. Resolution of relational conflict became "baked" into mathematics learning. Resolution was so much so part of the mathematical learning process that the focal girls unequivocally disavowed mathematical argumentation seeing it as a sign of discord and to be avoided. Ms. Patterson addressed disruption and behavioral challenges in the same breath as a mathematical questions or ideas. For example,

Ms. Patterson gave two boys base-ten blocks, instead of the reward of M&Ms, during the probability activity, because they had behaved inappropriately. Here, a common mathematics manipulative was used as punishment. In other words, the tools, forms of argumentation, and, generally, the ways of doing mathematics cannot be separated from times and spaces of the social life of the classroom.

The seamlessness of the social and mathematical was also reflected in the girls' small groups. Many of the girls moved effortlessly between discussions about their friendships, social life, and mathematics work. In the provided examples, the girls rarely shared their thinking in a mathematically substantive way. However, this does not mean their banter during mathematics work was not consequential to their learning. To the contrary, it seems the girls' social talk provided social connection and engagement in the mathematics assignments. The lack of mathematical argumentation from my vantage had little to do with the girls' unwillingness or inability to engage in such thinking. Rather, their lack of mathematical argumentation related to the nature of the mathematical tasks, which were not cognitively demanding and did provide multiple solution strategies. Given the rudimentary and repetitive nature of the mathematical work, social talk amongst the girls was an anchoring force to relatively mundane work.

The natural (and, frankly, expected) response to the girls' lack of mathematical talk and engagement in the activity would be to introduce more mathematically rich demanding tasks that afford multiple solution strategies and methods, which promote a dynamic view toward mathematics versus "a static, structured system of

facts, procedures, and concepts” (Henningsen & Stein, 1997, p. 524). Of course, the presumption being that the task and participation structures, which facilitate the task, are what not only organizes children’s interactions, but establish a mathematical goal for the activity.

Yet, the examples of the girls indicate that the social events, particularly conflicts, played a substantive role in organizing the girls’ interactions with respect to where an individual girl may sit, her comportment and engagement in an activity, and the conversation between girls. For example, in Vignette 8, after the physical fight between Leslie and Aliyah, there is no attempt to engage in the mathematics activity by Heaven, Jamal, and Leslie. The focus for Heaven’s group was to make-sense of the fight and the social dynamics between the girls at this point in the school year. In this particular scenario, the children’s social objectives—attending to the social work of their lives—supplanted the mathematics activity. The small group structure, the pattern blocks, and the task of finding four-fifths of twenty operated as setting, props, and interactional script for engaging in their social work. In other words, changing the mathematical task will not likely impact whether they engage in social work but how they engage in the social work of negotiation, inclusion, and exclusion.

In my opinion, mathematical chauvinism has led to mathematical studies of classroom life that do not reflect actual teachers, children, or learning activities. The hyper-focus on mathematics misrepresents the actual goings-on of the mathematics classroom. Mathematics classrooms are not recognizable spaces in the research

literature. They are spaces where only children's mathematical talk is excerpted, behavior problems are absent, and children's disembodied mathematical thoughts and ideas lay open for teachers to consider. Such classrooms are not representative of any classroom in which I have taught, observed, and certainly, did not reflect Ms. Patterson's room. In essence, mathematical chauvinism obscures the mathematics classroom such that when real children with real bodies, social lives, and mathematical practices are described they are deemed unfit or positioned orthogonal to real mathematics. In addition to the present study, I have written elsewhere about the effects of this mathematical chauvinism (Martin & Gholson, 2012). A teacher, who I call Janice, engaged in a didactic and authoritative discussion style, which was antithetical to the reform-based curriculum being studied. The research team had positioned Janice as a weak mathematics teacher. However, in her conversations with me, Janice described her heightened authoritative tone to a series of fights in the hallways, where a teacher was struck. Janice made clear that she was not going to be "punked" by her students. I say, "It was clear that she felt that she had to reassert her authority within the classroom or lose her status (as this other teacher had lost their authority). This had a definite impact on classroom discourse. Janice often employed an Initiation-Response-Evaluation model in order to maintain classroom order and her status as an authority figure" (p. 218). Mathematical chauvinism led to Janice being positioned as a poor mathematics teacher, instead of a teacher, who read the social life of her school and classroom and made pedagogical decisions in light of her understanding. Said differently, mathematical chauvinism is an evaluative stance that marks

everything within a classroom scene as mathematical or non-mathematical leaving no room for description or imagination of how mathematics is imbricated by the social life of the classroom.

*Not “where,” but “what” is the mathematics?*

The chauvinistic gaze in mathematics begs the question, “Where is the math (in mathematics education research?” (Heid, 2010). Among other responses to such a question (e.g., Martin, Gholson, & Leonard, 2010), I would argue, along with Jean Lave (2009), that this question reveals a fundamental divide in the conceptualization of knowing and learning. Those who would ask ‘where is the mathematics’ suggest that knowledge is a static and complete collection of entities, i.e., that mathematics knowledge is well-defined cannon, that can be easily recognized, acquired by individual children, and located in their heads. However, others who take a situated activity perspective, view knowledge as socially constructed and transformative in use. Further, from a situated activity perspective, the process of learning is the engagement in human activity, for example, in which children use tools and develop identities as particular kinds of knower and doer. Lave makes an important distinction between these two perspectives, “In the latter case [of situated activity], ‘knowledge’ becomes a complex and problematic concept, whereas in the former it is ‘learning’ that is problematic” (p. 204). From a situated activity perspective, learning is not seen as problematic, but *what* is learned is an entirely different and complex question.

Through the present study I bracketed “mathematics” as *all* of the data collected in Ms. Patterson’s class after lunch and recess and before Specials class, as well as after Specials class until the end of the school day, approximately one and a half hours. This was the time period that scheduled by Ms. Patterson’s principal and appeared on her daily schedule as mathematics class. While the question of ‘where is the mathematics’ could be levied to Ms. Patterson’s math class, Ms. Patterson, her principal, and her children’s believed themselves to be engaged in mathematics learning. I hold this as a sociocultural fact, despite how outside individuals or communities would evaluate the time the class spent together. Similarly, I would argue that the girls’ engagement in activities and assignments was *doing mathematics* (not in the sense of cognitive demand) but from a situated perspective. Therefore, what the girls learned mathematically should be broadly interpreted. In the narrow sense (in terms of canonical knowledge), several of the girls showed substantial growth in their content knowledge, according to district benchmarks. However, the girls learned other things about the construction and use of mathematical knowledge. For example, good student behaviors are tied to being recognized as a good mathematics doer and knower. Also, mathematics can serve as a social tool, when lacking other forms of social power, to gain or maintain access within social groups. For Lamaresha, knowing and doing mathematics was based in a performance of liking mathematics, an exuberance, which occasionally paid dividends. In sum, what the girls learned about mathematics related to far more than topics and sub-topics, but in relation to performances of mathematics and the social power this holds.

### **Limitations of the Study**

At this point in time, I have three major concerns regarding the study design and analysis. First, the characterizations of learning and competence within this study rely heavily on teacher grades, teacher's verbal assessment, and standardized assessment scores. The research design did not include any clinical studies of children's competence in the domain of mathematics. As such, claims of learning are limited by these external characterizations or interpretative, discursive frameworks for students learning (e.g., Sfard, 2007).

Second, the contours of the social network will be established by a subset of the girls in the class. Meaning, some relationships may not be visible. Therefore, certain girls' centrality (or popularity) may be understated, while other girls' isolation will be overstated. To the extent possible, other data sources, such as video data, are necessary to triangulate the diagrammatic representation of the girls' social network.

Finally, there is a tendency within peer group studies to place an inordinate focus on particular groups of children or the "cultural seduction of the ethnographer by certain groups of children" (James, Jenks, & Prout, 1998, p. 86). The present study falls victim to this observation, although with good reason. The high status social group (or the Mean Girls) *is* the animating force for structuring and re-structuring the social life of the girls and the classroom work environment. Inclusion and exclusion are driven by the girls' membership to this particular social group. It is through integrating the quantitative and qualitative accounts of the girls' social



network, based largely on the functioning of the Mean Girls, that the different phases and trajectories within the social network can be observed.

### **Significance of the Study**

This study is significant insofar as children's engagement in social relationships networks and their learning within classroom communities are often treated separately. Learning, meaning-making, and reasoning are well understood to be the product of social interaction and the consequent relationships that children develop with their teachers, classmates, and subject matter. By and large education studies have focused primarily on individuals (their characteristics and identities) or interactions between individuals as they relate to disciplinary subject matter. There is little to no attempt to fully understand the nature of children's social relationships in the context of learning, that is, other than casually labeling children as "friends." The complexity in children's relational experiences, for example, the quality of their friendships or status within aggregate relationships, as found in informal groups and social networks, have largely been ignored when considering children's processes of learning. The present study rectifies this omission by exploring how children simultaneously negotiate both learning and relating to other children.

This study is also ideologically motivated towards the larger goal of understanding the phenomenal reality of "*learning mathematics while Black*" (Martin, 2012). Again, the girls' social network under study is not just *any* social network—it is a network of young, Black girls situated in the west side of Chicago. Therefore, the racialized meanings and mechanisms for structuring social

relationships, i.e., who is a member of a clique or not and who maintains what status, is intimately woven into the social network. This is noteworthy on at least three fronts: First, single-gender studies of Black children, particularly in mathematics, have overwhelmingly focused on the experiences of Black boys, irrespective of Black girls' similar disenfranchisement and marginalization in the discipline of mathematics (Gholson, 2013). This work attends specifically to the experiences of Black girls in mathematics learning. Secondly, few studies investigate Black girls' relationships and experiences in friendships, groups, or, more broadly, in social networks. Those studies that do address Black girls as a specific demographic seem to indicate potential challenges that Black girls face versus the support they receive from their peers. An important aspect of this study is to document the ways and manner in which Black girls engage in conflict, but also work to support one another socially and in the context of mathematics learning. Thirdly, this study is situated in an *all-Black* and *urban* context in which one-third and forty percent, respectively, of Black children experience learning in the United States. However, most research on Black children within friendships, peer relations, and groups focuses on integrated or predominantly white contexts. Generally, there seems to be more interest in how Black children develop and maintain relationships with other racial and ethnic groups than with one another. Again, the present study overcomes this tendency by taking seriously the *all-Black, urban* context as site of children's development, which moves beyond stereotypical notions of aggression, violence, and deviant behavior. That is, I also focus on the value Black social relationships. This is not to suggest that instances of aggression or violence that

occurred will be ignored or omitted from consideration, but such displays of behavior are placed within the more prevalent and routine context of learning, support, and nurturance.

Although a great deal of research exists *about* Black children, a small portion of this research is told from their perspective. This study also overcomes this trend by amplifying the voices of young Black children and relaying their stories through their own words. Equally important, this study positions Black children's thoughts, actions, and feelings as rational and developmentally appropriate. For example, one aspect of the present study focuses on Black children's construction of race in middle childhood (where typically the very young or college-aged are studied). Spencer and Markstrom-Adams (1990) have argued that there is little research on how African American children develop positive racial identities. The embedded narratives of the children in this study contribute by providing an account of Black normative development.

Finally, as a study of mathematics learning, this work attends to several issues that have remained undertheorized. One of the hallmarks of reform mathematics is helping children develop mathematical habits of mind, i.e., to assist children in becoming mathematics doers like mathematicians. Mathematical habits of mind include being a pattern sniffer, an experimenter, a describer, a tinkerer, an inventor, a visualizer, a conjecturer, and a guesser (Cuoco, Goldenberg, & Mark, 1996). These habits are facilitated by classroom practices, which allow students to "try out different mathematical ideas and to respectfully critique the ideas of other, often in public" (Nasir, Hand, & Taylor, 2008, p. 202). However, such practices are laden

with risks because mathematics demands more than the process, but a particular (read: mathematically correct) result (Seeley, 2009). Other disciplines generally have less risk as a greater variety of student responses can be accepted.

Accordingly, social network support makes risk-taking in the mathematics classroom a more or less viable proposition. Such processes of mathematical argumentation, justification, and explanation are generally considered from the perspective of ability and competence (e.g., in terms of sophistication) (Yackel & Cobb, 1996), but these processes are often trivialized and seen as natural or unproblematic from the perspective of social status and support. There is an assumption that children are unencumbered by social position in the context of their mathematical thinking. The proposed study acknowledges this social complexity.

Further, Nasir et al. (2008) note that “the bulk of this work [features and practices of mathematics classrooms] considers how these features support and constrain different forms of knowing and being for students in a general sense, instead of examining how they may be differentially available to particular groups of students” (p. 202). The proposed study begins with particularity—a specific cultural context of Black girlhood. In contrast to Magdalene Lampert’s (2001) work, who sought to impose mathematicians’ culture into the classroom context, the proposed study attempts to understand how sociomathematical norms rise out of the contested social space of Black girlhood. In other words, the proposed study provides an account of Black girls’ culturally specific enactment of mathematical practices (as facilitated by their teacher). That is, it is significant to understand how

young Black girls redefine the contours of mathematical argumentation, explanation, and justification and perhaps unsettle idealized notions of mathematical norms.

In sum, I envision this study as a contribution to learning theory generally as it relates to the community of practice literature, but also to understanding mathematics classrooms specifically. It is also a contribution to positive Black girl-child development, Black-girl child peer relations, as well as Black-girl mathematics learning.

### **Is Painting Portraits Emancipatory?**

In the previous section, I made several claims to the significance of this study as a contribution to the field of mathematics education and Black girl children's normative development. An entirely different claim is whether this study is in fact emancipatory for young Black girls pursuing their mathematics learning in elementary classrooms. Said differently, what is the emancipatory work of these six portraits? For example, can newly minted mathematics teachers now see the faces of young Black girls? Can these teacher see the young Black girls struggle for relevance and recognition within their own figured worlds or do these little girls continue to be perceived as little Black women along with all of the stereotypical baggage that entails in an adult-centric world?

My own perspective of the girls has shifted dramatically over the past three years since I first collected the data in Ms. Patterson's class. What I first conceptualized as a classic case of the bullying by one girl was really a complex web of social relations and power struggles, among all of the girls. Further, what I once

perceived as girl's off-task and idle gossip I now understand as the natural work of identity development *and* mathematics learning. My desire to take the children's figured worlds seriously forces me—us—into a space, where we begin to feel the vulnerability, joy, and ambivalence to doing mathematics.

My hope is that I have achieved some success in liberating Black girls from the statistical space juxtaposed somewhere between Black boys and White girls. I hope that I have created an image that not only sees Black girl worlds as legitimate spaces that deserve respect, but deliver young Black girls from the limits of our imaginations about what it means to know and do mathematics.

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## **APPENDICES**

## **Appendix A: Guiding Principles Classroom Observations: Videotaping, Audio-recording, & Field Notes**

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### **Videotaping**

- Focus of videotaping in the classroom should be on the students. The video should see how kids are talking and behaving, not necessarily following the teacher.
  - In particular, the focus of videotaping is on focal students in their groups and/or working individually.
  - When videotaping one or a group of focal students, provide rationale for the selection.
- When/if using a second camera, the second camera should be placed as a "control," i.e., in the same place, as to provide macro-shot of classroom activity.
- It is more important to visit the classroom regularly, rather than capture full lesson-cycle of content.
- CLIC staff to develop a feedback loop regarding data collection & analysis.
- 

### **Audio-recording**

- Audio recorders should be numbered and placed in student clusters.
- Audio recorders should be synced, i.e., at approximately the same time.

### **Field Notes**

#### *General*

- A primary purpose of the field notes is to provide an entry point to coding in analysis.
- The emphasis of the fields note is on the children.
- The field notes characterize how students are participating—balance between words and actions.
- The field notes will shift between two units of analysis:
  - During whole class instruction—describe what's happening in the whole class.
  - During independent practice or small group instruction—describe what the focal students are doing.
- The field notes should identify the norms and routines in the classroom.
  - Keep a running list of classroom norms and routines.
  - In particular identify the socio-mathematics/science norms, for example:
    - How are questions asked?
    - What constitutes an mathematical/scientific explanation?

- Where is the authority of mathematics/science located?
  - How are disagreements in mathematical/scientific understanding resolved?
- The field notes should capture identity markers.
  - Examples: constantly being disciplined; use of "Ms. Patterson's classroom," "Room 510," or "our neighborhood"

*Jakki's Classroom (Activity drives Content)*

- Capture shifts in activity structures and setting.
- Contextualize activity.
- Describe how various spaces, like the nooks, are being utilized.
- Annotate classroom maps.



## Appendix B: Field Note Cues to Refocus Observation

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- Where are students and teacher?
- What are they doing?
- How many students?
- Which students?
- What is the mood?
- How are the students sitting?
- Where are their eyes?
- What is the behavior?
- How are they raising their hands?
- Who is talking?
- How are they saying it?

**\*This list also included the names of the focal students in the classroom.**

## Appendix C: Elementary Interview Protocols: Fall, Winter, and Spring

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### Fall

Instructions: Bold, italicized words are not to be read, but guides for the interviewer.

#### Prelude to the questions:

- **Re-introduce yourself.**
- **Ask child how they are doing today. Are they having a good day?**
- **Offer child a compliment (hair, smile, name, etc.)**
- **Explain purpose of the interview(s) in the context of the project, if needed. (e.g., I'll be talking with some of you about what you think about yourself in school and out of school)**
- **Express gratitude for their willingness to be interviewed.**
- **"Let me know if you want to stop at any time and we'll stop right away"**

In this first interview, I want to learn a few things about you. We will talk about you, your neighborhood, being Black, your school, and mathematics/science. Are you ready? Do you have any questions?

#### Background

1. Is it okay if I call you (child's formal name)?
  - a. Do you have a nickname?
  - b. If yes: who calls you that?
2. Remind me how old you are and what grade you are in.
3. Have you always attended this school (Hay/May)?
  - a. If not: where else have you gone to school and when?
4. Who do you live with? Mother and Father? Mother? Father? Grandmother? Etc.
5. Do you have any brothers and sisters?
  - a. How many?
  - b. Do they live at home?
  - c. How old they are?
  - d. Are any of them in school?
6. Do you have a best friend?

- a. Why is that person your best friend?
  - b. What do you and your best friend like to do together?
- 7. Name two things that you like most about yourself?
  - a. Why did you pick those two things?
  - b. If child struggles: pick two words to describe yourself.
- 8. Name two things that you are really good at outside of school?
  - a. What makes you think that you are good at those two things?
- 9. What else do you like to do after school?
  - a. Why do you like doing those things?
- 10. Do you know what you want to be when you grow up?
  - a. Why did you choose that?
  - b. Do you know anyone who does that?

## Neighborhood

- 11. You mentioned that you live with **[from question 4]**. I'm also want to hear what you have to say about your neighborhood.
  - a. What do you like most about your neighborhood (or the street) where you live?
  - b. If PEOPLE not mentioned: What do you like most about some of the people who live in your neighborhood (or the street) where you live?
  - c. Is there anything you don't like about some of the people who live in your neighborhood?
  - d. Who lives in your neighborhood?
    - i. Are there Black people who live in your neighborhood (or the street) where you live?
    - ii. Are there any people who are not Black who live in your neighborhood (or the street) where you live?
      - a. If needed: like White, Hispanic/Latino, Asian?
    - iii. Who do you see most of the time?
  - e. Do you have any friends in your neighborhood that don't go to your school?
    - i. Tell me about your friends.
      - a. Are they Black?
      - b. Do you have friends who are not Black?
      - c. If yes: Tell me about your friends who are not Black.
      - d. If no: Are most of your friends Black?

## Being Black

- 12. What about you—are you a Black person (or African American)?
  - a. If yes: Why do you say that?
  - b. If no: How do you describe yourself?
- 13. If you met someone and that person did not know anything about Black people, what would you tell that person about Black people?

- a. Why would you tell that person these things?
  - b. If the student was unsure about where to start:
    - i. Do Black people talk differently?
      - a. If yes: how do they talk?
    - ii. Do they dress differently?
      - a. If yes: how do they dress?
14. Do you think Black people are smart?
- a. Why do you say that?
15. Are you happy about being a Black person?
- a. What makes you un/happy about being a Black person?
  - b. Do you sometimes not like being a Black person?
    - i. Why?

## **School**

16. Now, let me ask you a few more questions about school. What things do you like best about school?
- a. Are there any things you don't like about school?
    - i. Why?
17. What about in class—who are the kids that you play or work with the most?
- a. Why do you like playing and working with these kids?
18. What kind of student are you?
- a. Would you say that you are a good student or one of the best students in your class?
    - i. Why or why not?
  - b. If grades not used for justification to previous question: What kind of grades do you usually get?
    - i. Are you happy or satisfied with the grades you get?
19. How do you like being in Mr./Mrs. X's class this year?
- a. Why?
20. Do you think Mr./Mrs. X considers you to be a good student?
- a. Why? Why not?
21. Do you have a favorite subject?
- a. Why is that your favorite subject?
22. Do you have a least favorite?
- a. Why is that your least favorite subject?

## **Mathematics & Science**

23. You have been back to school for a little while now. Is there something really interesting that you remember when you were learning math/science in Mr./Mrs. X's class this year?
- a. Why did you find these things interesting?

24. If have not discussed math/science as least/favorite subject: Do you like math/science?
- a. Why? Why not?
  - b. What do you like best/least about mathematics/science?
  - c. Can you give me some examples?
  - d. Are mathematics/science important to you?
25. Do you consider yourself to be one of the better math/science students?
- a. Why do you say that?
  - b. Do you think Mr./Mrs. X thinks of you as a good math/science student?
    - i. Why?
  - c. If the student believes that they are a good student: Think about students who are good in mathematics/science, including yourself, what makes them good?
  - d. If the student does not believe that they are a good student: Think about students who are good in mathematics/science, what do you think makes them good?
26. Do you think of yourself as a mathematician/scientist?
- a. Why or why not?
27. Do you think you can be a mathematician/scientist?
- a. Why do you think this?
28. Tell me what you think mathematicians/scientists do?
- a. What made you think of these things?

**Closing to the questions:**

- **Ask the students whether they have any other comments or questions.**
  - **Thank the students for their time and interview.**
-

## Winter

Instructions: Bold, italicized words are not to be read, but guides for the interviewer.

### Prelude to the questions:

- **Ask child how they are doing today. Are they having a good day?**
- **Offer child a compliment (hair, smile, name, etc.)**
- **Express gratitude for their willingness to be interviewed.**
- **“Let me know if you want to stop at any time and we’ll stop right away”**

In this second interview, I want to learn a few more things about you. We will continue talking about you, your classroom and school, math/science, and how you see yourself as a young Black boy/girl. Are you ready? Do you have any questions?

### SECTION 1: ELABORATION ON 1ST INTERVIEW ANSWERS

First, let’s talk a bit about some things you told me last time because I want to better understand your thinking.

**Mia:**

1. Remember when you said that you used to talk about being Indian. What did you mean by that?
2. Where had you heard about being Indian before?

**Shawna:**

1. Remember when you were drawing pictures of the girls in the class. Are you still doing that?
2. Did your picture come true?
  - a. Why do you think that happened?

**Derrick:**

1. If you could describe a perfect day at school and with your friends, what would it be like?

**Jamal:**

1. If you went to a school that didn’t teach any mathematics, how would you feel?

**Brittany:**

1. Do you like that there are high and low groups?
2. Did being in the low group make you happy, sad, or it didn't matter?
  - a. Why or why not?

**Patrick:**

1. How has making friends been this year with your classmates?
  - a. Is it better or worse than 2<sup>nd</sup> grade?

**Jenique:**

1. Are you glad that you didn't transfer to a charter school so far this year?
  - a. Why or why not?

**Lamaresha:**

**[NO QUESTION]**

**Heaven:**

1. At the beginning of the year, you and Tia were very good friends. Are you still good friends?
  - a. If not, why not?
2. Have your friendships affected your schooling?

## **SECTION 2: COMMON QUESTIONS FOR ALL CHILDREN**

### **Background**

1. Do you still live with **[child's answer in PRE]**? **[OR]** Remind me who you live with.
2. Do you have a best friend?
  - a. Why is that person your best friend?
  - b. What do you and your best friend like to do together?
3. Do you know what you want to be when you grow up?
  - a. Why did you choose that?
  - b. Do you know anyone who does that?

### **Being Black**

4. Have your mom, dad, grandma or grandpa ever said anything about being Black to you?
  - a. What did they say?
5. What's your favorite TV show?

- a. Are there people on the TV show like you?
- b. How are they like you?
- c. How are they different from you?
- d. [If race doesn't come up: Are there any Black people on this show?]
- 6. Has any one been mean to you, or others, because you, or others, are Black?
  - a. Who was this person or these people?
  - b. How were they mean?
  - c. Tell me more details.

## School

- 7. What do you like best about school so far this year?
  - a. Why?
- 8. Is there anything you don't like about school so far this year?
  - a. Why?
- 9. What about the kids in class—who are the kids who you work with the most?
  - a. Why do you like working with these kids?
- 10. Who are the kids who you play with the most?
  - a. Why do you like playing with these kids?
- 11. Do you have a favorite subject?
  - a. Why is that your favorite subject?
- 12. Do you have a least favorite?
  - a. Why is that your least favorite subject?
- 13. How do you think you have been doing in school up to now?
- 14. Would you say that you do well in school?
  - a. Why/Why not?
  - b. If grades not used for justification to previous question: What kind of grades do you usually get?
  - c. Are you happy or satisfied with the grades you get?
  - d. Why/Why not?
- 15. Give me an example of something that you have done really well in your classroom.
- 16. Give me an example of something you think you need to improve.
- 17. Do you like being in **[T's name]** class this year?
  - a. Why/Why not?
- 18. Do you think **[T's name]** considers you to be a student who does well in school?
  - a. Why/Why not?

## Math/Science

Let's now talk specifically about math/science.

- 19. What is math/science class usually like?



- a. What do you do in math/science class?
  - b. What do you learn?
20. Is there something you find really interesting in your math/science class this year?
- a. Why do you find these things interesting?
21. If math/science hasn't been discussed as least or favorite subject: Do you like math/science?
- a. Why? Why not?
22. If math/science has been discussed as least/favorite subject: What do you like best/least about math/science?
- a. Can you give me some examples?
23. Do you consider yourself to be a student who does well in math/science?
- a. Why do you say that?
  - b. If the student believes that he/she does well: Think about students who do well in math/science, including yourself, what makes them do well?
  - c. If the student does not believe that she/he does well: Think about students who do well in math/science, what do you think makes them do well?
24. Do you think **[T's name]** thinks you are a good math/science student?
- a. Why do you say that?
25. Is math/science important or not important to you?
- a. Why/Why not?
  - b. If child answers referring only to in-school math/science: What about math/science outside of school?
    - i. Do you think it's important to you?
    - ii. Why? Why not?
26. What about your family—do they consider you as someone who does well in math/science?
- a. Why do you say that?
27. Is anyone in your family particularly good in math?
- a. Your parents?
  - b. Siblings?
  - c. How did you find this out?
28. What have your parents or brothers and sisters told you about math/science?
29. What math/science things do you do outside of school?
30. Is the math/science that you do outside of school like the math/science you do inside of school?
- a. How is it the same/different (depending on child's answer)?
31. Let's think about people outside of school-What kinds of people do you think can do math/science?
- a. What do they look like?
  - b. What do they do?
    - i. Do they use math/science in their jobs?
  - c. How do they use math/science?

### **SECTION 3: CONVERSATION ON CLASSROOM PERFORMANCES**

Let's talk now about some things that I've observed while I've been in your classroom.

**Mia:**

1. Mia, I noticed that Ms. Patterson sometimes complements you during the lesson. She'll say, "Mia's ready" or "Mia's gotta it!" Do you agree with that does Ms. Patterson do that?
2. How does that make you feel when Ms. Patterson says that about you?
3. Do other students ever make fun of you for being a good student?
4. Would you like to continue getting compliments?
  - a. Why or why not?

**Shawna:**

1. Shawna, I noticed that sometimes you sit away from the class during rug time. Do you agree with that?
2. Why do you that sometimes?
3. Is sitting away from the class useful?
4. How does it make you feel?

**Derrick:**

1. Derrick, I noticed that sometimes you move to a back table by yourself when it is time to work. Do you agree with that?
2. Why do you that sometimes?
3. Is sitting away from the class useful?
4. How does it make you feel?

**Jamal:**

1. Jamal, I noticed that sometimes get frustrated when working with your classmates on a mathematics assignment? Do you agree with that?
2. Why does that upset you? (Use Mia as an example if he answers in the negative.)
3. How does it make you feel when working with other people on a mathematics problem?
4. Is working with other people useful to you?

**Brittany:**

1. Brittany, I noticed that you always seem to be a helper in Ms. Patterson's class. Do you agree with that?
2. Why do you think that is?
3. Do you like being a helper?
  - a. Why?

**Patrick :**

**[NO QUESTION]**

**Jenique:**

1. Jenique, I noticed that when you work in small groups you like to be the leader. Do you agree with that?
2. Do you like being the leader?
  - a. Why or why not?
3. Do you think you are a good leader?
  - a. Why or why not?
4. Do you like working in groups with your classmates?
  - a. Why or why not?

**Lamaresha:**

1. Lamaresha, I notice that you raise your hand a lot in class and are very excited. Do you agree with that?
2. Why is it important to answer questions in class?

**Heaven:**

1. Heaven, I noticed that you have changed your seat several times in class? Do you agree with that?
2. Why have you changed seats?
3. Is where you sit in class important?
  - a. Why or why not?

**SECTION 4: CLOSING UP INTERVIEW**

**Ask the students whether they have any other comments or questions.**

**Thank the students for their time and interview.**

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## **Spring**

Instructions: Bold, italicized words are not to be read, but guides for the interviewer.

### **Prelude to the questions:**

- **Ask child how they are doing today. Are they having a good day?**
- **Offer child a compliment (hair, smile, name, etc.)**
- **Express gratitude for their willingness to be interviewed.**
- **“Let me know if you want to stop at any time and we’ll stop right away”**

In our last interview, I want to you to reflect on this school year and talk about what your goals and expectations next school year. We will continue talking about you, your classroom and school, math/science, and how you see yourself as a young Black boy/girl. Are you ready? Do you have any questions?

### **Background**

1. Did you have a birthday this school year?
  - a. When was your birthday?
  - b. How old are you now?
2. Have you changed where you lived or whom you lived with at any time this year?
3. Have any of your responsibilities at home, like chores, or privileges, like being allowed to do something, changed over this year?
4. What do you do when you’re not in school?
  - a. Is this different for different days of the week?
  - b. Who do you spend most of your time with?

### **Friends**

5. Who has your best friend(s) been over the year?
  - a. Have your best friend(s) changed over the year?
  - b. Why do you think it has changed?
  - c. Do you think that you will be best friends next year?
  - d. Why or why not?

6. What sorts of things do you do together?
  - a. Have any of the things that you do with your best friend changed?
  - b. What sorts of things do you expect to do next year with your best friend(s)?
7. How are you feeling about making friends next year?
  - a. Why or why not?

### **Being Black or African American**

8. Do your parents or family attend events or go to places with lots of Black people in the city, like parades, museums, or fairs?
  - a. If yes, do you like attending these events?
9. Does your family ever talk about Black history?
  - a. What sorts of things come up during those discussions?
  - b. What would you like to learn about in Black history?
10. If someone walked in your home and none was there, would they know a Black or African American family lived there?
  - a. How would they know?
11. Do you think that you will always live around other Black people?
  - a. Why or why not?
12. Could you tell whether or not some one is Black if you never seen them?
  - a. For example, if you talked to someone on the phone, could you tell whether they were Black or not?

### **Future Plans (College and Career)**

13. What you want to be when you grow up?

### **School**

14. How would you describe this school year?
  - a. What stands out as the best thing about school? The worst?
  - b. Why these events?
  - c. What would you change about the school year?
  - d. What do you think the next school is going to be like?
15. There were a couple/several fights this year at **[School Name]**.
  - a. Why do you think fights happen?
  - b. Are fights a big deal?
  - c. Have you been in a fight at school?
  - d. What was it about?
  - e. Do you think there will be fights next year at your school?
16. Who were the people in your class that you worked with and hung out with the most over the year?

- a. Have you ever not wanted to work with someone in class? Why?
- 17. If you had to give yourself an overall grade in school this year A, B, C, D, or F, what grade would you assign?
  - a. Do you think that this will match the grades that your teachers assigned you?
    - i. If no, why the difference?
  - b. Are there things that you do well in school that you don't feel like you get credit for?
  - c. What sort of grades do you think you will get in school next year?
- 18. What was your favorite subject this year? Why?
  - a. What do you think will be your favorite subject next year? Why?
  - b. What was your least favorite subject this year?
  - c. What about next year?
- 19. How does this year in **[T's Name]** compare to last year?
  - a. Did you like being in **[T's Name]** class this year? Why/why not?
  - b. Was this year's class difficult or not? How?
  - c.

## **Math/Science Class**

Let's now talk specifically about math/science class.

- 20. Looking back over the year, how would you describe your mathematics class?
  - a. Does anything stand out as a good memory?
    - i. Why do you think this stands out?
  - b. What has been or will be your greatest success this year in mathematics/science class?
  - c. What was your biggest difficulty this year in mathematics/science class?
- 21. Now, at the end of the year, would you say that you participate more during mathematics/science class or at other times during the day?
  - a. Why is that?
- 22. Do you think it is okay to argue in mathematics/science class?
  - a. What do you do when there are disagreements in mathematics/science class in your group?
  - b. How do you resolve arguments in mathematics/science class?
  - c. Is there a difference between arguing in mathematics/science class and other kinds of fights?
- 23. When you are working through a mathematics problem/science question in class, do you have to follow the particular rules or can you make decisions about how you work?
  - a. How do you know when you are on the right track when you working?
- 24. When do you usually give your best effort in mathematics/science?
- 25. What do you like best (or least) about doing mathematics/science?

26. How would you describe your performance in mathematics/science class this year?
- a. How would you grade yourself?
  - b. Do you think your classmates would agree or disagree with your description?
  - c. What about **[T's name]**? Why do you say that?
  - d. Do you think that the grades you get or your test scores show what you really know about mathematics/science?
27. Who or what helps your mathematics/science learning?
- a. Can you give examples?
  - b. Where do you go when you need help?
28. What are some of things that you learned this year that you think will be helpful for next year?
29. Think about your classmates: do you think some of your classmates who do well in mathematics/science are naturally good at mathematics/science or do they practice and study?
- a. Which students? How do you know?
30. Is it important to you to show your teacher and classmates that you are good at math?

### **Math/Science in General**

31. Now that you have completed another school year, what would you say math/science is?
- a. Is there a difference between what you would say mathematics/science is in-school versus out-of-school?
32. Do you think mathematics/science will be important to your future?
- a. How and why?
33. Tell me what you understand mathematicians/scientists do.
- a. Do you consider yourself a mathematician/scientist?
  - b. Do you think other people outside of your class this year see you as a mathematician/scientist? Why or why not?

### **CLOSING UP INTERVIEW**

#### **June Students:**

34. How do you feel about your school closing?
35. Are you looking forward to moving to a new grade next year? Why or why not?
- a. Do you have any concerns about a new grade/school?

#### **All Students:**



**36.**What will you remember most about [T's name]?

**Ask the students whether they have any other comments or questions.**

**Thank the students for their time and interview.**

## **Appendix D: Post-Observation Questions for Teacher Interview**

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- How did today's lesson go?
- Were you happy with student participation?
- Which students "got" today's lesson? Which didn't?
- How are you approaching the content for that day and how it fits into a longer trajectory?
- If necessary: Why students are sitting where they are?

## **VITA**

## **MAISIE L. GHOLSON**

### **EDUCATION**

2009-Present      **UNIVERSITY OF ILLINOIS AT CHICAGO**

Ph.D. in Curriculum & Instruction with emphasis in Mathematics Education expected in July, 2015. Committee: Danny Martin (Chair), Josh Radinsky, Marisha Humphries, Kristie Dotson (Michigan State University), Robert Berry (University of Virginia)

Dissertation title: The Mediating Influence of a Young Black Girls' Social Network in their Mathematics Learning

**UNIVERSITY OF ILLINOIS AT CHICAGO**

M.Ed. in Instructional Leadership Educational Studies

2001                **DUKE UNIVERSITY**

B.S. in Electrical Engineering

Minor: Computer Science

### **FELLOWSHIPS**

National Academy of Education/Spencer Dissertation Fellowship, 2014-2015, \$25,000

UIC Abraham Lincoln Fellowship, 2014-2015, \$25,000

NSF Graduate Research Fellows Program in STEM Education, 2011-2014, \$90,000

## **RESEARCH EXPERIENCE**

### **GRADUATE RESEARCH ASSISTANT (2012-2013)**

#### **Content Learning-Identity Construction (CLIC) Project**

*Principal Investigators:* Danny Martin (UIC), Justine Kane (Wayne State University), Maria Varelas (UIC)

*Description:* University of Illinois at Chicago Award of Excellence funded-research project investigating the role of identity development of African American children in science and mathematics classrooms of predominantly Black schools.

*Duties:* Field researcher for lower elementary (3<sup>rd</sup> grade) and upper elementary (8<sup>th</sup> grade Algebra) classrooms; recorded fieldnotes, video, and audio, conducted student interviews, as well as collected student work and classroom artifacts; designed database for research data for project; and assisted in the facilitation of bi-weekly meetings with classroom teachers.

### **VOLUNTEER RESEARCH ASSISTANT (2011-2012)**

#### **American Migrations Project**

*Principal Investigator:* Joshua Radinsky (UIC)

*Description:* NSF-funded 5-year program of curriculum development to investigate teaching and learning the histories of African American and Latino migrations in American history, using geographic information systems (GIS) to map historical census data.

*Duties:* Attended weekly planning meetings; assisted in collecting classroom data of curriculum implementation; conducted analysis of mathematical thinking in the use of GIS maps; conducted critical race analysis of student-generated historical narratives; and assisted in development of learning objectives and lessons.

### **GRADUATE RESEARCH ASSISTANT (2010-2011)**

#### **Motorola Math Club Evaluation Project**

*Principal Evaluator:* Danny Martin (UIC)

*Description:* Privately funded collaborative between Young People's Project-Chicago Chapter and University of Illinois at Chicago in the evaluation of after school mathematics program.

*Duties:* Field researcher and lead writer of evaluation report.

### **GRADUATE RESEARCH ASSISTANT (2009-2011)**

#### **Intensified Algebra Project**

*Principal Investigators:* Susan Goldman (UIC), Jim Pellegrino (UIC), Martin Gartzman (UIC), Alison Castro-Superfine (UIC), Linda Chaput (UT-Austin), Susan Hudson-Hull (UT-Austin), Phillip Uri Treisman (UT-Austin)

*Description:* NSF-funded collaborative between University of Illinois at Chicago and the Dana Center at the University of Texas at Austin in the development of double-period Algebra curriculum.

*Duties:* Field researcher for double-period algebra classes; conducted clinical interview with students; designed web-based survey instruments for teacher feedback in curriculum implementation; analyzed and developed maps for various curricular units; conducted professional development for curriculum.

## **POST-SECONDARY TEACHING EXPERIENCE**

### **Teaching Assistant (Fall 2012), UNIVERSITY OF ILLINOIS AT CHICAGO**

*Description:* MATH 140: Arithmetic and Algebraic Structures. First of two required mathematics content courses for undergraduate elementary education students.

*Duties:* Assisted students during class and with grading.

### **Instructor (Summer 2011), UNIVERSITY OF ILLINOIS AT CHICAGO**

*Supervisor:* Daniel Miltner (UIC)

*Description:* MTH 465: Teaching Algebra for Understanding. South Cook County Initiative, initiative to promote middle school teacher endorsement in the teaching of Algebra in 8th grade. Supported by UIC Office of High School Development.

*Duties:* Developed course curriculum collaboratively and taught one section via an activity-based pedagogy

## **SECONDARY TEACHING EXPERIENCE**

### **Mathematics Teacher (Summer 2010), UIC COLLEGE PREP HIGH SCHOOL**

*Supervisor:* Martin Gartzman (UIC)

*Description:* Chicago, IL urban university charter high school

*Duties:* Taught a summer bridge program, Mathematics for Success; implemented curriculum developed by Dana Center at the University of Texas at Austin with cohort of 8<sup>th</sup> grade students entering high school.

## **Secondary Mathematics Teacher (2005-2009), KLEIN FOREST HIGH SCHOOL**

*Supervisor:* Bill Lakin (Klein Independent School District)

*Description:* Houston, TX suburban-urban public high school

*Duties:* Taught Algebra I & II (on-level, Pre-Advanced Placement, sheltered language instruction, special education in co-teach) and served as Algebra I Team Leader (team of 10 teachers); in developed integrated Algebra curriculum with business for campus-based International Business Academy; presented at district Technology Liaison Meeting on "The Sunny Side of Center-Based Instruction." Taught Educational Technology professional development courses for the district. Implemented a grant program and developed curriculum for students placed "at-risk" entering Pre-AP classes in conjunction with Rice University professors and staff.

## **JOURNAL ARTICLES**

Gholson, M. & Martin, D. B. (2014). Smart girls, Black girls mean girls, and bullies: At the intersection of identities and the mediating role of young girls' social network in mathematics communities of practice. *Journal of Education*. 194(1), 19-33.

Gholson, M., Bullock, E., & Alexander, N. (2012). On the brilliance of Black children: A response to a clarion call. *Journal of Urban Mathematics Education*. 5(1), 1-7.

Martin, D.B., Gholson, M., & Leonard, J. (2010). Mathematics as Gatekeeper: Power and Privilege in the Production of Knowledge. *Journal of Urban Mathematics Education*. 3(2), 12-24.

## **BOOK CHAPTERS**

Gholson, M. (2013). The mathematical lives of Black children: A sociocultural-historical rendering of Black brilliance. In J. Leonard & D.B. Martin (Eds.), *The brilliance of Black children in mathematics: Beyond the numbers and toward new discourse* (pp. 55-76). Charlotte, NC: Information Age Publishing, Inc.

Washington, D., Torres, Z., Gholson, M., & Martin, D. B. (2012). Crisis as a discursive frame in mathematics education research and reform: Implications for education Black children. In S. Mukhopadhyay & W.M. Roth (Eds.), *Alternative forms of knowing (in) mathematics: Celebrations of diversity of mathematical practices* (pp. 53-70). Rotterdam: Sense Publications.

Martin, D.B. and Gholson, M. (2011). On becoming and being a critical Black scholar in mathematics education: The politics of race and identity. In O. Skovmose & B. Greer (Eds.), *Opening the Cage*. Rotterdam: Sense Publications.

## BOOK REVIEWS

Gholson, M. & Martin, D.B. (2012). Taking context seriously: A review of six recent books on issues of equity and diversity. *Journal for Research in Mathematics Education*, 43(1), 114-121.

## EVALUATION REPORTS

Gholson, M., McGee, E., Washington, D., & Martin, D.B. (2011). Looking forward and back: Year 0 evaluation report of Young People's Project Algebra Labs Program.

## MANUSCRIPTS IN PREPARATION

Gholson, M. (2014). Clean Corners and Algebra: A Critical Examination of the Construction of Black Girls and Women in Mathematics.

Gholson, M. (2014). Beneath the Shadow of a Problem: The Empirical Space Occupied by Black Girls and Women in Mathematics Education.

## INVITED TALKS

Gholson, M. (2011, May). *Your Knowledge Ain't Like Mine: Embracing Sociocultural Perspectives in Mathematics Education*. Invited speaker at Seminar Series on Alternative Forms of Knowledge Construction, Portland State University and Portland Community Colleges, Portland, OR. [See at <https://www.youtube.com/watch?v=GXtWBWNMtZc>.]

## CONFERENCE PRESENTATIONS

Gholson, M. & Martin, D.B. (2013, June). *Smartness and bullying: Student constructions as members of a mathematics classroom community*. Paper presentation at the 43<sup>rd</sup> Annual Meeting of the Jean Piaget Society, Chicago, IL.

Gholson, M. (2013, April). *The collective mind: At the many intersections of race, Black learners, and identity in mathematics education*. Symposium presentation at the research presession of the annual meeting of the National Council of Teachers of Mathematics, Denver, CO.

Gholson, M., Butler, L., and Radinsky, J. (2013, April). *Proportional reasoning with GIS tools in the study of the Great Migration*. Presentation at the research presession of the annual meeting of the National Council of Teachers of Mathematics, Denver, CO.

Lynn, J. & Gholson, M. (2011, April). *Algebra Intensification: Research-based Interventions*.



Presentation at the annual meeting of the National Council of Supervisors of Mathematics, Indianapolis, IN.

## **HONORS AND AWARDS**

Hilliard & Sizemore Research Institute on African American Education-AERA, 2014

UIC Conference Travel Awards, 2009-2014, \$1,500

## **EDITORIAL BOARD SERVICE**

**Co-Guest Editor**, *Journal of Urban Mathematics Education* 2012 Spring/Summer edition, Benjamin Banneker Conference Proceedings.

## **NATIONAL SERVICE**

**Planning Committee Member (Research)** of National Council of Teachers of Mathematics Regional Conference in Houston; conference held November 19-21, 2014.

**Volunteer** for Psychology of Mathematics Education-North American Chapter National Conference in Chicago; conference held November 14-17, 2013.

## **VOLUNTEER REVIEWER**

National Council of Teachers of Mathematics 2013

American Education Research Association

Social Context Division 2010, 2011, & 2012

Research Focus on Black Education 2010, 2011, & 2012

## **ACTIVE PROFESSIONAL MEMBERSHIP**

National Council of Teachers of Mathematics (NCTM)

American Educational Research Association (AERA)

Benjamin Banneker Association (BBA)

## **OTHER WORK EXPERIENCE**

### **Patent Agent (2004-2005), DEWIPAT INC.**

*Supervisor:* Adenike Adewuya

*Location:* Houston, TX

*Duties:* Developed strong relationships with in-house counsel/inventors via continual emails and reporting letters; managed docketing database of domestic client and governmental correspondence; and drafted utility applications in the electrical and mechanical arts

### **Patent Agent (2002-2004), OSHA & LIANG LLP (Previously Rosenthal & Osha LLP)**

*Supervisor:* Jon Osha

*Location:* Houston, TX

*Duties:* Conducted prior art searches for clients regarding subject matter in electrical/chemical/mechanical arts; drafted and filed approx. 10-12 provisional and utility applications per year; drafted and filed approximately 100-120 responses to official office actions per year various arts; and drafted opinion of client product infringement of competitor's switch relay technology.