# CASE STORIES OF MATHEMATICAL AND RACIAL IDENTITY 

 AMONG BLACK GIRLS IN A SMALL URBAN SCHOOL DISTRICTBy<br>JENNIFER V. JONES<br>A Dissertation submitted to<br>The Graduate School of Education<br>Rutgers - The State University of New Jersey, in partial fulfillment of the requirements<br>for the degree of<br>Doctor of Education<br>Graduate Program in Mathematics Education<br>\section*{Approved by}<br>Dr. Gerald A. Goldin, Chair Rutgers University<br>Dr. Alice S. Alston<br>Rutgers University<br>Dr. Yakov Epstein Rutgers University<br>Dr. Danny Bernard Martin<br>University of Illinois, Chicago

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Abstract of the Dissertation<br>Case Stories of Mathematical and Racial Identity Among Black Girls in a Small Urban School District by Jennifer V. Jones<br>Dissertation Director:<br>Dr. Gerald A. Goldin

This research investigated aspects of the developing mathematical identity and racial identity of two Black adolescent girls attending middle and high school in a small urban school district.

The study was guided by the following research questions:

1. What can be inferred from $7^{\text {th }}$ grade and high school interview data about the development or co-construction of two African-American girls' mathematical and racial identities in a small urban school district? In particular, in what ways do they see themselves as effective mathematical learners, and how do they perceive their school experiences having contributed to this? How do they perceive themselves as Black girls, in their own eyes and in the eyes of others? Do they see any relationships between their developing mathematical identities and their racial identities? What light is shed on these questions by information gathered from peers with whom they interact?
2. What "critical events" identified in $7^{\text {th }}$ grade retrospective interview videotapes support these inferences? A "critical event" is an affective, social, and mathematical interaction pertaining to identity that occurred during $7^{\text {th }}$ grade.
3. What stable dimensions of the girls' mathematical and racial identities can be documented in data concerning their experiences since $7^{\text {th }}$ grade, particularly experiences during $8^{\text {th }}, 9^{\text {th }}$, and $10^{\text {th }}$ grades, described by the girls themselves?

Evidence was gathered from $7^{\text {th }}$ grade and high school mathematics affect surveys, $7^{\text {th }}$ grade retrospective interviews on classroom activities, a multidimensional inventory of Black identity (MIBI-t, Sellers et al 1998), and high school interviews. Case stories for two focus girls were developed with additional data from three girls, all of whom were in the same $7^{\text {th }}$ grade mathematics class and attended the same high school. The study gives evidence that all of the girls perceived themselves as capable mathematics learners Black girls who are able to "do math". Evidence from $7^{\text {th }}$ grade "critical events" indicates complex relationships among mathematics activities, affective and social interactions, and the classroom environment. From $7^{\text {th }}$ grade on, all of the girls believed that a good mathematics teacher creates a supportive mathematics learning community for students of all abilities. Stable dimensions of three girls' mathematical identity include belief in their own ability, and the belief that they have experienced both opportunities and barriers to their mathematics learning. Stable dimensions of racial identity among three girls include high Private Regard (I am proud to be Black), and low Public Regard (Most people think that Blacks are as smart as people of other races). The two focus girls do not, however, perceive relationships between their own racial and mathematical
identities. Rather, for these girls, the most important reported influences on their mathematics identity were a) classroom opportunities to work together on fun but challenging mathematics tasks, b) classroom environments in which both mistakes and correct answers are valued, and c) respect and value as members of classroom mathematics learning communities.

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## Dedication

## To Mayme Washington Jones and

## To John Zolia Jones

Mommy and Daddy, your love and example taught me to keep my eyes on the prize.
I love you.

## To Jade Marjani Harris

Daughter, your love and being made me want to be a better person, for you.
I love you.

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## CHAPTER 1: OVERVIEW

### 1.1 Context for the Study

"...the most urgent social issue affecting poor people and people of color is economic access. In today's world, economic access and full citizenship depend crucially on math and science literacy. I believe that the absence of math literacy in urban and rural communities throughout this country is an issue as urgent as the lack of registered voters in Mississippi was in 1961."

Radical Equations: Civil Rights from Mississippi to the Algebra Project, pg. 5 Moses and Cobb (2001)

For many years, education research has documented "achievement gaps" that highlight unequal mathematics standardized test scores between White and non-White students. The US Department of Education's National Center for Education Statistics (NCES) reports the results from periodic National Assessment of Education Progress (NAEP) assessments designed to measure what nationally representative samples of fourth- and eighth- graders know and can do across five mathematics content areas. Since 1969 NAEP results have compared the mathematics scores of Black and other non-White students to that of White students, publishing these comparisons in a report called The Nation's Report Card. Gaps or differences in scores are used to define the mathematics achievement of ethnic/racial groups of students.

NAEP scores of White students are used to "normalize" American students' mathematics achievement (Martin 2009). African-American and Latino students' mathematics performance improved during the 1970s and 1980s. According to the 2001 report, the difference between White and Black students' mathematics NAEP scores was
least in 1990, and the difference between White and Latino students' scores was least in 1992 (NCES 2001). Between 2005 and 2007 the difference between White, and Black and Latino eighth-graders' mathematics scores did not change. However, there was a greater increase in the scores of Black females than there was for White females. (NCES 2009)

Mathematics achievement levels are reported as percentages of students scoring at or above Basic and Proficient levels, or at an Advanced level. In 2011, race/ethnicity information was collected so that NAEP results could be reported for a greater number of non-White student categories. NAEP mathematics scores were reported for White, Black (including African-American), Hispanic (including Latino), Asian/Pacific Islander, American Indian/Alaska Native students, and students with heritage from two or more races (NCES 2011). Since 1990, the average mathematics score of eighth-graders had increased by 21 points. However, the percentage of Black, Hispanic, Asian/Pacific Islander, and American Indian/Alaska Native students who scored below Basic was 49\%, $39 \%, 14 \%$ and $45 \%$ respectively, compared to $16 \%$ of White students who scored below Basic. Among high-scoring eighth-graders (i.e. above the $75^{\text {th }}$ percentile) only $5 \%$ were Black.

According to The Condition of Education 2011, a report published by NCES, the average scores for all ethnic/racial groups improved from 2005 to 2009 with the percentage of students scoring below Basic, decreasing from $39 \%$ to $36 \%$ (NCES 2011). In 2003, for the first time the NAEP mathematics scores of eighth grade students from 18 urban districts in the United States participating in the Trial Urban District Assessment (TUDA) were reported for comparison to public school eighth graders in large cities (i.e.
population $>250,000$ ) and across the nation. In 2009, White eighth grade public school students scored the same or higher than the national average in all but four participating urban school districts. Black eighth graders scored the same or higher in only four participating urban school districts (NCES 2009).

Mathematics has become increasingly central to discussions of academic, personal, and professional success and "undergirds a multitude of disciplines including engineering, physics and computer sciences; disciplines central to technological innovation and economic progress." (Clark, Johnson and Chazan 2009, pp. 50). Black students' underachievement on standardized, norm reference, high-stake tests for students - as compared to White students - may suggest why Black males and females continue to be underrepresented in mathematics and science careers.

Different researchers suggest a number of possible explanations for school mathematics underachievement and under-representation of Blacks in mathematicsrelated careers. Radical Equations: Civil Rights from Mississippi to the Algebra Project is a seminal work by Robert P. Moses and Charles E. Cobb (2001) that connects the history of racial politics and voting rights in Mississippi in the United States to the mathematics, curriculum, teaching practices, student achievement and equitable learning opportunities that Black and minority students receive in poor rural and urban schools. Moses and Cobb assert that $21^{\text {st }}$ century and global economic access is defined by mathematics literacy, and many African-American and students of color lose options for college and career because of chronically poor access to school mathematics specifically preparation and access to algebra before completing middle school (2001).

Moses and Cobb also use statistics pertaining to the number of Ph.D.'s awarded to Blacks to note limits on Black students' future economic access and career opportunities caused by poor access to mathematics and underachievement in middle and high school. In 1995, Blacks were 15 percent of the U.S. population but earned only " 1.8 percent of the Ph.D.s in computer science, 2.1 percent of those in engineering, 1.5 percent in the physical sciences, and 0.6 percent in mathematics." (pp. 10-11). In 2006, statistics on Black males and females pursuing science, technology, engineering and mathematics (STEM) fields remained unchanged as reported by the National Science Foundation (NSF 2009). Specifically, first year African-American college students who intended to major in mathematics or statistics was $0.4 \%$ and $0.8 \%$ for females and males, respectively.

Conflicting community and school cultures have also been cited as influences on Black students' mathematics attitudes, participation, achievement, and pursuit of mathematics-related professions and careers. Using interview and survey data, and narratives of academically successful Black students at a predominately Black urban high school, Fordham and Ogbu (1986) described the phenomena that some Black female and male students respond to racialized school mathematics experiences by resisting the value and emphasis on test scores, and under-valuing commitment and persistence in mathematics studies. Black students' opposition to classroom and school culture, which some Black students deem to be "acting White", can explain differences between White and Black student's school mathematics experiences, access to higher education (e.g. high test scores), and attainment of advanced degrees.

In the 1990 s, critical race theory (CRT) gained prominence in order to theorize and understand embedded inequities in the structure of schools and schooling in the United States. CRT places the distinct and unique perspective on race taken by Blacks and other minority groups who have been historically oppressed in American culture, at the center of understanding differences in school experiences and academic performance. From this perspective, it puts in the foreground stories of people in minority groups that serve as counterstories to the dominant narrative in academic literature and the wider culture. By acknowledging and highlighting these counterstories based upon experiential knowledge, CRT challenges the claim of objectivity, meritocracy, color-blindness, race neutrality, and equal opportunity by exposing the self-interest, power, and privilege maintained in the dominant narrative.

In 1995, Ladson-Billings and Tate conceptualized critical race theory in education in Toward a Critical Race Theory of Education asserting that descriptions of "savage inequalities" (e.g. Kozol 1991) were inevitable because discussions of race and racism in education had been "muted and marginalized". The article theorized CRT as an analytical tool to understand inequities between middle class and poor African-American and Latino students' school experiences, and the disparities between White and non-White students' achievement. Ten years later Ladson-Billings stated that "CRT is a theoretical treasure" in a summary prefacing articles in the March 2005 issue of Race, Ethnicity and Education (Vol. 8, No. 1, pp. 115-119).

In recent years, some mathematics education research has focused on the contextual complexities of Black students' access to school mathematics. It has been asserted that racialized school experiences negatively impact African-American
children's ability to develop positive mathematics identities. For example, Martin's research on mathematical experiences amongst African-American adolescents and young adults (2006) explored firsthand accounts - from students and parents - to reveal complex and historical relationships between racial, academic, and mathematics identity development. There has been research on teacher classroom practices that influence academic empowerment, and racial and mathematics identity co-construction (e.g. Davis and Martin 2008). Some research and opinions on race in mathematics education challenge the positioning and comparison of Black children's mathematics ability to that of White children which is based on inequitable school contexts, access, and opportunities (e.g. Martin 2007, 2008, 2009). And more research and editorials such as How Is It That One Particular Statement Appeared Rather Than Another?: Opening a Different Space for Different Statements About Urban Mathematics Education (Stinson 2010) are appearing in new journals. For example, The Journal of Urban Mathematics Education (JUME) was co-founded to highlight discussions of race and racism in mathematics education research and provide counter-conversations about urban mathematics education, and the role of race and racism in mathematics identity coconstruction amongst Black and minority female and male students.

The study herein focuses on two adolescent African-American girls. It describes their mathematics experiences in an urban school district, and the experiences they believe most influenced their mathematics identity throughout middle and high school. In addition to these girls, three of their peers provided additional data and information about their middle and high school mathematics experiences. In order to understand, respond to, and make meaningful changes to increase the numbers of African-American students
who pursue mathematics and mathematics-related careers - particularly girls - it is important to understand their own perceptions of their identities, their abilities, and their opportunities as mathematics learners. This approach to understanding the disparities between White and Black students' mathematics participation and achievement differs from studies that focus on test scores as a measure of ability or systemic school inequities. The girls in this study spoke about their experiences, feelings and beliefs about mathematics learning, and reflected on their mathematics and racial identity. By hearing stories in Black adolescent girls' own voice and words, we can learn more about the complexities of their racial and mathematics identity development. This insight can help inform what is known about systematic inequities between White and Black urban girls' participation in school mathematics, and increase opportunities for Black girls' success in school mathematics and the numbers of Black girls in mathematics-related professions and careers.

This is the compelling reason for why mathematics education research to collect stories of mathematical experiences and learning from diverse populations of AfricanAmerican girls is needed. Research on co-developing racial, social and mathematics identities can highlight the voices of the girls themselves, in order to inform changes in classroom practices, school- and district-based programs, and public education policies that meet the needs of African-American girls, and increase the number of Black girls who pursue school mathematics and STEM careers. This study addresses a crucial need to explore the school mathematics experiences of African-American girls related to racial identity and mathematics identity.

### 1.2 Purpose of the Study

The primary goals of this qualitative study were to 1 ) illuminate affective, social, and mathematical events that may pertain to racial and mathematics identity, 2) explore perceptions of racial and mathematics identity, and 3) infer relationships, if any, between racial identity and mathematics identity, including the co-construction of racial and mathematics identity, for two African-American girls in a small urban public school district.

This study is qualitative. Video tapes of classroom lessons and individual student interviews, and mathematics attitudes surveys collected during the girls' $7^{\text {th }}$ grade mathematics class (2006-2007) provided the data used to develop inferences about their mathematics identities. Data collected from each of the focus girls and one additional girl (three girls altogether) in their sophomore and junior high school years consist of a mathematics attitudes survey, two videotaped individual interviews, and an inventory of Black identity (MIBI-t). These three girls participated in a videotaped group interview. In addition, a mathematics attitudes survey and videotaped individual interview was collected from two more Black girls to provide more information about the experiences, feelings, beliefs and perceptions related to mathematics and racial identity amongst a small group of African-American girls attending an urban public high school.

### 1.3 Findings

The five Black girls who participated in this study talked openly about their perceptions of racial identity, and consistently about the mathematics classroom experiences they valued most. The survey, inventory, and interview data collected and
described in this study support the following findings. Here are some representative examples in the focus girls' own voice related to mathematics and racial identity.

All of the girls remembered positive learning experiences during their $7^{\text {th }}$ grade mathematics class, and felt that opportunities to participate in mathematics explorations, discussions and problem-solving and group work had been few since then. As a result, all believed they had developed positive mathematics identities during $7^{\text {th }}$ grade, and had retained positive mathematics attitudes, habits and abilities since then. For example, during an interview Tyana specifically reflected on her mathematics identity development:
"Like I always had a struggle like once again I used to be scared to answer questions and like I used to be like if I get it wrong I'd be like well I got it wrong so I might as well I had been talking if I get it wrong then I'ma get it wrong all the time. But Mr. P broke me out of that mentality because if you get it wrong but you could still get it right the next question." (Protocol 1 line 183)

All five girls also reported similar and positive perceptions of their racial identity. Data collected in this study substantiate the girls' positive mathematics attitudes, beliefs, and behaviors, and the most influential factors on their self-described identities. For example, Jana stated:
"Yeah I think I'll be kinda proud like when I see a Black person on top of their game in school and doing their work, getting good grades because that's not what other people see of us they see, the people of other races they see us failing and they see you know us being out in the streets you know and not being successful so I, I am kinda proud like when I think of Black people and mathematics cuz you know other people think we're dumb so I do be kinda proud" (Protocol 1 line 190)

Mathematics attitudes survey responses and interview statements reveal the high regard each girl has for her ability and potential as a mathematics learner and "doer" of mathematics. For example, Tyana said:
"Yeah it felt like I knew what I was doing all the time like I knew what I was doing and like nobody tell me I was wrong like I just go to math do all the work and be done." (Protocol 1 line 178)

MIBI-t results from the girls who completed the inventory - including both focus girls - indicate a positive private regard for being Black. For example, all three responded "really agree" to "I am happy that I am Black", and "I am proud to be Black". However, there were differences in the girls' responses to statements on two ideology subscales. Reflecting one aspect of their perceptions about assimilation of Blacks in American society, Tyana and Shaniyah responded "really disagree" to the statement "I think it is important for Blacks not to act Black around White people", and Jana responded "kind of agree". Another difference in the girls' perception of Black's relationship to other minorities is revealed in Jana and Shaniyah's response of "really agree" to "people of all minorities should stick together and fight discrimination" in contrast to Tyana's response of "really disagree".

All five girls in this study indicated positive feelings about the importance of mathematics in everyday life on the mathematics attitudes survey. However they did not convey a clear sense of the role of high school mathematics learning for success in college or for future career opportunities and choices. For example, during the group interview both focus girls and one non-focus girl were asked if they intended to take a mathematics class during the last year of high school. Their responses were "no" and "maybe" in spite of their belief that mathematics is important beyond school as indicated on the mathematics survey. Both survey and interview data from all of the girls include
descriptions of using mathematics in terms of keeping track of money when shopping or earning money on the job and getting paid for work.

Although many responses were similar, the focus girls responded very differently to some items on the mathematics attitudes survey. For example, Jana responded "neither agreed nor disagreed" that "my life outside of school makes me want to do well in math class" each time she completed the survey. In contrast, Tyana "disagreed", "strongly disagreed" and "agreed" with the statement the first, second and third times, respectively.

Each of the five girls was interviewed for this study. During questioning about who influenced their perceptions of themselves as mathematics learners, four out of the five girls named a family member, a friend of the family or peers as positive academic influences. But during the group interview, the focus girls were surprised that a major focus of the study was to uncover evidence of the relationship between racial identity and mathematics identity development. Tyana exclaimed "I never thought about that!" and the other girls agreed with "me either". Jana was confused and unsure about racial and mathematics identity co-construction during her Protocol 2 interview when asked about her perception of any relationships. She stated, "Yeah I guess like...I really don't know...Black girls do mathematics...I don't know..." (line 186).

The focus girls in this study had not considered and did not consider coconstruction to be a key factor influencing their current racial and mathematics identities. Rather, the girls' points of view, in their own their words, voice the critical importance of specific school mathematics experiences that support positive mathematics identity development, confidence, and self-empowerment in developing identities as Black girls who do mathematics.

### 1.4 Significance and Limitations

With so few Black girls persisting in high school and college mathematics and successfully pursuing STEM careers, this study, which focused on data collected from a small group of African-American girls in one small urban public school district, is not immediately generalizable to other diverse groups of Black girls. In addition, the researcher is not neutral and brings experiences, personal perspectives, and family and social norms - as an African-American woman - to this study. Analyses reflect the researcher's personal knowledge and perspective of African-American culture, and related nuances and contexts of school experiences. Therefore, duplication of interpretive narratives and generalization to other populations of adolescent Black girls are not possible. In addition, correlations to test scores or academic performance are beyond the scope of this study.

However, the stories and interpretations herein can inform future mathematics education research that intends to examine and understand the unique attributes of African-American girls' mathematical experiences. Findings from this study suggest future research focused on the complex dimensions of Black girls' development of mathematics identity, and school mathematics experiences that build long-term positive racial and mathematics identity co-construction.

National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, NCES 2011-455

## CHAPTER 2 LITERATURE REVIEW

### 2.1 Introduction and Overview of Theoretical Framework

Moody (2001) asserted the need to examine the range of mathematics learning experiences of Black girls', the dynamics of race, racism and gender on mathematics education, and the impact of those dynamics on girl's participation and success in school mathematics, and their pursuit of mathematics-related careers. The research reported herein contributes to those goals. This chapter describes the theoretical and empirical frameworks that influenced this dissertation research.

The issue of racial identity, self- and academic-identity, and relationships to students' experiences and outcomes is complex. There are social science literatures, for example psychology and child development research, that investigate relationships between racial-ethnic identity or pride, and academic achievement among adolescents (e.g. American Journal of Community Psychology 2003, Child Development 2006). Seminal research by psychologists to understand cognition and mathematics learning (e.g. Piaget and Szeminska 1941), and studies of the nature of situated cognition and learning (Brown, Collins and Duguid 1989) have implications for examining ageappropriate curriculum and classroom practices. There are studies of the development of mathematical ideas amongst individuals and groups (e.g. Martino and Maher 2002, Sran 2010, Steffero 2010, Schmeelk 2009), case studies of Black males who succeed in mathematics and higher education (e.g. McGee and Martin 2011), and girls' and women's interest and pursuit of STEM careers (e.g. Ong 2009). There is also research on the complexities of student motivation (e.g. Dweck 1986, Middleton and Spanias 1999, Walter and Hart 2009), group dynamics (e.g. Noddings 1989), affect and cognition in
mathematical problem solving (e.g. DeBellis 1996, DeBellis and Goldin 2006), patterns of affective engagement among students in urban mathematics classrooms (e.g. Goldin, Epstein and Schorr 2007; Epstein et al 2007, Alston, Goldin, Jones, McCulloch, Rossman and Schmeelk 2007), and the relationship between students' epistemological beliefs, cognition and learning (e.g. DeCorte and Op't Eynde 2003) from which to draw upon when investigating students' identity development in mathematics classroom contexts.

There is also no shortage of school mathematics achievement analyses that characterize the differences in norm-referenced, high-stakes test scores between White and non-White students who attend public schools in America as "gaps" (e.g. NAEP 2009). While these comparisons of American students' performance continue to use White students' test scores as indicators of mathematics achievement there is a growing body of literature focused on qualitative and empirical research to illuminate, document, and understand the school mathematics experiences of Black and other non-White American students.

Research on teaching and learning in urban classrooms, where the majority of students come from low socio-economic families and are Black or African-American, Hispanic or other ethnic minority, has drawn attention to learning and teaching in diverse, non-White, urban student communities (e.g. Schorr et al 2009), culturally relevant pedagogy (e.g. Ladsen-Billings 1995), and to the impact and effectiveness of reform mathematics curriculum (e.g. Lubienski 2007). This growing body of research and literature also includes increasing numbers of studies and research reports to investigate the unique learning experiences of Black and African-American students. For example, research on the school and education experiences of African-American males are
published in a journal devoted to highlighting and addressing issues affecting these students (see Journal of the African-American Male).

For this dissertation study the researcher chose to emphasize a framework drawn from Black feminist thought and CRT in education, and research on the development and co-construction of racial and mathematics identity development among AfricanAmerican students in public urban schools.

The sections in this chapter begin with the epistemology for this research by describing Black feminist thought and critical theories of race in education. A review of research literature germane to understanding affect, culture and mathematics learning and urban mathematics classrooms is presented next. The sections that follow discuss literature and research focused on mathematics identity, including identity development among female adolescents, identity and motivation, and sociocultural theories of mathematics learning. Next, research on African-American identity and mathematics learning, theories of racial identity development and tools used to assess racial identity, the development of Black female identity, African-American students' academic identity, and learning styles and social interactions among African-American students in learning contexts is presented.

Finally, research on African-American students' mathematics identity is presented. The chapter concludes with a summary of the research literature germane to this dissertation study.

### 2.2 Epistemology


#### Abstract

"I could have chosen to write...in the dominant scholarly tradition - statement of the problem, review of the literature, methodology, data collection, analysis, and implications for further research. Indeed, this is what I was trained to do. But that tradition rejects my necessary subjectivity. Thus I chose to integrate my "scholarly" tools with knowledge of my culture and my personal experiences."

From The Dreamkeepers: Successful Teachers of African-American Children


Ladson-Billings (1995)
"The same situation can look quite different depending on the consciousness one brings to interpret it."

## From Black Feminist Thought: Knowledge, Consciousness, and the Politics of

 Empowerment Collins (1990)The two quotes presented above reflect this researcher's approach to investigating possible relationships between the racial identity and mathematics identity of two African-American girls. The research design and interpretations herein are based upon what the researcher knows - from personal experience - about the girls' experiences both in and out of the mathematics classroom. Simply defined, epistemology is the study of knowledge; from the Greek word epistanai which means to understand. More specifically, it is "the study or a theory of the nature and grounds of knowledge especially
with reference to its limits and validity" (www.merriamwebster.com/dictionary/epistemology). The theoretical framework guiding this study's inquiry, knowledge production, and claims is presented below.

## Black Feminist Thought

In Black Feminist Thought (1991) Patricia Hill Collins defined Black feminism to include "women who theorize the experiences and ideas shared by ordinary black women that provide a unique angle of vision on self, community, and society". I draw on Black feminist thought to describe two focus Black girls' affective, mathematical and social interactions pertaining to identity, and to interpret their school mathematics experiences and make inferences about their co-constructed development of racial identity and mathematics identity during middle school and early high school. The five Black girls who participated in this dissertation study are not merely subjects of the focus, but are connected to me through race, gender, and the local and national cultural community.

Collins (1991) described four dimensions of Afrocentric feminist epistemology which provide an overarching perspective of this study. The first of these dimensions is concreteness. Black feminist thought "encompasses theoretical interpretations of Black women's reality by those who live it" (p. 209). Collins argued the weight of concreteness in social science and education inquiry, research and methodology utilized by Black women scholars in stating "for most African-American women those who have lived through the experience about which they claim to be experts are more believable and credible than those who have merely read or thought about such experiences" (p. 209). African-American women in the United Stated share the common experience of being

Black and female, and although individual contexts and experiences differ greatly there are shared understandings of the daily experiences of Black women in America. Such examples include noticing that there are no other Black people in the store/class or on the bus, hearing major news reports focused on missing White children and women, recognizing absence of television commercials that advertise products for women of color, and wondering why so few talk show hosts are Black women given the Oprah Winfrey phenonemon It is these kinds of first-hand experiences that separate knowledge (reading or thinking about) from wisdom (living it) (p. 209), and which shape my epistemological stance and voice in this particular study.

As one example of this dimension of Black feminism, sociologist Joyce Ladner used concrete insight as a Black woman to inform her study of Black female adolescent's self-perceptions (1971). Especially interested in the role models, aspirations and resources available for inner-city girls to achieve personal or academic goals, Ladner interviewed, observed, and socialized with over one hundred girls during four years, concluding that "the total misrepresentation of the Black community and the various myths which surround it can be seen in microcosm in the Black female adolescent." Her study emphasized the importance of personal experience and concreteness on both inquiry and research methods. Despite the subjectivity of her research, Ladner successfully used "preconceived academic ideas and labels and... her own past as a Black child" (Collins 1991) to offer a unique perspective, understanding, and representation of the inner-city Black girls with whom she interacted with.

The second dimension of Black feminist thought is connectedness and the use of dialogue which has roots in traditional African worldview. Bell (1993) posited that "worldview" is conceptualized to incorporate distinct categories of racial/cultural group's realities that convey "a particular group's structuring of reality (cosmology)". Worldview includes a racial/cultural group's beliefs (ethos), values (axiology), assumptions about life, nature and the universe, and epistemology (King \& Dixon 1976). Molefi Asante (1987) described African worldview as holistic and seeking harmony with words, dialogue, interactions and connections - an important part of belonging to an AfricanAmerican cultural community. African worldview and cultural consciousness differ from European and European American worldviews that dominate American society and institutions, including law and education (Bell 1993).

Connectedness is a critical dimension of Black and Afrocentric feminist epistemology that emphasizes dialogue, and stresses "connectedness rather than separation" as an essential component of producing and validating knowledge (Collins 1991, p. 215). An excerpt from Black Feminist Thought: Knowledge, Consciousness and the Politics of Empowerment described how Collins (1991) used connectedness:
"For example, I often use the pronoun "our" instead of "their" when referring to African-American women, a choice that embeds me in the group I am studying instead of distancing me from it. In addition, I occasionally place my own concrete experiences in the text. To support my analysis, I cite few statistics and instead rely on the voices of Black women from all walks of life."

The third and fourth dimensions of Black feminist epistemology refer to ethical principles that guide the production of knowledge and of making claims based on that
knowledge. The dimension of caring emphasizes individual uniqueness and expressiveness, emotion and feeling in dialogue, and the capacity for empathy. And accountability makes the role of personal position and responsibility essential for those making knowledge claims and those who argue the validity of those claims. Collins argued that the ethics of caring "pervade" African-American culture, and an individual's moral and ethical connections to their knowledge claims lends credibility to those claims (p. 218).

Conflicts between mainstream social science research and Black feminist epistemology in research have been acknowledged. In an important work on Black women's history by Elsa Barkley Brown titled How My Mother Taught Me To Be A Historian In Spite Of My Academic Training (Brown 1991), Brown drew upon her own mother's knowledge and ideas about African-American washerwomen. In doing so she conveyed the significance and value of using concrete and lived everyday experiences to inform theoretical work noting, "It was my mother who taught me how to ask the right questions-and all of us who try to do this thing called scholarship on a regular basis are fully aware that asking the right questions is the most important part of the process" (p. 74).

The ethics of Black feminist epistemology described above guided this research inquiry's approach and methodology which is described in Chapter 3.

## Critical Race Theory (CRT) in Education

There is a history of racial prejudice and discrimination in the American educational system making issues of race an inherent and relevant lens for research on Black students' experiences in public schools and classrooms in America (LadsonBillings and Tate 1995). Martin (2006a) stated, "In my view, disregarding race in discussions of education in America would be dishonest and sloppy science". In this researcher's opinion, there is no other meaningful way to research or understand Black students' experiences with American education in public, private, secular or religious school settings. In Critical Race Theory in Education: All God's Children Got a Song, Dixson and Rousseau (2006) collected works by critical race theorists that reflect and address various themes and issues of educational equity, cultural capital, culturally relevant pedagogy and multicultural education, as well as qualitative methodological approaches including epistemology, ethnography, storytelling, and narrative and counter narrative, and case study.

Critical race theory (CRT) in education research began to emerge when LadsonBillings and Tate (1995) argued that race was undertheorized in education policy, teaching and learning practice, and assessment of performance and achievement. Toward a Critical Race Theory in Education (1995) was a call to advance the field of education research and to understand the relevance of CRT themes in order to effect changes in education policy, to enhance and develop multicultural classroom practices, and to increase performance and achievement outcomes for non-White students. Broadly, CRT
takes into account the inherent pervasiveness of race and racism in the daily experiences of people of color. Six themes are reflected in CRT:

1) racism is pervasive and permanent in American society,
2) claims of objectivity, neutrality, colorblindness, and merit are to be challenged,
3) ahistoricism is to be challenged with contextual/historical analyses,
4) experiential knowledge of people of color is to be credited and valued,
5) issues from many [interdisciplinary] areas can be addressed, and
6) ending racial oppression is a significant part of ending all forms of oppression.

CRT in education positions race prominently in all aspects of classroom and school research, practice, and policy making. The central tenets of CRT in education (Dixson \& Rousseau, 2006) are:

1) the ingrained nature of race and racism in the institution of American public education,
2) the importance of narrative, counternarrative, and the naming of non-White's realities in education experiences, and
3) the centrality of benefits to White students in education policies and practices ("interest convergence").

Milner argued that CRT in educational research emphasizes and values "knowledge construction, naming one's own reality, and the multiple and varied voices and vantage points of people of color" (2007). The tenets of CRT in education are evident
in this dissertation which used the girls' own voices to construct knowledge about their experiences, to name their perceptions as reality, and to understand their similar and contrasting points of view.

### 2.3 Affect, Culture and Mathematics Learning

The complexity of classroom teaching and learning makes it difficult, at best, to explain the differences in students' abilities to demonstrate knowledge on highs stakes tests. Past studies have shown that positive mood is beneficial to both learning and performance (e.g. Bryan and Bryan 1991), and in recent decades there has been growing interest in the roles and relationships of affect and motivation, group interaction, meaningful and conceptually challenging tasks, and classroom environment and emotional safety on students' mathematics participation, identity, and learning. There are also research findings confirming the critical importance of attention to affective issues for children in urban schools with large numbers of lower socio-economic status (SES) and minority students (e.g. Anderson 1999). Much of the analyses in this researcher's study were informed by works focused on understanding the role of affect on mathematics classroom behavior, learning and identity.

## Affect and Mathematics Learning

Several decades ago the mathematics education research community began to look at affect and mathematical problem solving which led to further exploration of the relationship between affective factors and cognitive processes. Theories of affect for mathematical problem solving included a three-part view of the affective domain: beliefs, attitudes, and emotions and were published in a book edited by McLeod and Adams
(1989). McLeod (1989) described "feelings of moderate intensity and reasonable stability" as "affective responses that involve positive or negative feelings of moderate intensity and reasonable stability" (pp. 249). Affect also includes emotions which are described as affective responses involving unstable feelings (both positive and negative), and beliefs primarily cognitive having been "built up rather slowly over a relatively long period of time" (pp. 246).

In African Philosophy: Assumptions and Paradigms for Research on Black Persons, King and Dixon (1976) described affect in terms of how African-American students experience "phenomena holistically" (p. 20). According to Ma and Cartwright (2003), student affect is a critical determinant in school motivation and performance. At that time they claimed that there was a lack of longitudinal perspective to describe mathematics affect over time. Their study focused on gender differences as they followed students from middle school to high school and investigated their school and out-ofschool environmental influences on mathematical affect development and rates of affective change over time. In each school year from $7^{\text {th }}$ grade to $12^{\text {th }}$ grade, a total of 3,116 students (including 1,490 girls) were surveyed in 52 public middle and high schools that participated in the Longitudinal Study of American Youth. Three factors were identified from 10 survey items measuring mathematics affect: attitude toward mathematics, anxiety toward mathematics, and utility of mathematics. Ma and Cartwright concluded that environments in schools and classrooms had a significant influence on both boys' and girls' affect, with girls' affect more often being negatively impacted by school environments (2003).

Powerful mathematical affect (McLeod, 1992, 1994; Goldin 2000, 2007) refers to the dynamic and changeable emotions and feelings that surround the learning of mathematics, and the "doing" of mathematics. Curiosity or disinterest, satisfaction or frustration, pride or disappointment, and other feelings both positive and negative can and do occur during mathematical activity (McLeod 1992, 1994; Goldin 2000). The variety of changing emotional feelings, as well as more stable attitudes towards and enduring beliefs about mathematics (e.g. liking or disliking mathematics, what mathematics is, what mathematics is good for), and about one's self in relation to mathematics (e.g. one's ability to do mathematics, the value of mathematics in one's life) is reflective of the complex and interrelated contexts in which mathematics identity takes form and develops.

## Culture and Mathematics Learning

For decades there has been literature describing African cultural influence on the social/affective characteristics of African-American children in learning situations (e.g. Hale 1986; Fordham 1993; Willis 1998). There are also seminal works describing schools in large urban districts attended by poor non-White students (e.g. Kozol 1991), and culturally relevant teaching and learning in urban schools (e.g. Delpit 1995; LadsonBillings 1995). Research on culture and learning in urban classrooms, and mathematics in urban classrooms are described below.

## Urban Mathematics Classrooms

Studies of sociocultural influences on the school experiences of AfricanAmerican and inner-city, low- income and minority students are important contributions
to education research. African-American's developmental experiences in mainstream culture are shaped by the "double consciousness" or "two-ness" of being both Black (minority) and American (mainstream) (Dubois 1903). Boykin and Ellison (1995) further argued that African-Americans had to develop a "triple consciousness" to integrate three cultures - minority, mainstream, and Afroculture which is linked to the "culture ethos of traditional Africa" and unique for African-Americans (pp. 99).

In Code of the Street Anderson (1999) described his ethnographic research to study sociocultural influences and central issues of everyday life in Philadelphia that were played out among African-American students in inner-city classrooms. For Black children living in poor neighborhoods, Anderson found that out-of-school issues of violence, respect, and the informal rules of behavior - codes of the street - were significant factors that influenced school engagement and performance. His research of inner-city African-American adolescents' development of oppositional street culture and the impact on school engagement and success, contrasted with children in multi-racial, middle and upper-middle class Philadelphia communities. Anderson's study focused primarily on boys, and only discussed girls' roles in relation to the boys' lives. Ongoing research to investigate and understand engagement and interaction in urban mathematics classrooms (Goldin et al 2007) continues to emerge informed by Anderson's ethnographic research of inner-city Black youth (1990, 1999).

Another ethnographic study by Dance (2002) shed light on the school experiences of adolescent inner-city, low-income boys in Boston. In Tough Fronts: The Impact of Street Culture on Schooling, Dance (2002) used the voices of individual students to describe their beliefs about school learning and the value of school learning. These
beliefs were influenced by cultural practices in the communities in which the students lived and significantly impacted the ways in which their classroom behaviors reflected out-of-school "street" culture. Black boys in the study also believed that many teachers had low expectations of their ability. As Lubienski (2007) and Martin (2003) have suggested, teachers' beliefs and expectations significantly influence and effect students' experiences in mathematics classrooms, and students' academic self-concept, as well as classroom behavior.

### 2.4 Mathematics Identity

Debates in the social sciences to conceptualize self and identity development in education continue. In this section prevailing theories of identity development, academic identity and motivation, and sociocultural theories of mathematics learning pertinent to the goals of this study are presented.

## Identity

"We are who we thought we were"
Arizona Cardinals fan banner during the 2009 NFC championship playoff game.
The Arizona Cardinals won the game.
Identity is a complex construct, influenced by many aspects of an individual's or group's reality. This qualitative dissertation study into the mathematics and racial identities of Black girls takes into account several aspects of identity development. Theories of adolescent female and racial identity development, as well as definitions of mathematics competency, mathematics disposition and mathematics identity inform this study and are presented in the following sections.

Identity has been conceptualized in the fields of psychology, social psychology, anthropology, and sociology. Stryker (1968) claimed that an individual's self is comprised of multiple, internalized identities which differ in significance, exists in a hierarchy of importance, and is closely interrelated with social roles and behavior. Concepts of self and identity are complex, and there are numerous contextual variables that influence one's views of who they are. Adolescents learn who they are and who they can become as a result of interactions with others in social contexts and from media (Oyserman and Destin 2010).

Sfard and Prusak (2005) asserted that identity development is a relational and dynamic process. In a research report titled Telling Identities: In Search of an Analytical Tool for Investigating Learning as a Culturally Shaped Activity, they theorized identity as a process rather than a fixed state of being, and proposed equating identities with "stories about persons" (p. 14). This theory of identity is positioned within a broad sociocultural tradition, drawing from sociology, cultural theory, and education. Furthermore, Sfard and Prusak proposed narrative as a "missing link" to understanding learning in sociocultural contexts (p. 15).

Sfard and Prusak made a distinction between an individual's "actual" and "designated" identity. Actual identities are those illuminated in "stories about the actual state of affairs" (p. 18). Designated identities convey what an individual expects (or considers possible) for themselves, at the present time or in the future. For example, one's actual identity may be revealed in the statements one might use in response to the questions "who are you?" and "who do you see yourself to be?" Designated identities can
be revealed in responses to the questions "who or what will you be?" and "what could you become?"

Further, Sfard and Prusak argued that both actual and designated identities are reflected in the stories an individual tells about themselves. Statements such as "I am happy that I am Black", "I am good at math", "I want to be good at math", and "I'm going to work with animals [be a veterinarian]" were of particular interest to this researcher to gain some insight into the actual and designated identities of the Black girls in this study. In addition, Sfard and Prusak also called for "narrative-minded researchers" to shed light on learning as cultural activity (p. 21). In this study, statements that reveal or infer actual and designated identities, and inform descriptions of school mathematics experiences related to both racial identity and mathematics identity were used to develop illustrative narratives that infer the focus student's racial and mathematics identities.

## Female Adolescent Identity

There is increasing discourse on identity in education, as well as the relationships between identity, race, and learning mathematics. Over 5000 articles on the topic of self have been published since 1987 (Banaji \& Prentice 1994). Much of this research is focused on the role of "self" in social behavior, and issues regarding social strategies that individuals use to pursue goals of self-enhancement, self-knowledge, and selfimprovement. In their review of the major psychology and sociology journals (e.g. Journal of Personality and Social Psychology, Journal of Personality, Journal of Social Psychology), Banaji and Prentice found that many recent inquiries had focused on social
and cultural norms that shape social behavior, and self-identities that influence learning behaviors among adolescents (1994).

The American Academy of Child and Adolescent Psychiatry (AACAP 2009) defined adolescence as the years beginning at age 13, and ending when a child reaches 18, the age of legal adulthood in American society. Generally the years before adulthood progress through teenage stages of early, middle and late adolescence leading up to adulthood. Middle or junior high school years, typically spanning grades six through eight or nine, are a time when adolescents develop physically and emotionally, and experience significant influences from peer groups. School teachers, parents, and this researcher attest to the challenges, issues, difficulties faced by adolescents, both in and out of school settings. Although each child is unique, adolescence is characterized as the time when pre-teens and teenagers experience self-consciousness, insecurity, confusion, changes in self-image, and development of identity. To complicate adolescence even more, television and advances in technology, especially cable network programming and the accessibility and use of cell phones, Internet, and social networks, has become an important part of $21^{\text {st }}$ century living that influences the way adolescents perceive and identify themselves, and create narratives about their lives.

According to AACAP (2009), during early stages of adolescence, ages 13 to 15, children typically begin to seek independence from parents, develop closer relationships with friends or peers, and grapple with sexuality, changing bodies and feelings, gendered roles and identity development. It is a time of physical, emotional, and social change that significantly impacts intellectual and social development, as well as self-esteem and
identity development, particularly for girls. The impact of these changes can have both positive and negative influences on academic achievement and social development.

McGraw, Lubienski and Strutchens (2006) have argued that girls' attitudes and self-concept related to mathematics (and science) are more negative than boys. Their quantitative study of mathematics achievement and attitudes based on NAEP data reported from 1990 and 2003 (mathematics scores and student responses to attitude items), showed small differences in boy's and girls' achievement scores but great differences in how boys and girls perceived school mathematics and mathematics-related careers. These gender differences reflect traditional sex-role stereotypes - in and out of school - as well as perceptions of academic ability (Meece and Scantlebury 2006) and girls' pursuit of STEM careers, and will continue unless interventions are identified and implemented (McGraw, Lubienski and Strutchens 2006).

There are theoretical literatures and empirical research studies that have documented or explored the development and "coming-of-age" amongst adolescent girls in general. For example, psychologist Emily Hancock used the life stories of 20 women who identified and described their adolescent experience (between the ages of 8 and 10) as a time of independence, self-reliance and resourcefulness during which time they displayed the capacity to multitask and organize everyday and extra-curricular activities, and to be imaginative and aspiring. In The Girl Within (1989) Hancock reported that these attributes diminished during the process of the women's adolescent development and concluded that "at the core of women's identity is a distinct and vital self, first
articulated in childhood, a root identity that gets cut off in the process of growing up female" (p. 3).

The Harvard Project on Women's Psychology and Girls' Development was a longitudinal study exploring the experiences of 315 adolescent girls at two prestigious private girls' schools (Brown and Gilligan 1992). The researchers conducted observations and interviews from 1986 to 1990 and found that girls in the study began to express their feelings and opinions less and less by late adolescence. Results of the study were published in a book titled Meeting at the Crossroads: Women's Psychology and Girls' Development (1992). The sample was drawn from primarily White girls who attended the elite private schools and can not be used to generalize all girls' experiences.

While there are universal characteristics of female adolescence there is a growing and significant body of literature aimed at understanding the multicultural perspectives of Black, African-American, and other historically marginalized groups of girls and women in the United States. Therefore, this researcher turns to literature focused on the unique issues and challenges affecting identity development and academic motivation amongst Black and African-American female adolescents.

## Identity and Motivation

Motivation to learn in school is a complex topic because motivation differs between individuals, and its manifestation can differ greatly in and among individuals according to classroom contexts and content areas. Identity development, learning, and motivation are interconnected, and students' motivation to engage in school mathematics has been problematic for many years (Dweck 1986). NCTM (1989) articulated two
important goals for children's school mathematics learning - learning to value mathematics and becoming confident in one's own ability - in an effort to address the national trend of declining numbers of students who enjoy or want to take mathematics classes through the end of high school (Dossey, Mullis, Lindquist and Chambers 1988). This reflects the increasingly important need to understand how the value of school mathematics learning is related to one's confidence, identity development, pursuit, success, and thus motivation to engage with mathematics in school and beyond.

Identity is important to academic motivation and engagement. Dweck's theories of academic motivation (1986) focus on cognitive explanations for why learners value achievement. What is valued as achievement, and how it is valued (i.e. intrinsic rewards vs. extrinsic rewards) can influence students' engagement in classroom and school activities (1986) and contributes to positive academic identity. Students' beliefs about themselves, "for girls in particular" (Middleton and Spanias 1999, pp. 70) have a great impact on the development of mathematics identity. Roeser, Peck and Nasir (2006) asserted that positive self and racial identities are connected to increased motivation and higher performance and achievement outcomes among African-American students.

## Sociocultural Theories of Learning Mathematics

Classrooms are complex social systems in which participants assume roles and display various behavioral attributes (Fennema and Peterson 1984). Cobb, Gresalfi and Hodge (2009) argued that mathematics classroom competence is negotiated through interactions between students and teacher. One research investigation focused on competence (e.g. engagement with mathematics) among students in two middle school
mathematics classrooms using The Algebra Project Transition Curriculum. Briefly, The Algebra Project is designed to engage African-American students in mathematics learning through a "five-step curricular process": engaging in a shared subway or bus "trip"; modeling the "trip"; using informal and intuitive language to describe the "trip"; shifting to formal and mathematical language; and finally creating symbolic, mathematical representations of the "trip".

Gresalfi, Martin, Hand and Greeno (2008) collected classroom videotapes from one $6^{\text {th }}$ grade, one $7^{\text {th }}$ grade and one $8^{\text {th }}$ grade classroom, each using The Algebra Project, from January through May of the 2001-2002 school year, with one camera focusing on students as they worked in groups. The researchers offered evidence of "negotiated" competencies that are supported by group work and the nature of the activities. Competencies, such as observing, recording, explaining, and making sense of one's own and other's work, were expected as students shared a physical experience and collected data that was used to move from concrete to symbolic to abstract mathematical representation (Moses \& Cobb 1999). The research also focused on teacher interactions and tasks however, Gresalfi et al reported observed evidence of the distribution of agency and accountability among students through "negotiated" competencies.

Cobb, Gresalfi and Hodge (2009) documented and analyzed negotiated normative identities by examining urban middle school students' patterns of interactions in the classroom, how students listened, took notes, asked questions for clarification, and demonstrated understanding to the teacher, and how reasoning and disagreements were explained and justified. They described normative identity and personal identity
constructs to clarify and analyze the classroom participation of eleven $8^{\text {th }}$ grade students in an urban middle school. Seven students in the study were African-American, 3 students were White, and 1 student was Asian-American from the school's approximately $40 \%$ African-American and $60 \%$ White student population. The research was reported as An Interpretive Scheme for Analyzing the Identities That Students Develop in Mathematics Classrooms (2009) and documented forms of mathematical agency, authority, and accountability, noting that students' understanding of "general classroom obligations, their valuations or appraisals of these obligations, and the grounds for their valuations" were an important part of the analyses of empirical evidence. (p. 47). Interviews were conducted by a female researcher as part of the study's narrative approach to identity (Sfard 2002). This was done to encourage rich responses from students by providing a communicational context. The interviewer also examined evidence of personal identity during video-taped interviews to gain insight into students' interpretations of classroom activities and obligations - to themselves, each other, and the classroom community - and assessments of their own and other students' mathematical competence (Cobb, Gresalfi and Hodge 2009).

Anderson (2007) conducted a study of middle to late adolescent boys and girls in a rural $9^{\text {th }}-12^{\text {th }}$ grade high school. Drawing from earlier social theories of learning (Wenger 1998; Gee 2001), Anderson examined four aspects of mathematics learner identity. In Being a Mathematics Learner: Four Faces of Identity, Anderson described the four perspectives of identity - students' engagement in mathematics classrooms, students' imagination of how mathematics fits into life experience, students' alignment with institutional boundaries and requirements, and the nature and nurture of students'
perception of their own characteristics as mathematical learners (2007). In addition, Anderson stated that mathematical concepts and skills were necessary for mathematical activity but that learners developed a mathematics learner identity as a member of the classroom community. The study used semi-structured individual interviews with 14 students in two groups - those enrolled in precalculus or calculus, and those not enrolled in a mathematics course during $11^{\text {th }}$ and $12^{\text {th }}$ grades. Using the voices of students, the study reported both positive and negative perceptions about doing mathematics in the classroom with further analyses that described the influence of the mathematical tasks and classroom structure on their behavior and perceptions of mathematical identity (Anderson 2007).

School mathematics identities are developed through classroom interactions and activities, and students and teachers bring beliefs about themselves, about mathematics and doing mathematics, and about the role of mathematics in their lives into school and into mathematics classrooms. Informed by a year-long ethnographic and observational research study of adult African-American mathematics students' successes and failures in a northern California community, including interviews with their parents and teachers, Martin (2006a) asserted that mathematics identities are always "under construction", and occur in "highly racialized (and gendered) spaces." Martin defined mathematical identity as shaped by students' perception of 1) their ability to perform in mathematical contexts; 2) the instrumental importance of mathematics; 3) the constraints and opportunities in mathematical contexts; and 4) the resulting motivations and strategies used to obtain mathematical knowledge (2006b). This dissertation study sought, in part, to define the
focus girls' mathematics identity and to illuminate their perceptions of and relationships between their own racial identity and mathematics identity.

In 2000, the National Council of Teachers of Mathematics (NCTM) published Standards for School Mathematics, and included guidelines and goals for classroom mathematics teaching and learning in order to clarify expectations for students' understanding, knowledge, and skills. In addition, NCTM articulated six Principles for School Mathematics (2000). One principle is Equity which states that "excellence in mathematics education requires equity - high expectations and strong support for all students." An overarching theme in Principles and Standards for School Mathematics (2000) states that "educational equity is a core element". Furthermore, NCTM's vision intended to guide educators in "continual improvement of mathematics education in classrooms, schools, and educational systems" (2000). While it seems impossible that anyone could argue against high expectations for all students, NCTM's Equity Principle reflects mainstream efforts to improve student outcomes in mathematics that do not take into account the role of race (and racism) and culture in classroom and school practices, and policy-making decisions and practices, such as testing.

Mathematics teaching and learning in urban schools often tends to focus on the learning of facts (e.g. times tables) and procedures (e.g. algorithms or formulas) as a strategy to improve test scores (Tate 2001). Given the large numbers of minority students attending urban schools, important research continues to examine the roles of affect and culture to understand Black children's academic identity, and their behavior and interaction in learning situations. These research studies have been reported in journals of
psychology, education, sociology, and other disciplines. Research focused on AfricanAmerican students' mathematics learning and identity and germane to this dissertation research is presented in the next sections.

### 2.5 African-American Identity and Mathematics Learning

Um, my name is [Pamela]... interesting facts about me - ummmm... except that I am a really good math student Pamela, Protocol 1 Interview

Racial identity and academic identity, behavior and achievement among Black and African-American students continue to be contemporary issues in urban education. African-American girls from low-income communities face compounding factors, and continue to be underrepresented in mathematics- and science-related careers (NSF 2003). As she spoke with students in a Washington, D.C. public school, First Lady Michelle Obama acknowledged that she had struggled with racial identity and language during her years as a Chicago public school student but had persevered in achieving good grades: in response to a student who asked "how did you get to where you are now" Mrs. Obama said that she had focused on "getting my A" even though her peers had often said that she sounded "like a White girl" (Wright, 2009 व 10).

## Black and African-American Identity Development

African-American children have played an important role in research to understand the relationship between racial group identity and psychological well-being (Sellers, Morgan and Brown 2001). Results from studies aimed at bridging research on the challenges facing African-Americans students in general and the special challenges
facing Black and other minority female adolescents in middle and high school suggest the importance of understanding racial and academic identity to improve African-American girls' learning and participation in school mathematics, and their access to STEM careers.

## Dimensions of Racial Identity

The United States Bureau of the Census (2000) defines an African-American as someone with origins in "any of the Black racial groups of Africa", a White/Caucasian with origins in "any of the original people of Europe, North Africa, or the Middle East", and an Hispanic as a "person of Mexican, Puerto Rican, Cuban, Central or South America or other Spanish culture or origin regardless of race" (US Bureau of the Census 2000). Racial identity is an important area of development for school-age children, particularly in middle school, where self-identities are being tested and challenged, and are central to notions of normativity, access, and power (Castagno 2008). Almost all recent studies that examine patterns and differences in school mathematics education, including access and opportunities to participate in school mathematics, confirm inherent and complex relationships to race (Ladson-Billings and Tate 1995). The role and impact of race and racial identity on academic opportunities is critical for understanding Black children's school experiences.

Models of racial identity development for Blacks emerged and developed to understand the processes of racial identity development, and the Black experience in the United States (e.g. Cross 1971). According to Tajfel (1981), the construct of racial identity development is salient for many ethnic minorities due to the negative social values associated with race and skin color in American society. Cross's model of Black
identity (1971) posited that racial identity develops through four sequential stages of development influenced by social, environmental, and other circumstances. They are: 1) pre-encounter (or pre-identity), 2) encounter, 3) immersion and emersion, and 4) internalization. The model was developed further in response to new issues of multiracial identity, and changing racial perceptions and attitudes: miseducation was added to take into account the pervasiveness of African-American children's school experiences that ignore the role of Africa in the origin and history of Western civilization, and the preencounter stage was expanded to reflect race as a salient feature of Black identity (Cross 1995). Also, assimilation was added to refer to a developmental state when one's African-American identity is less salient than their identity as an American, as well as aspects of nationalist and biculturalism to reflect the growing multiculturalism of American experiences.

In 1998, building on the four stages described by Cross (1971), Sellers et al proposed the Multidimensional Model of Racial Identity (MMRI) as a conceptual framework to understand racial identity, drawing on the self-reported feelings and perceptions about race held by individuals. Using the personal experiences of this researcher for illustration, the underlying assumptions of the racial identity theory are:

1. racial identities are stable but influenced by situation or circumstance (e.g. when I'm in the United States, I'm Black but when I am in another country, I'm African-American)
2. situations or circumstances influence the place of race in hierarchically ordered, multi-identities (e.g. when I'm the only female in a room, my primary selfidentity is female; when everyone in the room is White or a White male, my primary identity is Black or Black female)
3. an individual's self-perceptions of their racial identity are valid indicators of their racial identity (e.g. I am Black because my parents and relatives are Black, and I was raised in an African-American community), and
4. the status of one's racial identity at a point in time reflects a location on a developmental continuum (e.g. a pre-encounter stage when I was always included with my White ballet classmates in extra activities, and then an encounter stage when I was the only one excluded from extra activities - an immersion in African-American-ness during which time I made deliberate efforts to wear African inspired clothes and hairstyles, and to distance myself from White friends, and emersion from African-American-ness and internalization when I became adept at code-switching depending upon whether I was with Black friends or White friends).

The MMRI outlines four dimensions of racial identity meant to explain what it means to be Black. Three dimensions, centrality, regard and ideology, describe one's definition of self with regard to racial identity, and in general remain stable once established. In contrast, there are salient and dynamic dimensions of racial identity that are subject to contextual influences. To operationalize the model and to measure the stable dimensions, Sellers, Rowley, Chavous, Shelton, and Smith (1997) developed the Multidimensional Inventory of Black Identity (MIBI), designed for use with adults. It has been used with youth age 12-17 (NICHD 2002) however a subsequent version was developed for use with younger children. Instruments used to assess African-American adolescent racial identity, including the MIBI-t, are discussed in detail below.

In 2006 Oyserman, Altschul and Bybee concluded that adolescent's racial identity effects school performance and achievement. Their findings from a qualitative study of 139 Black and Hispanic students in three low-income urban schools to examine
the effects of racial-ethnic identity on academic achievement were reported in the journal Child Development (2006). The researchers examined the effects of racial-ethnic identity on academic achievement during early adolescence by asking 98 African-American and 41 Hispanic boys and girls in interviews to describe their own racial-ethnic identity at four times during $8^{\text {th }}$ and $9^{\text {th }}$ grade.

Analysis of the study's data was reported as Racial-ethnic Identity in Midadolescence: Content and Change as Predictors of Academic Achievement and uncovered evidence that racial value, connection, and perception of one's racial group affected the students' grades, and supported claims that academic performance can be influenced by one's racial identity and perception of belonging to a stereotyped racial group (Steele 2004). The study focused on three components of racial-ethnic identity among early adolescence: feeling connected to their ethnic group, being aware of how others perceived their ethnic group, and perceiving academic achievement as characteristic of their ethnic group. Using a Likert-scale racial-ethnic identity (REI) questionnaire (see description in Black Identity Instruments below), analysis revealed that racial-ethnic identity among students in the study became more salient during the transition from middle school and high school. In addition, grades and school outcomes were better among students who had expressed a connection to their racial-ethnic group and who believed that academic achievement was characteristic of the racial group they identified with. Oyserman, Altschul and Bybee argued that improving perceptions of the academic achievement of one's racial-ethnic group, and supporting racial-ethnic identity development during adolescence can be important and successful interventions to increase African-American and Latino students' school success. Oyserman further
asserted that "Girls are doing better in school than boys overall, but racial-ethnic identity can be beneficial for both boys and girls."

This dissertation study did not seek to assess possible relationships between the focus girls' racial identity and academic achievement (i.e. grades and test scores). However, Oyserman, Altschul and Bybee's study did utilize a racial identity questionnaire (REI) to measure African-American and Latino adolescent students' racialethnic identity (2006). Other instruments developed and used to measure racial identity and the multidimensional inventory of Black identity for teens (MIBI-t) that was used in this study are described below.

## Black Identity Instruments

There have been a number of instruments developed and used to measure racial identity. A questionnaire to group phrases and descriptions of Blacks was developed by Hall, Freedle and Cross (1991) based on Cross's nigrescence model. Also based on Cross's model, Parham and Helms developed a 30 item Racial Identity Attitudes Scale (RIAS) to measure Black racial identity based on the premise that the development of racial identity is a lifetime process (Parham and Helms 1981). The Developmental Inventory of Black Consciousness (DIB-C) was a 40 item instrument created by Milliones (1980) to measure Black consciousness and used with African-American college students. There is also a 42 item instrument created by knowledgeable psychologists and designed to measure African Self Consciousness (ASC). Baldwin (1985) posited this theory to describe the structure and nature of Black personality and argued that African self consciousness reflects the worldview or life approach that is
embraced by Africans and is unique to people of African descent. This theory has been cited in psychology, sociology, political, and science research.

In 1992 Phinney developed a 14 item instrument to measure stages of ego identity development (Erikson 1968) and its operationalization (Marcia 1980). The Multi-group Ethnic Identity Measure (MEIM) is based on the premise that ethnic identity develops through adolescence and remains fairly consistent as part of one's self-concept. The National Survey of Black Americans (NSBA) was first conducted in 1979 by researchers at the University of Michigan. The original and the follow-up study in 1986 did not utilize existing conceptual models of racial identity but was designed to examine what racial identity meant to participants through focus groups. The Multidimensional Racial Identification Scale (MRIS) was a 31 item instrument developed by Sanders-Thompson (1991) to measure racial identity, refined from 31 items to 30 items in 1995.

The Multidimensional Inventory of Black Identity (MIBI) was developed in 1997 to measure the racial centrality, ideology and regard dimensions of the MMRI (described earlier in this chapter) among African-American adults and college students (Sellers, Rowley, Chavous, Shelton, \& Smith 1997). A developmentally appropriate survey was developed for use with adolescents and teens (MIBI-t) and students in $5^{\text {th }}$ grade (MIBI$5^{\text {th }}$ ) to assess three stable dimensions of multidimensional model of racial identity (Sellers et al. 1998).

The MIBI-t consists of seven subscales with three items in each subscale (see Chapter 3 Research Questions and Methodology, Table 3.5). Use of the MIBI-t with African-American middle school and high school students (289 girls and 200 boys)
confirmed evidence of both construct validity and external validity (Scottham, Sellers and Nguyen 2008), and was reported in A Measure of Racial Identity in African American Adolescents: The Development of the Multidimensional Inventory of Black Identity-Teen. A sample of four hundred eighty nine African-American adolescents, including 289 girls, participated in the study to determine whether adolescents understood and experienced racial identity in ways consistent with the MMRI dimensions, and to determine the appropriateness of the MIBI-t for use with adolescents.

## Black Female Identity

Black girls living in the United States experience American society at the intersection of race, gender, and class. Critical theorist bell hooks (1993) pointed out the lack of scholarly research on Black women's unique experiences within American society. Much of the research literature on African-American women's identity that was published throughout the 1980s and 1990s dealt with either gender identity or racial identity. In other words, few dealt with aspects of gender and race related specifically to Black female's double minority status in America.

African-American youth face issues that are both similar and different from those faced by other ethnic youth, as well as issues faced by White youth. According to Joyce West Stevens, Black females undergo significant psychosocial development during adolescence (1997). She claimed in African-American Female Adolescent Identity Development: A Three-dimensional Approach (1997) that developing a healthy social identity resulted from experiences that provide worth and value as an African-American, and as a female. Based on her work with girls in poor African-American communities,

Stevens, a social worker, described three critical dimensions of the identity development process and concluded that Black female adolescents develop coherent meanings from their socialization experiences, develop bicultural competence while sustaining their connection to immediate and extended family and community; and negotiate strategies of resistance for self-liberation to counteract both racial and gender devaluation.

Some research reports shed light on the school mathematics opportunities and experiences of African-American girls. One such study is entitled Sleeping Beauty Redefined: African-American Girls in Transition (Kusimo 1997). Kusimo's report on a three year NSF-funded project called Rural and Urban Images: Voices Of Girls in Science, Mathematics, And Technology, provided rich descriptions of Black female adolescent identity, such as self image, interests and activities, social interactions and skills, academic perceptions, and role models. These themes emerged from data that were collected during videotaped interviews conducted by female interviewers with 16 African-American girls in $6^{\text {th }}, 7^{\text {th }}$, and $8^{\text {th }}$ grades at the girls' schools. Eight girls attended and urban school and eight attended a rural school. Loosely structured and informal interviews provided information about the girls' self-concept, interests, and perceptions of academic ability and social support networks.

Overall, the girls conveyed positive self-concepts but half of the girls believed that boys were innately better at mathematics and science, and none of the girls described themselves or any other Black female as someone who is good in mathematics and science. Relevant to the context of this dissertation research, Kusimo did not focus on what might put these girls at academic or social disadvantage, but on giving "voice to the
girls' essence" that was reflected in their own narratives about their lives, selfperceptions, academic capabilities, hopes, and dreams (1997).

A more recent field study reported as a dissertation entitled Identity Formation within a Multicultural Context: A Field Study of Early Adolescent African-American Girls Set in an Inner-city Community in North Philadelphia (2005), investigated how 66 inner-city African-American girls, ages 11 to 13, perceived their sociocultural context and messages about identity and behavior, and the influence of a multicultural street culture on identity development. Goodman's qualitative study analyzed data collected from participatory observations, and individual and group interviews to describe a complex of moral and behavioral codes that center around giving and receiving respect, and maintaining self-respect. Goodman concluded that adherence to these codes had shaped the girls' perceptions of their place in the world around them (2005).

Analyses of gendered, socially constructed racism (Essed 1990, 1997) led Essed to theorize everyday racism and suggest an analytical process to illuminate the systemic nature of racism in the lives of women of color. She proposed identification of the characteristics of racialized, everyday situations ranging from encounters while shopping to interactions with mathematics teachers in classrooms. These five characteristics are:

1. Context: i.e. who, what, and where?
2. Complication: i.e. what happened?
3. Explanation: i.e. what makes you believe that the situation or encounter is racist and/or gender racist?
4. Argumentation: i.e. why can the situation or encounter be seen as racist and/or gender racist? and,
5. Reaction: what did you do?

Essed (1990) asserted that "in public discourse there is a tendency to obscure the pervasiveness of racism in the lives of people of color". This researcher agrees that race and racism continue to be avoided in discussions of educational equity and in education research. More specifically, this researcher agrees that racialized mathematics learning experiences negatively impact African-American students' development of mathematics identities, as both Ladson-Billings and Tate (1995) and Martin (2006b) have argued.

## African-American Students and Academic Identity

There are hypotheses about the relationship between African-American identity, behavior and school achievement. Some studies have led researchers to hypothesize that African-American students exhibit behaviors that reflect a belief that they cannot achieve success in school or that success in school is not compatible with being Black or AfricanAmerican. Fordham and Ogbu (1986) theorized that African-American students reject and resist behaviors that lead to school success, equating academic success with "acting White".

Fordham studied and described in-school behaviors and the academic success of both high- and low-achieving adolescent Black girls in a Washington, D.C. public high school. Data were collected during a 3 -year ethnographic study of 33 girls in $11^{\text {th }}$ grade. Reported in Those Loud Black Girls (1993) Fordham describes how low-achieving girls were defined by their assertive presence and challenges to school norms. In contrast, high-achievers defended against identification with "acting White" by becoming silent in school. Through observations, individual, and group interviews, Fordham revealed how
voice was used by girls in the study to reflect their identity as a member of the Black community, and to avoid being identified by peers as "acting White". The study provided insight into the girls' perceptions about academic identity but findings can not be generalized across all groups of Black and African-American girls in public schools.

The development of an academic identity is an important issue for understanding learning, achievement, and performance, particularly for African-American students (Perry, Steele and Hilliard 2003). Steele and Aronson (1995) argued that "stereotype threat" negatively impacts learners who are members of a domain specific minority group. Steele (1997) has defined and used the term to describe what an individual member of a group will experience in situations where they may be judged by negative stereotypes of the group. Many groups are negatively stereotyped in society but the impact that stereotype threat can have on minority student populations (e.g. girls and women, African-Americans) is especially relevant for educational research on Black students' academic identity and performance. Research by Steele and colleagues reported evidence of the fear of negative stereotypes or the fear of performing in a way that confirms a negative stereotype among White and Black, male and female students. Drawing on studies designed to examine the effect of both implicit and explicit gender and domain identification of test-takers, Steele argued the significant impact that stereotype threat phenomena can have on an individual's ability to perform on academic tasks and high-stakes tests such as the Graduate Record Examination (1997).

An ethnographic research study (Lim 2008) was conducted in an ethnically diverse school ( $70 \%$ White, $26 \%$ Black, and a small number of Hispanics) to explore
school mathematics experiences and the impact of sociocultural contexts on motivation and mathematical identity development. Data collected were participant observations in $6^{\text {th }}$ grade regular and advanced mathematics class, interviews with eight students (and the White, female 40 -something teacher who taught both classes), and school records and documents. A cross-case study of two African-American girls from the larger study, one in the regular class and one in the advanced class, was entitled The Road Not Taken: Two African-American Girls' Experiences with School Mathematics and reported in the journal Race Ethnicity and Education. Findings from the study revealed that the two girls had contrasting personalities and achievement levels. However, differences between the teacher's cultural classroom structure and instructional strategies, and the girls' cultural and social disposition (e.g. emphases in individual rather than cooperative work, restricted physical movement, and structured communication styles) seemed to inhibit access to mathematics learning and mathematics identity development. Lim argued that a future in mathematics endeavors and pursuit of higher level mathematical knowledge was limited for both girls.

A study conducted by Smalls, White, Chavous and Sellers (2007) explored African-American adolescent's associations of racial identity beliefs, behaviors and academic engagement outcomes. The 390 self-identified African-American students in $7^{\text {th }}$ to $10^{\text {th }}$ grades, drawn from a larger sample of students attending middle and high school in a large midwestern school district completed survey instruments to assess the extent to which they identified with an academic orientation in social and peers contexts. Most of the students were in $7^{\text {th }}$ or $8^{\text {th }}$ grade and about half of the students in the racially diverse school district (58\% White, $15 \%$ Black, $12 \%$ Asian, $4 \%$ Latino, and $11 \%$ other
racial/ethnic minority) were girls. The MIBI-t (Scottham, Sellers and Nguyen 2007) was used to assess students' racial identity attitudes and other survey items measured students' perceptions of academic identity with peers (e.g., "I feel I must act less intelligent than I am so other students will not make fun of me"). Analyses of all data collected indicated that racial and social identities, as well as personal experiences, influenced how African-American students responded to school experiences, engaged in school experiences, behaved in school environments.

Qualitative and ethnographic studies such as those described above serve to illuminate African-American students' school behaviors and their own perceptions of relationships between racial identity and academic performance and achievement. These and other studies provide important foundations for continued examination of the breadth and variety of school experiences of Black children in urban, suburban and rural communities across the United States. The research and findings in this dissertation study add to the growing body of literature describing Black children's school experiences and their beliefs about themselves and their academic identities.

## Learning Styles and Social Interaction Among African-American Children

There have been studies to identify and compare learning preferences and styles of non-White students. For example, separate investigations of the learning style preferences of Mexican-American (Dunn et al 1993), Chinese-American (Tseng 1993), and gifted African- and Mexican-Americans, and American-born Chinese students (Ewing 1993) uncovered patterns attributable to ethnic and cultural influence, and social
acculturation rather than genetic or cognitive deficiencies in comparison to White children.

## Learning Styles

There are many accepted definitions of learning style relevant to teaching and learning. In a journal focused on children's psychology, Polce (1987) characterized children's learning style as "cognitive behaviors and qualities indicating how learners perceive, conceptualize, and problem-solve, interact with and respond to learning environments." Bennett's definition of learning style builds on theories of cognition to include a learner's perceptions, interactions, and responses to learning environments based on a learner's cultural experiences. In a book entitled Comprehensive Multicultural Education: Theory and Practice Bennett defines learning style as:
"that consistent pattern of behavior and performance by which an individual approaches educational experiences. It is the composite of characteristic cognitive, affective, and physiological behaviors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment. It is formed in a deep structure of neural organization and personality which molds and is molded by human development and the cultural experiences of home, school, and society." (p. 94)

Gardner's research to theorize multiple intelligences (MI) is well-known (1983, 1999). Based on interviews and brain research on people from diverse backgrounds and professions, Gardner defined seven intelligences in Frames of Mind (1983), and then nine
in Intelligence Reframed (1999). Gardner proposed that individuals may use several intelligences for effective learning and argued that MI theory is importance for improving education. MI posits that each child has nine intelligences - verbal/linguistic and logical/mathematical, musical/rhythmic, visual/spatial, bodily/kinesthetic, interpersonal, intrapersonal, naturalist and existentialist. While traditional teaching practices focus on verbal/linguistic and logical/mathematical intelligence and continue to be valued (e.g. high-stakes testing and other assessment practices), MI theory recognizes differences in learning styles and the role that culture can play in determining one's preferences for learning.

Learning style, as defined by the National Task Force of Learning Style and Brain Behavior (cited in Bennett 1990) defines the construct as: that consistent pattern of behavior and performance by which an individual approaches educational experiences. In a journal focused on children's psychology, Polce (1987) characterized children's learning style as "cognitive behaviors and qualities indicating how learners perceive, conceptualize, and problem-solve, interact with and respond to learning environments." In a book entitled Comprehensive Multicultural Education: Theory and Practice Bennett (1990) defined learning style as "that consistent pattern of behavior and performance by which an individual approaches educational experiences. It is the composite of characteristic cognitive, affective, and physiological behaviors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment." (p. 94). And Howard Gardner is well-known for his research to theorize categories of multiple intelligences used by all learners (Gardner 1983, 1999) -
verbal/linguistic and logical/mathematical, musical/rhythmic, visual/spatial, bodily/kinesthetic, interpersonal, intrapersonal, naturalist and existentialist.

Theories of African-American learning styles and preferences take into account the impact of culture, ethnicity and heritage on learning differences and patterns of behaviors - not deficits - exhibited and utilized by Black and White children in American classrooms. Boykin (1983), Willis (1989), and Durodoyle and Hildreth (1995) described multidimensional characteristics of African-American learning styles amongst AfricanAmerican children which reflect an African worldview, including orientations towards people (social/affective), interdependence with people and the environment (harmonious), oral expression, creativity, style and verve (expressive creativity), and movement, rhythm and body language (nonverbal). Descriptions of learning behaviors and preferences in this study are based on, but not limited to, described patterns of African-American children's behaviors in learning situations.

The influence of African worldview on African-American culture has been described earlier, and for some time [this] worldview has called attention to Black children's school learning experiences. There have been studies of learning preferences indicating that many African-American children approach learning with emphases on social and affective interaction, holistic perspectives, and a sense of community harmony (Hale 1986). Other research indicates that African-American students tend to be expressive, creative, flexible and open-minded in their thinking, and adept at nonverbal communication (Willis 1992). These empirical and theorized concepts, especially relevant to this researcher's study, are discussed below.

Hale (1986) described learning behaviors and styles from observations of AfricanAmerican children in pre-school and elementary school settings in the book Black Children: Their Roots, Culture, and Learning Styles. Noting the failure of the American education system to be effective and successful for many Black children, Hale argued the significance of African cultural roots and heritage, and the role of play on children's cognition, behavior, and identity. With a goal of suggesting how to better connect African-American home and community culture with school culture, Hale used both observation and interviews with both "Afro-American and Euro-American" grandmothers to describe cultural values and practices to conceptualize patterns of behavior and learning styles among Black children.

Boykin (1986) observed, characterized, and described nine dimensions of social and affective characteristics that, he argues, are expressed by African-American children in school mathematics learning situations that relate to children's cognitive functioning. They are spirituality, harmony, movement, verve, communalism, expressive individualism, orality, social time perspective, and affect. The dimension of affect includes emotional expressiveness and sensitivity to emotional cues, and the integration of feelings with cognitive elements.

Cole and Boykin (2008) conducted two experimental studies that extended earlier work with African-American students to assess various learning conditions characterized by music, movement, and stories read aloud. In one experiment, data were collected from 48 African-American $4^{\text {th }}$ grade students ( 24 boys, 24 girls) in a moderate-sized city in southern California. In the second experiment, 128 students in $4^{\text {th }}$ and $6^{\text {th }}$ grades ( 62 boys,

66 girls) participated. The experiments were designed to assess the impact of music and movement on students' learning, specifically children's use of music, rhythm, and percussion in story recalling activities. Briefly, a story was read aloud, selected musical pieces were played, and students were allowed to move to the music or encouraged to move to the music. Students were randomly assigned to one of four learning conditions (p. 340), such as moderately paced music playing as students entered the classroom, and music turned on or off during the story. Then, students responded to questionnaire items on story recall, mood, and affect. There was a positive cognitive response evident in the $4^{\text {th }}$ grader's enhanced abilities to recall and retell stories in the experiment. Cole and Boykin (2008), and Boykin and Allen (1988) reported that the moods, verbal interactions, and social interactions of African-American children improved when music and movement were part of the learning situation.

By modifying Boykin's characteristics, Willis used (1989) four categories to describe learning styles and preferences observed among African-American children:

1. Social/Affective: people-oriented, emphasis on affective domain, social interaction is crucial, social learning is common.
2. Harmonious: interdependence and harmonic/communal aspects of people and environment are respected and encouraged; knowledge is sought for practical, utilitarian, and relevant purposes; holistic approaches to experiences; synthesis is sought.
3. Expressive creativity: creative, adaptive, variable, novel, stylistic, intuitive, simultaneous stimulation is preferred; verve; oral expression.
4. Nonverbal: nonverbal communication is important (intonation, body language, etc.), movement and rhythm components are vital.

There are important criticisms that can be made of characterizing ethnic or racial learning styles. For example, Cox and Ramirez (1981) caution against using learning styles and culture to generalize and stereotype children. "The concept of cognitive or learning styles is on easily oversimplified, misunderstood, or misinterpreted. Unfortunately, it has been used to stereotype minority students or to further label them rather than to identify individual differences that are educationally meaningful." (p. 61). And Boykin's and Willis' categorizations have been criticized as promoting stereotypes (Moody, 2001).

It is true that patterns of learning preferences and styles may be used to characterize and stereotype behaviors exhibited by specific groups of minority children. Labeling and stereotyping non-White children are not the intention of these descriptions. Boykin is explicit in noting differences of cultural influences and circumstances - not deficits - that impact learning styles and difficulties amongst Black and White children, and contends that the cultural context of learning is a critical mediator of children's achievement (1994).

African-American children's learning styles as described by Hale, Willis and Boykin were helpful to identify and describe videotaped classroom behaviors of the girls
in this study which draws upon research of learning preference and styles of AfricanAmerican children, as well as professional and personal experience.

## African-American Students and Mathematics Identity

There continues to be emerging literature on African-American student success that relies on students' own accounts and commentaries about school and mathematics experiences. For example, Martin's qualitative study of successful African-American students in northern California found that their identity as Black Americans had positive and significant impact on their academic identity overall, and on their decisions to achieve in mathematics in particular (2000).

Martin has argued and theorized the mathematics learning experiences of AfricanAmerican students as "racialized" (2006), taking into account historical, cultural, and community perspectives. Martin studied African-American students' racial and academic identity, as well as the values and perceptions of students' parents. Martin (2007) defined mathematics identity as one's beliefs about their ability to do mathematics, the significance that one places on mathematical knowledge, one's beliefs about their opportunities and barriers to mathematics learning and mathematics-related careers, and one's motivation and persistence to obtain mathematics knowledge. This definition was used in this study to identify and interpret the data collected, and informed this study's description of the mathematics identities of the focus girls.

Cobb, Gresalfi and Hodge's research (2009) which was cited earlier in this chapter is related to Martin's work (2003) examining the sociocultural, historical, community, and school contexts of mathematics experiences, and the significance of race
on students' participation, success, and persistence in mathematics. Results of the analyses of their data led to the conclusion that interrelated influences of socialization and identity formation on mathematics achievement were significant for AfricanAmerican students (Martin 2007). Mathematical contexts and beliefs about ability, and meanings are dynamic influences on classroom activity and achievement, and are crucial to the development of African-American learner's mathematics identity. Martin (2007) asserted that an individual's self-understandings, as well as how an individual is seen by others characterizes mathematics identity.

### 2.6 Summary

Mathematics classrooms are complex social systems in which students interact with the teacher to negotiate and develop competencies and mathematical identity and agency (e.g. Cobb, Gresalfi and Hodge 2009, Moses and Cobb 1999). In recent decades the mathematics education research community has examined the affective domain and its role in mathematics learning (e.g. McLeod and Adams 1989; Goldin 2002, Goldin, Epstein and Schorr 2007), identifying affective pathways and engagement structures relevant to mathematical learning. Ma and Cartwright asserted that student affect is a critical determinant in school motivation and performance, and that school and classroom environments often negatively impacted girls' affect (2003). This dissertation study adopts Martin's perspective (2007) to define mathematics identity as one's beliefs about their ability to do mathematics, the significance of mathematical knowledge in one's own life, one's opportunities and barriers to mathematics learning and to entering mathematics-related careers, and one's motivation and persistence to obtain mathematics knowledge.

Identity development, mathematics learning, and motivation are interconnected and problematic (Dweck 1986). Among girls in particular, attitudes and mathematics identity are often negative (e.g. Meece and Scantlebury 2006, McGraw, Lubienski and Strutchens 2006). There is a need to better understand Black girls' mathematics learning experiences (Moody 2001). Research projects and studies collect empirical, qualitative, and quantitative data about urban students' school experiences, opportunities, and performance, including Black girls, from classroom observations, test scores or other assessments. Black feminist thought (e.g. Collins 1991, Brown and Gilligan 1992) and critical race theory in education (Dixson and Rousseau 2006, Ladson-Billings and Tate 1995, Milner 2007) provide background for describing and interpreting the collected data, and for developing the case stories for two girls in this dissertation study.

There have been models of racial identity (e.g. Cross 1971, Baldwin 1985), and a number of instruments developed to assess and measure dimensions of racial identity (e.g. Parham and Helms 1981, Milliones 1980, Phinney 1992, Sanders-Thompson 1995). The construct and external validity of the MIBI-t (Sellers et al 1998) used in this dissertation research were reported in 2008 (Scottham, Sellers and Nguyen). AfricanAmericans' developmental experiences integrating "multiple consciousness" - minority, American mainstream, and African - are unique to Blacks in the United States (e.g. Dubois 1903, Boykin and Ellison 1995). The complexities of sociocultural influences on the school experiences of African-American, low-income and minority students have been described and reported in ethnographic research studies (e.g. Anderson 1999, Dance 2002). Studies that examine patterns and differences in access, opportunity, and participation in school mathematics have revealed complex and profound relationships to
race (e.g. Ladson-Billings and Tate 1995, Martin 2007). And Martin (2007) has examined the racialization of school mathematics experiences and the co-constructed development of mathematics identity and racial identity among African-American youth.

Theories of identity development and sociocultural theories of mathematics learning are pertinent to this study. Qualitative research studies provide specifics about the impact of social and cultural worlds on urban students' perceptions of and attitudes towards school and mathematics (e.g. Lewis and Lim 2008). Research on identity development - actual and designated (Sfard and Prusak 2005), female adolescence and learning (e.g. Hancock 1989, Banaji and Prentice 1994) were discussed to provide the general context for the development of girls' self- and academic identity. There are some features of Black girls' adolescence and identity development in common with White and other non-White girls. Aspects of everyday and school experiences, and gendered racism (Essed 1990) are unique and must be considered when describing or interpreting data about Black girls (Ladner 1971, hooks 1993, Stevens 1997). Rich descriptions of African-American girls' school mathematics experiences and opportunities, and themes related to Black girls’ identity (e.g. Kusimo 1997) have added to research literature focused on highlighting self-concept and perceptions of academic ability in the girls' own voice.

Some studies explore hypotheses about the relationship between racial identity, academic identity, and attitudes and behaviors among Black students in school and learning situations. Studies exploring the meanings of racial identity among urban African-American boys and girls reveal the complexities of students' perceptions about what it means to have a successful academic identity (e.g. Nasir, McLaughlin and Jones

2009, Wright 2011). In addition, studies to examine associations between AfricanAmerican adolescent's academic outcomes and their racial identity beliefs and behaviors (e.g. Smalls, White, Chavous and Sellers 2007) indicate that social identities and personal experiences influence how students engage in and respond to school experiences, and how they behave in school environments. Some researchers have hypothesized that some African-American students reject and resist behaviors that lead to school success believing that academic success is "acting White" (Fordham and Ogbu 1986). Fordham also found that some Black girls' assertive behavior and challenges to school norms reflect their identity as a member of the Black community to avoid being identified as "acting White" (1993).

Academic identity is an important issue for understanding performance and achievement outcomes for African-American students (Perry, Steele and Hilliard 2003). It is argued that "stereotype threat" negatively impacts learners who are members of a domain specific minority group (e.g. Black, female) (Steele and Aronson 1995).

Learning styles have been characterized as the cognitive behaviors, and the qualities of perceptions, conceptualizations, interactions and responses to learning environments (e.g. Polce 1987). In 1983 and 1999 Gardner theorized and argued the importance of recognizing multiple intelligences to improve the education of children in schools, and also recognized the role that culture plays in one's preferences for learning. African cultural influence on the social/affective characteristics of African-American children has been described in education and social science literature for decades, taking into account the impact of culture, ethnicity and heritage on the differences among Black and White students' behaviors in American classrooms (e.g. Hale 1986, Fordham 1993,

Boykin 1983, Willis 1998, Cole and Boykin 2008). Research on Black students' school behaviors and learning styles influenced how the data collected for this dissertation research was described and interpreted.

The development of Black students' racial identity and mathematics identity is complex. African-American boys and girls are confronted with multiple mainstream and African cultural influences that impact their self-identity and academic identity. The development of African-American girls' racial identity is further complicated by gender, and urban school environments can negatively impact Black girls' academic identity. The author of this dissertation study has sought to use the research literature described above as well as her own personal experience and knowledge, together with the voices and stories of five African-American girls in an urban school district, to uncover how two of these girls perceive themselves as Black girls who effectively learn and pursue mathematics, and how they believe they are perceived by others as Black girls who "do mathematics".

## CHAPTER 3 RESEARCH QUESTIONS \& METHODOLOGY

### 3.1 Research Questions

This qualitative study focused on the affective, social, and mathematical interactions related to identity of two Black girls in a seventh grade mathematics classroom, and the co-construction of racial identity and mathematics identity in middle and high school. Data from three additional African-American girls are included to set the context further, and to obtain additional perspective.

This study posed the following research questions:

1. What can be inferred, if anything, from $7^{\text {th }}$ grade and high school interview data about the development or co-construction of two African-American girls' mathematics identities and racial identities in a small urban school district? In particular, in what ways do they see themselves as effective mathematical learners, and how do they perceive their school experiences having contributed to this? How do they perceive themselves as Black girls, in their own eyes and in the eyes of others? Do they see any relationships between their developing mathematics identities and their racial identities? What light is shed on these questions by information gathered from peers with whom they interact?
2. What "critical events" identified in $7^{\text {th }}$ grade retrospective interview videotapes support these inferences? A "critical event" is an affective, social, and mathematical interaction pertaining to identity that occurred during $7^{\text {th }}$ grade.
3. What stable dimensions of the girls' racial and mathematical identities can be documented in data concerning their experiences since $7^{\text {th }}$ grade, particularly experiences during $8^{\text {th }}, 9^{\text {th }}$, and $10^{\text {th }}$ grades, described by the girls themselves?

### 3.2 Key Terms and Definitions

Described below are terms that are used interchangeably or need definition, and those used to identify and interpret observed behaviors and inferred emotions and feelings pertaining to both mathematical and racial identities.


#### Abstract

Affect Mathematical affect includes the emotions, attitudes, beliefs, and values (DeBellis and Goldin 2006) experienced during mathematical activity. Emotions can be unstable or fleeting and include positive feelings such as curiosity, excitement or pride, and negative or mixed feelings, such as fear, anger or frustration. Attitudes are more stable and may reflect one's way of thinking, perspective or viewpoint, and include one's preferred ways of behaving and most frequent emotions. Beliefs reflect what one holds to be true and are generally stable. Values refer to what one holds as fundamentally important or worthy. The word affect is used throughout this dissertation as a term to describe the stated, observed or inferred emotions, attitudes, beliefs and values of the girls in this study in connection with mathematics.


## Racial Identity and Terms

"In this country American means white. Everybody else has to hyphenate." Toni Morrison - in The Guardian (January 29, 1992)

African-American racial identity is defined as "that part of the person's selfconcept that is related to her/his membership within a race", and includes "the significance the individual places on race in defining him/herself and the individual's interpretations of what it means to be Black" (Sellers et al 1998). In 1988 Jesse Jackson
stated "To be called African-Americans has cultural integrity. It puts us in our proper historical context." (Martin 1991). The terms "Black" and "African-American" are often used interchangeably in the United States to describe American citizens from the African diaspora. Whether one prefers to be called Black or African-American - or has no preference - is determined by the meaning of the terms to the individual.

All of the girls who participated in this study identified themselves as Black as indicated on the required consent form to participate in this study. Furthermore, the girls and the researcher used Black and African-American interchangeably during interviews for this study. Therefore, the researcher has capitalized both terms and they are used interchangeably throughout this dissertation. ${ }^{1}$

## Interactions and "Critical Events"

1. Affective interaction: observed, expressed or inferred emotional state or change in emotional state during mathematics or social interaction (e.g. smiling and nodding, "I feel good", "I didn't want to be wrong")
2. Social interaction: observed verbal or non-verbal communication between students that is not primarily related to the mathematical problem, task or activity (e.g. asking to work with a friend, talking about out-of-school activities or socializing, dancing or moving rhythmically, multitasking) and possibly related to African-American children's learning styles (see below).

[^0]3. Mathematical interaction: observed or inferred behavior or communication that is centered on a classroom mathematical activity. Examples include evidence of:

- participating: observable verbal or non-verbal behavior indicating individual engagement (e.g. thinking out loud, using mental math or paper and pencil to perform calculations, or looking puzzled), engagement within a small group (e.g. listening to or showing and explaining something to another student in the group), or interacting during a whole class discussion (e.g. raising hand to ask a question or respond to a question posed by another student or the teacher)
- making mathematical representations: using numbers, words or pictures such as a number pattern or equation, diagram, chart, etc. to illustrate ideas, strategies or solutions
- using tools: selecting or using standard and non-standard tools and manipulatives to make a representation, calculation, or measurement Interactions may, of course, belong to more than one of these categories.

4. A "critical event" for this study is defined as an affective, social, and/or mathematical interaction pertaining to the identity of one of the two focus girls that was observed and coded in $7^{\text {th }}$ grade videotaped data.

## Learning Styles

Willis's multidimensional characteristics of the learning styles of AfricanAmerican children in learning situations (1989) are used in this study to identify (code)
and clarify descriptions of the girls' observed and inferred behaviors related to racial and mathematics identity. The nine dimensions described by Boykin in 1983-spirituality, harmony, movement, verve, affect, communalism, expressive individualism, orality and social time perspective - are integrated into four learning style characteristics:

1. social/affective: refers to people-oriented, social learning with an emphasis on the affective domain,
2. harmonious: refers to holistic approaches to learning situations and experiences, respect for the interdependence and harmonic/communal aspects of people with the environment, and knowledge for practical, utilitarian, and relevant purposes,
3. expressive creativity: refers to a preference for creative, adaptive, variable, novel, stylistic, intuitive, and simultaneous stimulation, verve (intense and energetic movement, and stylistic body language), and oral expression in learning situations, and
4. nonverbal: refers to intonation, facial expressions, body language and rhythmic movement, and other nonverbal communication.

## Mathematics Identity

The values that one holds for achievement contribute to positive academic identity (Dweck 1986). Girls' beliefs about themselves have a great impact on the development of mathematics identity (Middleton and Spanias 1999). Overall, mathematics identity encompasses an individual's self-understandings and others' perception of one's mathematics participation, ability, and performance in mathematics
contexts. This study adopts Martin's perspective (2007) to define mathematics identity as:

1. belief(s) about one's ability to do mathematics,
2. the significance of mathematical knowledge,
3. opportunities and barriers to mathematics learning and entering mathematics-related careers, and
4. the motivation and persistence to obtain mathematics knowledge.

### 3.3 Methodology

## Introduction

This report arose from an NSF funded project to examine mathematics teaching and learning in urban school districts, and incorporates additional data collected for the sole purpose of this dissertation. The first set of data were collected when the participants were in $7^{\text {th }}$ grade during the 2006-2007 school year, and the second set when they were in high school $\left(9^{\text {th }}, 10^{\text {th }}\right.$ or $11^{\text {th }}$ grade) from 2009 to 2011. This section describes the study's methodology and data collection, and is organized as follows. The context of this study and the original study from which it emerged is presented, and followed by a description of the participants. Next, the data used in this study are described. Lastly, a description of how the data were used and analyzed is presented.

## Context

During the 2006-2007 school year, MetroMath, The Center for Mathematics in America's Cities, an interdisciplinary collaboration of three, large universities Rutgers, University of Pennsylvania and City University of New York, conducted a large NSFfunded study in two public urban school districts - one large district and one small district in which this study was conducted. The research, focused on affect and social interaction,
drawing on perspectives that included urban studies and social psychology, mathematics and mathematics education, and cognitive science (Alston et al, 2007) to gain meaningful insight about how students developed confidence and initiative in mathematics. The classrooms in the two districts were selected because the teachers had been identified as those who 1) believed that students were capable of mastering conceptually challenging mathematics, and 2) strove to provide an emotionally safe classroom environment for thoughtful discussion and problem solving. An emotionally safe environment is one where mathematical inquiry (including mistakes, false starts, discovery, criticism of each others' ideas, and impasse) does not lead to experiences of fear, pain, humiliation, shame, or domination and submission, and where students' experiences include trust, confidence, dignity, and shared respect (with the teacher and with other students) in the doing of mathematics (Goldin, Epstein and Schorr, 2007).

The mathematics classroom selected in the smaller urban school district was a $7^{\text {th }}$ grade class located in the larger of the school district's two middle schools (grades 6-8). Students who lived in communities with large, and very large homes, as well as students who lived in the more densely populated downtown communities attended this middle school. The majority of the city's 48,000 residents represented ethnically and culturally diverse communities of Blacks, including African-Americans and those from the Caribbean and Africa, and Latinos, with very small numbers of White, Asian and other ethnic minorities. The public school system served approximately 7000 students from pre-K to grade12, with ancillary facilities throughout the city for children ages 3and 4, as mandated by the state. This middle school's student population had been changing from being predominantly Black, non-Hispanic to include a rapidly growing number of Latino
students over the decade preceding the study. As summarized in Table 3.1, the majority of students in this middle school were Black and Hispanic, in contrast to the average Black and Hispanic student population in schools across the state.

Table 3.1 School and State Student Ethnicity

| Ethnicity | This School | State Average |
| :--- | :--- | :--- |
| Black, not Hispanic | $72 \%$ | $18 \%$ |
| Hispanic | $28 \%$ | $18 \%$ |
| Asian/Pacific Islander | $<1 \%$ | $8 \%$ |
| White, not Hispanic | $<1 \%$ | $56 \%$ |

Source: NCES, 2005-2006
The $7^{\text {th }}$ grade mathematics class was comprised of 11 boys and 8 girls, ages 12 to 14 years old, and represented the ethnic and cultural diversity of the city's Black and Latino communities. The school assigned students to mathematics classrooms according to their scores on the state's high-stakes mathematics test. The school's grade 6 scores on the 2006 language arts literacy and mathematics assessment of skills and knowledge are summarized in Table 3.2.

Table 3.2 Grade 6 State Summary Assessment of Skills and Knowledge of Students in This School: Spring 2006

|  | Language Arts Literacy | Mathematics |
| :--- | :--- | :--- |
| Partially Proficient | $57.4 \%$ | $69.9 \%$ |
| Proficient | $40 \%$ | $28.2 \%$ |
| Advanced Proficient | $2.6 \%$ | $1.8 \%$ |

Source: NJDOE, 2006 Statewide Assessment Report
The mathematics scores of the nineteen students placed in this mathematics class were partially proficient or proficient like the rest of the school.

## Participants in the Study

There were five girls from the $7^{\text {th }}$ grade mathematics classroom in the original study described above whom participated in the present study: Jana, Tyana, Shaniya, Erica and Pamela. All the names of students herein are pseudonyms.

Jana: Jana was identified as a focus student in the original study by researchers and the $7^{\text {th }}$ grade mathematics teacher, Mr. P, who had agreed that she was soft-spoken but could be assertive at times. She had also been observed to be friendly, kind, cooperative and sensitive. At times, Jana was observed to be energetic and talkative, and able to assert herself during whole class discussions or when working with a partner and with individuals in a small group. In other words, she appeared to be a good candidate for a study of affect in an urban mathematics classroom.

Tyana: Tyana was identified as a focus student in the original study, as someone who often dominated classroom discussion, and asserted strong opinions when interacting with both girls and boys in the class. Tyana appeared comfortable and confident when working in a small group of boys and girls, and often worked with one of the non-focus girls in this study. Mr. P had described her as assertive, out-spoken and out-going, and playful and confident with her peers and adults alike. In addition, the present researcher had met Tyana when she was in $5^{\text {th }}$ grade and had observed the same energetic, outspoken, and confident behavior during fifth grade mathematics classes. On the first day of $7^{\text {th }}$ grade classroom videotaping, Tyana had greeted the researcher with a big smile and a hug, boasting to her classmates with pride that she knew one of the Rutgers researchers.

Jana and Tyana's presence and behaviors in the classroom were markedly different which made them appropriate focus participants in the original study and for the present study's inquiry about Black girls' racial identity and mathematics identity.

Shaniyah, Erica and Pamela: Three additional girls from the $7^{\text {th }}$ grade mathematics class participated in the present study. Shaniya, Erica and Pamela were nonfocus students in the original study. Each had completed one or both Affect Study Student Survey administrations, and had interacted with Jana and Tyana during class discussions or small groups. Erica had been interviewed once during the original study. All three girls participated in the present study and provided information about their own mathematics classroom experiences, mathematics identity, and racial identity.

Table 3.3 summarizes information about the five participants in this study.
Table 3.3 Study Participant Summary

| Student | Focus/Non-focus | Protocol-Grade | Description |
| :---: | :---: | :---: | :---: |
| Jana | Focus 1 | Protocol 1-9 ${ }^{\text {th }}$ | Soft spoken but had a lot to say when asked. Often appeared tentative during $7^{\text {th }}$ grade class discussions or when working in a small group but sometimes selfassured and confident. Always willing to work with and help others. Presence in the classroom markedly different from Tyana. |
|  |  | Protocol 3-11 ${ }^{\text {th }}$ |  |
| Tyana | Focus 2 | Protocol 1-11 ${ }^{\text {th }}$ | Talkative and could dominate $7^{\text {th }}$ grade classroom and small group conversations. Assertive, self-assured and self-confident to work with others. Very sociable with peers and adults. Presence in the classroom markedly different from Jana. |
|  |  | Protocol $2-11^{\text {th }}$ |  |
|  |  | Protocol 3-11 ${ }^{\text {th }}$ |  |
| Shaniyah | Non-focus | Protocol 1-9 ${ }^{\text {th }}$ | Self-assured and self-confident. Talkative at times and often paired with Tyana during $7^{\text {th }}$ grade classroom activities. |
|  |  | Protocol 3-11 ${ }^{\text {th }}$ |  |
| Erica | Non-focus | Protocol 1-9 ${ }^{\text {th }}$ | Soft-spoken and non-assertive during $7^{\text {th }}$ grade class discussions and group work. Sociable with female peers. Moved to America at age 2 from Jamaica. |
| Pamela | Non-focus | Protocol $1-9^{\text {th }}$ | Self-assured and self-confident during interviews but non-assertive during $7^{\text {th }}$ grade classroom discussions. |

## Data

To investigate the focus and non-focus girls' school mathematics experiences and attitudes related to identity, data collected when the girls were in $7^{\text {th }}$ grade and in high school were used. These data are described below.

## $7^{\text {th }}$ Grade Data

Seventh grade data used in this study were collected during the original 20062007 MetroMath affect study. There were five cycles of data collection between September 2006 and June 2007, each consisting of two consecutive days of mathematics classroom lesson videotaping, a pre- and post-lesson videotaped interview with the teacher, Mr. P, and a post-lesson videotaped retrospective interview with four focus students - two boys and two girls, Jana and Tyana. The focus students had been identified by the researchers and Mr. P to follow closely throughout the yearlong study. A team of MetroMath affect researchers viewed the classroom videotapes immediately after the two days of videotaping and collaboratively identified several interesting episodes of classroom affective, social and/or mathematical interaction as suggested by Powell, Francisco \& Maher (2003). The episodes were edited as video clips and shown to the four focus students during retrospective interviews conducted within several days of each cycle of classroom videotaping. Retrospective interviews were also conducted with some of the non-focus students in the class. All interview videotape transcriptions used in the present study were verified by the researcher and at least one other independent researcher.

The Affect Study Student Survey was administered two times during the original study. The 40 -item survey was designed to provide data about students' attitudes and beliefs about mathematics and mathematics learning at the beginning of the school year during Cycle 1 in September (9/22/2006) and at the end of the school year during Cycle 5 in June (6/15/2007). For this study the researcher identified eleven items on the survey that possibly pertain to identity because the statements refer to one's self-perception or the perceptions that others have of one's self, shown in Table 3.4.

Table 3.4 Affect Study Student Survey: Possible Identity Items

| 2. | I don't expect to use much math when I get out of school. |
| :--- | :--- |
| 3. | I'm not the type to do well in math. |
| 8. | I study math because I know how useful it is. |
| 13. | My family would be proud of me if I were a good math student. |
| 14. | I expect to use math lots of ways when I'm an adult. |
| 19. | My grades aren't very important to my family. |
| 21. | I am good at doing hard math problems. |
| 24. | My life outside of school makes me want to do well in math class. |
| 26. | I am sure I can learn math. |
| 27. | It would mean a lot to me to get A's in math. |
| $40 . O E$ | How do you think you will use math when you are an adult? |

The 40-item Affect Study Student Survey is found in Appendix C.

## High School Data

The present study began by considering how to reach some of the girls who had been in the $7^{\text {th }}$ grade mathematics class during the original 2006-2007 study. Two years had passed and the first task was to determine which of the girls attended the local high school.

Mr. P lived in the community, supported middle school extracurricular and after school functions (e.g. serving as D.J. and/or chaperoning school dances), maintained mentoring relationships with many former students, and kept in touch with some students via e-mail. He volunteered to help initiate and support the girls' participation in this study, and in April 2009 Mr. P sent the following letter to [four] girls via e-mail:

Hi young ladies,
My name is Ms. Jones and I hope that you remember me as one of the researchers from Rutgers University who came into Mr. P's $7^{\text {th }}$ grade math class o videotape and conduct interviews. Well, like Mr. P, I've finished all of the classes for the degree of doctor of education and now we must complete our own research projects (dissertation). My project focuses on YOU - all the girls who were in Mr . P's $7^{\text {th }}$ grade math class at $\square$ MS.

All you have to do is let me interview you 3 times (about 1 hour each time on videotape) before school ends in June. If you agree to participate I will pay you $\$ 20$ for each interview (\$60 total). The interviews will be fun and interesting questions about being a girl and math identity, race identity, and your experience in math classes since Mr. P's $7^{\text {th }}$ grade class.

Please call me immediately on my cell phone 201- or e-mail me at jvann_jones@hotmail.com if you are willing to participate. Then we can find the best way to get you the details of the study and the permission forms (for example, I could meet you at school dismissal or come to your house).

I am hoping that all the girls from Mr. P's $7^{\text {th }}$ grade math class participate (including girls who are not at PHS now). You can help by spreading the word to all the girls in this select group. I'm really looking forward to seeing you all again.

Thanks in advance, Ms. Jones

After accepting the disappointing result that none of the girls replied to the email, Mr. P provided the researcher with the original study's class list of student names, addresses and phone numbers. There had been ten girls assigned to the class and the researcher's next plan was to telephone each of the girls and re-introduce herself as "one of the ladies from Rutgers who came into Mr. P's classes to videotape in $7^{\text {th }}$ grade... the Black lady". The goal was to briefly describe the study to a parent or guardian for preliminary consent, and to get an address where the full description and details of the study and consent forms could be sent.

The researcher sat down with the contact list one evening hoping to reach the homes of all ten girls. The student list was nearly three years old and the telephone numbers for six of the girls were out of service or disconnected with no forwarding number. It was hoped that the contact information for Jana and Tyana had not changed.

Jana's home telephone was answered by her mother, who gave the researcher permission to call Jana on her cell phone. Jana agreed to be a focus student. She also said that she had remained friends with two other girls from the $7^{\text {th }}$ grade class and volunteered their cell phone numbers, suggesting that the researcher call them directly. When reached by cell phone the two girls, Shaniyah and Erica, agreed to participate in the study. A fourth girl's phone number, Pamela, had not changed. When her mom answered she asked the researcher to mail the information and consent forms to her place of employment so that her daughter could participate.

By the end of May 2009 the researcher had obtained oral and/or written consent from the mothers of Jana, Shaniyah, Pamela and Erica. An interview meeting was confirmed with Pamela by phone, and cell phone conversations with Jana, Shaniyah and

Erica quickly turned to text messaging to schedule their interview meetings. All of the interview meetings were scheduled after school at the library which was conveniently located next to the high school campus.

At this point the researcher still had not reached Tyana by telephone. Each call had resulted in a busy signal or full voice mail message. However, the researcher was confident that Tyana would be part of the present study because Jana, Shaniyah and Erica had said they often see her during the school day or outside of the school building and volunteered to tell her that the researcher was "looking for her". Mr. P had also volunteered to talk to Tyana's younger sister and cousin who attended the middle school.

On the afternoon of Pamela's interview the researcher waited for her on the steps of the library. As was the usual custom, students walked along and sometimes stopped to talk on the sidewalks and benches near the entrance to the library. Among one group, the researcher noticed a girl who looked and sounded like Tyana. She was talking and walking with several other girls but when the researcher called her name out loudly she turned and did not hesitate to come right over while her friends continued on. Tyana recognized the researcher and walked right up, reached out with a hug, and asked what the researcher was doing [standing at the front door of the library]. Tyana agreed to participate and to be a focus student without hesitation, and took the information and consent form for her mother to sign.

The Parent Permission Cover Letter consisted of the following:

Dear Parent or Guardian,
My name is Jennifer V. Jones and I am a Rutgers University MetroMath doctoral student and researcher. I have lived in $\square$ for many years, and my daughter graduated from and High School. As a Black woman I am interested in learning more about the mathematics classroom experiences of Black and other girls of color, and their development of self-identity and mathematics identity.

I would like to schedule several meetings with girls who were in Mr. P's $7^{\text {th }}$ grade math class at $\square$ Middle School to gain valuable information about their school mathematics experiences since $7^{\text {th }}$ grade, and their identities as girls of color and as mathematics learners.

I have enclosed a PARENT CONSENT FORM for Student Participants ${ }^{2}$ that describes what will happen during each meeting. If you and your daughter agree that this is an appropriate study for her to participate in, please sign the attached Permission to Participate section, and return everything to me in the self-addressed stamped envelope. Participation is voluntary, and your daughter will receive $\$ 20$ each time she meets with me.

If you and your daughter do not think that it is appropriate for her to participate, please return everything to me in the self-addressed stamped envelope. If you have any questions about the study, please don't hesitate to call me. Thank you very much for your time.

Jennifer V. Jones
MetroMath doctoral candidate

[^1]
## Protocols

Three protocols were developed by the researcher, who hoped each of the five girls who participated in this study would complete all three. Protocol 1 and 2 were twopart individual interview sessions that took place after school in a small, private room on the lower level of the public library located one block from the girls' high school. The room had a large table with chairs and the video camera was set on a tripod in the corner. The interviews were videotaped and the girl being interviewed sat at one side of the table while the researcher, sat out of camera range on the other side of the table.

The researcher conducted Protocol 1 with Jana, Shaniyah, Erica and Pamela in June of 2009, a few weeks before they completed $9^{\text {th }}$ grade. Tyana had also scheduled a meeting with the researcher after school but postponed and did not reschedule. First, each girl was left in private to complete the same Affect Study Student Survey described above, which they had already taken twice when in the $7^{\text {th }}$ grade. Second, each girl was interviewed and received $\$ 20$ as a token of appreciation for her time. The semi-structured interview questions were designed to glean information about the girls' mathematics classroom experiences since $7^{\text {th }}$ grade.

Protocol 1 consisted of the following:

## Part 1: Affect Study Student Survey (40-items as in Appendix C)

Part 2: Interview - participant was asked the following questions and shown video clips from $7^{\text {th }}$ grade.

1. What math class are you in this year? What are you working on now? What have you worked on this year?
2. What do you remember (if anything) about the lesson or class in the video clip?

What do you remember about other times in Mr. P's math class? (e.g. what happened?)

Is there a particular math lesson or event that you remember from Mr. P's class? (If yes, can you describe whether it was graphing something or measuring something or doing calculations or what? Can you say why you remember this lesson or event?)
3. How is your current math class like Mr. P's $7^{\text {th }}$ grade class? How is your current math class different from Mr. P's $7^{\text {th }}$ grade class?
4. Do you still work in groups or with a partner in math class? (If yes, does it help you do or learn more math during class? Why do you think it does? If no, would it help you to do or to learn more math during class if you worked in groups or with a partner? Why or why not?)
5. Now I have a fantasy question for you! You can imagine anything because this is your story. I'd like for you to imagine and tell me what the "perfect math class" would look like! Can you describe your teacher, your classmates, what you would be talking about, the size or color of the room...!

Additional prompts:
What would the classroom look like and sound like? (e.g. individual desks or group tables)

What would the teacher be doing? (e.g. showing/telling students how to solve problems)

What would students be doing? (e.g. practicing what the teacher shows, working with each other to solve problems)

What kinds of things would be in the room? (e.g. books/worksheets, calculators and manipulatives, newspapers)

How would the teacher know if you learning more math? (e.g. tests, homework, class participation/discussion)
6. What importance, if any, does school mathematics have for you? Why or why not? (e.g. every day, job/career future)
7. How do you think of yourself in relation to mathematics? (e.g. I'm good/not good at it)

It was not until the next calendar year that the researcher attempted to continue data collection. At that time Jana informed the researcher that Pamela had moved out of the school district and she didn't know how to reach her anymore. And unlike the first meetings to conduct Protocol 1, Shaniyah, Erica, and the researcher could not schedule a time to meet at the library. The researcher conducted Protocol 2 with Jana (at the end of $10^{\text {th }}$ grade), and Protocol 1 and 2 with Tyana (at the beginning of $11^{\text {th }}$ grade) on two consecutive days. The researcher was unable to conduct Protocol 2 with the three nonfocus girls within the timeline for this study.

Protocol 2 was designed by the researcher to collect data about the girls' racial identity and mathematics identity, and possible evidence of co-construction. First, each girl was left in private to complete the Multi-dimensional Inventory of Black Identityteen (MIBI-t). Then, each girl was interviewed and received \$20 as a token of appreciation for her time. The structured interview questions were designed to elicit the girls' feeling and beliefs about their Black identity, as well as any beliefs about relationships between their Black and mathematics identities.

The MIBI-t is a version of the MIBI designed especially for adolescents (Sellers, Rowley, Chavous, Shelton and Smith 1997) to measure racial attitudes at the time of administration. The stable identity components of centrality, regard and ideology proposed in the multidimensional model of racial identity (MMRI) (Sellers et al 1998) are assessed from 5-point Likert scale responses (ranging from strongly agree to strongly disagree) to a subset of items from the MIBI. The girls were informed of the inventory's purpose and scope, and told that it was shorter than the adult version, responses were intended to reflect an individual's present state, and responses were neither correct nor incorrect.

The 21 items on the MIBI-t are shown in Table 3.5.

Table 3.5 MIBI-t Instrument

| Centrality Scale |
| :--- |
| 1. I feel close to other Black people. |
| 2. I have a strong sense of belonging to other Black people. |
| 3. If I were to describe myself to someone, one of the first things that I would say is that I'm Black. |
| Regard Scale (Private Regard Subscale) |
| 1. I am happy that I am Black. |
| 2. I am proud to be Black. |
| 3. I feel good about Black people. |
| Regard Scale (Public Regard Subscale) |
| 1. Most people think that Blacks are as smart as people of other races. |
| 2. People think that Blacks are as good as people from other races. |
| 3. People from other races think that Blacks have made important contributions. |
| Ideology Scale (Assimilation Subscale) |
| 1. It is important that Blacks go to White Schools so that they can learn how to act around Whites. |
| 2. I think it is important for Blacks not to act Black around White people. |
| 3. Blacks should act more like Whites to be successful in this society. |
| Ideology Scale (Humanist Subscale) |
| 1. Being an individual is more important than identifying yourself as Black. |
| 2. Blacks should think of themselves as individuals, not as Blacks. |
| 3. Black people should not consider race when deciding what movies to go see. |
| (Minority Subscale) |
| 1. People of all minority groups should stick together and fight discrimination. |
| 2. There are other people who experience discrimination similar to Blacks. |
| 3. Blacks should spend less time focusing on how we differ from other minority groups and more time focusing on how we are similar |
| to people from other minority groups. |
| Ideology Scale (Nationalist Subscale) |
| 1. Black parents should surround their children with Black art and Black books. |
| 2. Whenever possible, Blacks should buy from Black businesses. |
| 3. Blacks should support Black entertainment by going to Black movies and watching Black TV shows. |

Protocol 2 consisted of the following:
Part 1: MIBI-t (21-items as in Table 3.5)
Part 2: Interview - participant was asked the following questions.

1. Can you tell me what you know or think about the office of President of the United States? Does the President have anything/something to do with you and your life?
2. Barack Obama is the first Black man to be elected president in the history of the United States. What do you know about him? How do you know?
3. As President of the United States Mr. Obama now lives in the White House in Washington, D.C. with his family. Can you describe how that makes you feel?
4. President Obama has two daughters - Sasha is 7 years old, and Malia is 10 years old. What do you imagine them to be like? What makes you think so?
5. What kind of school experiences do you imagine Sasha ( $2^{\text {nd }}$ grade) and Malia ( $5^{\text {th }}$ grade) to have? Do you think they might like or be "good" at math? Why or why not?
6. What do you think makes someone "good" at math in school?
7. Do you think that everyone can be "good" at math in school?
8. Do you think that Sasha or Malia could someday be elected president of the United States like their father? Why or why not?
9. Do you think that you could be elected as president of the United States? Have you always felt this way or has President Obama's election changed your thinking? How?
10. What do you know about the President's wife, Michelle Obama? Do you know what she has done in the past? What do you think her job or role will be?
11. Does having a Black President and First Family have anything/something to do with you and your life?

On 5/18/2009 the researcher conducted a pilot administration of Protocol 2 at Rosalind's (pseudonym) home, a 13 year old girl attending the second middle school in this school district, who was completing the $8^{\text {th }}$ grade algebra honors mathematics class. Rosalind was presented with all twenty-one items on the MIBI-t, grouped per the scales and subscales. She completed the MIBI-t in approximately 10 minutes after which the researcher conducted an interview to elicit feedback on the instrument and interview questions (see Appendix xx for full interview transcript). When asked what she thought about the MIBI-t Rosalind said that two items were unclear to her. The first was "I feel close to other Black people". Rosalind wanted to know which Black people the item referred to, and asked "Black people I know or strangers?" A second item stated "It is important that Blacks go to White schools so that they can learn how to act around Whites". Rosalind said that she did believe that Blacks needed to know how to act around White people but did not need to attend White schools to know this.

The pilot administration alerted the researcher to questions of interpretation and was used to fine-tune Protocol 2. It was anticipated that the girls in the study may find that some of the items were unclear to them - which they did. This is discussed further in Chapter 4 Data and Analysis. The researcher also presented the twenty-one MIBI-t items
in random order and without scale or subscale labels. There was no intent to change the instrument but to remove any possible distraction as the girls read each item.

Protocol 3 was a semi-structured group interview conducted by the researcher. Jana, Tyana, Shaniyah, and Erica were asked to decide among themselves what day and time worked best for them all. The girls had different and busy schedules in and out of school, and sometimes made other plans at the last minute requiring the other girls and researcher to reschedule. After several weeks, Jana, Tyana and Shaniyah suggested that the researcher conduct the group interview without Erica, who agreed without dismay.

The purpose of the group interview was to allow the girls to a) reflect on the study (process, math survey, racial identity inventory, interview questions) and their participation in it, and b) provide a forum for informal discussion of their classroom mathematics experiences, Black identity, and mathematics identity, and c) collect addition interview data about the girls' racial and mathematics identities.

Protocol 3 consisted of the following:

## Introduction Script

First, let me say thank you for getting together for this interview! All of the interview questions I'm going to ask you have to do with you and mathematics your experiences in math classes, what math means to you, and how you feel and think about yourself and math. Are you OK talking to me in this group about these things and yourself? I'd like for you to share as much as you can about yourself as a learner of math - how you feel and what you think. It may help to think in terms of "I feel..." or "I think..." or "for me..." whenever possible. I
hope that talking to each other and listening to each other will encourage you to use phrases like that throughout this interview. Please say your name and your age.

## Interview Prompts

1. What do you think about the study? (e.g. math attitudes survey, MIBI-t, individual interview questions)
2. Can you talk to each other about your experiences as a learner of mathematics? What can you share about how you have developed as a mathematics learner in your school classes $-7^{\text {th }}$ through $10^{\text {th }}$ grades and this year so far?
3. What, if anything, do you think about mathematics and racial identity? What, if anything, does that mean to you?
4. Do you think there is a relationship between racial identity and mathematics identity or achievement?
5. What does each of you think the role of mathematics will be in your future schooling ( $12^{\text {th }}$ grade and beyond) or in your career/job?

The data used in this study are summarized in Table 3.6

Table 3.6 Summary of Data


## Methods for Reporting and Analyzing Data

A. $7^{\text {th }}$ Grade Data

## 1. $7^{\text {th }}$ Grade Retrospective Interviews

The researcher watched the interviews multiple times to become familiar with the content and context, and then to describe the overall context. At least one critical event per interview was identified. A critical event could be a sequence of question and answer dialogue that meets the definition for a critical event. Critical events were coded for affective, mathematical, and social interaction using the codes in Table 3.7.

Table 3.7 Retrospective Interview Interaction Codes

| Affective Interaction | Mathematical Interaction | Social Interaction |
| :---: | :---: | :---: |
| Interested <br> Angry <br> Curious <br> Bored <br> Excited <br> Ashamed <br> Disrespected <br> Happy <br> Confused <br> Frustrated <br> Embarrassed <br> Afraid <br> Proud <br> Nervous <br> Relieved <br> Respected <br> Sad <br> Satisfied <br> Successful <br> Upset | Participating <br> Making mathematical representations <br> Using tools | Social/Affective (affect, social time perspective) <br> Harmonious (harmony, communalism, spirituality) <br> Expressive Creativity (verve, movement, expressive individualism, orality) <br> Nonverbal <br> Note: the dimension of social/affective includes emotional expressiveness towards others, sensitivity to emotional cues from others, and the integration of feelings with cognitive elements. |

Themes that emerged in critical events were summarized.
2. $7^{\text {th }}$ Grade Affect Study Student Surveys

The researcher identified items that possibly pertain to identity. Each of the girls' responses to these items was described and themes that emerged in responses were summarized.

## B. High School Data

1. Protocol 1

The researcher described the Affect Study Student Survey items that possibly pertain to identity, and then described the girls' interview responses. Themes that emerged were summarized.
2. Protocol 2

The researcher described the girls' responses to the MIBI-t, and then described the girls' interview responses. Themes that emerged were summarized.

## 3. Protocol 3

The researcher described the girls' conversation during the group interview and their responses to the prompts. Themes that emerged were summarized.

## Case Story Development

Using the data reported and analyzed as described above, case stories of the middle and high school mathematics experiences, and the beliefs about their own mathematics identity and racial identity were developed for the two focus girls, Jana and Tyana. Triangulation of survey, inventory, and interview data (Stake 2000) enabled the researcher to 1) gain a deeper understanding of phenomenon that emerged, 2) uncover similarities and differences between participants, and 3) infer relationships between mathematics identity and racial identity. The multiple sources of data described above were used to create rich descriptions of the girl's experiences and beliefs, to make informed inferences, and to draw reasonable conclusions.

The case story development also included aspects of portraiture by illuminating positive aspects of girl's stories, as well as stated or implied challenges or failures during their learning experiences (Lawrence-Lightfoot \& Davis 1997). The researcher was reflective, and sometimes inserted her own or her daughter's interpretations into the girls' own stories about their racial and mathematics identities:
"I am a mirror that reflects back their pain, their fears, and their victories. I am also the inquirer who asks the sometimes difficult questions, who searches for evidence and patterns. I am, the companion on the journey, bringing my own story to the encounter, making possible an interpretive collaboration."

Excerpt from I've Known Rivers: Lives and Loss of Liberation
Lawrence-Lightfoot 1994

## Chapter 4 <br> Data and Analysis

### 4.1 Introduction

This chapter begins with a description of the $7^{\text {th }}$ grade data collected for the original affect study during the 2006-2007 school year. First, the critical events that were identified in the $7^{\text {th }}$ grade retrospective interviews are described. There were five interviews with Jana (Cycles 1-5), four interviews with Tyana (Cycles 1-4), and one interview with Erica (4/25/2007). Next, responses of all of the girls to items on the affect study student survey that possibly pertain to identity are described. Then themes that emerged in critical events and the surveys are summarized.

Next, the high school data collected for this study are described beginning with Protocol 1. Responses to items on the affect study student survey that possibly pertain to identity are described. Then each girl's interview is described, followed by a summary of themes that emerged across all three surveys and in Protocol 1 interviews.

Next, Protocol 2 data are presented. Jana, Tyana, and Shaniyah's MIBI-t responses are described, followed by a description of Jana's interview and Tyana's interview, and a summary of themes that emerged. Data collected in the group interview with Jana, Tyana and Shaniyah, Protocol 3, are described next, followed by a summary of themes that emerged pertaining to racial identity and mathematical identity. Finally, overarching and recurring themes that emerged throughout all of the data presented in this study are used to present case stories - coherent narratives - for Jana and Tyana.

Pseudonyms are used throughout in place of students' actual names. The mathematics tasks for Cycle 1-4 come from units in the Connected Mathematics 2
program (CMP2 Lappan, Fey, Friel and Phillips 2006). The analyses presented here are then discussed in Chapter 5, Conclusions, Discussion and Limitations.

## 4.2 $7^{\text {th }}$ Grade Retrospective Interviews and Critical Events

## CYCLE 1

The two days of Cycle 1 classroom videotaping captured students working on a problem from the unit Variables and Patterns shown in Figure 4.1

Figure 4.1 Activity for Cycle 1 (CMP2, 2006, Variables and Patterns, Problem 3.1)
Connected Mathematics 2 (CMP2), Variables and Patterns, Problem 3.1
A. Copy and complete the table.

| Time (hr) | Distance for Speed of $50 \mathrm{mi} / \mathrm{h}$ | Distance for Speed of $55 \mathrm{mi} / \mathrm{h}$ | Distance for Speed of $60 \mathrm{mi} / \mathrm{h}$ |
| :---: | :---: | :---: | :---: |
| 0 | 0 | * | 18 |
| 1 | 50 | 0 | 18 |
| 2 | 100 | \% | 1 |
| 3 | a | * | $\underline{8}$ |
| 4 | 星 | * | 5 |
| 5 | 沓 | 42 | 5 |
| 6 | ${ }^{1}$ | * | 3 |

B. Copy and complete the graph for all three speeds below. Use a different color for each speed.

C. Do the following for each of the three average speeds:

1. Look for patterns relating distance and time in the table and graph. Write a rule in words for calculating the distance traveled in any given time.
2. Write an equation for your rule, using letters to represent the variables.
3. Describe how the pattern of change shows up in the table, graph, and equation.

On the first day students had worked in small groups to complete the table and each student was to make a graph the data. One student, a boy named Ryan, was asked to make an overhead transparency of his graph to present to the class. This had led Tyana to believe that Ryan's graph was correct although it was not - Mr. P had planned for the class to discuss the graph in order to help everyone compare graphs and find their own mistakes. On the second day there had been a lively class discussion about Ryan's graph, driving, speeding and speed limits, and about the times it would take to travel a given distance at three different speeds. Mr. P had built upon the students' interest and posed a new question for the activity by asking students to work in their groups to figure out how long it would take to travel a given distance of 320 miles at 50,55 , and 60 miles per hour.

## Jana <br> "You're making her feel bad"

The researcher (the author of this dissertation) began the interview by asking Jana to describe the first video clip. In this clip, Jana sat with three girls. On the second day of the cycle, the girls were talking about equivalent decimals and fractions. One girl, Nammi, had said that she had already figured out that the time it took to travel 320 miles at 60 mph was 5 and $1 / 3$ hours, or 5 hours and 30 minutes. None of the girls made any comment about Nammi's statement and it is not certain why. Jana and the other two girls may not have recognized Nammi's mistake, or they may have chosen to ignore Nammi's statement. Jana had found the time to travel 320 miles at 50 mph and had gotten 6.40 by using the calculator to divide 320 by 50 . Nammi told her to figure out the fraction for 6 and $1 / 4$ ! When Jana said that [ 6 and $1 / 4$ ] is 6 and $1 / 25$ th, Nammi said that she needed to figure out $40 \%$ of 25 and told Jana that she would not get that answer by using the
calculator. The following is an excerpt from the classroom videotape transcript that Jana had just viewed.

Nammi: (to Jana) Why you using your calculator? You not gonna figure it out that way. It's gonna come out as a um decimal, we're not doing decimals, we're doing percentage...
(Jana does not respond and looks down at her paper)
Nammi: (to Jana) So, I said $4 / 10$ of 25 is 10 . You get that? (to Dyana) You get it?
Dyana: I get it, but I don't know the answer.
Nammi: (to Jana) You're still trying to figure... (laughing)
Carol: 4/10ths of 25, oh yeah.
Nammi: Is 10 . So, obviously $40 \%$ of 25 is 10 !
Dyana: Yeah, I get it!
Nammi: (to Jana) What are you using the calculator for? (to Carol) She's not gonna figure that out on the calculator! Yeah, she's not gonna figure it out on the calculator!
(Nammi is tapping her pencil on the desk)
Carol: ( whispering to Nammi) you're making her feel bad
Nammi: (aloud) Who, I'm not making her feel bad, I'm just telling her she's not gonna get the answer on the calculator, it's gonna come out as a decimal, cuz it came out as a decimal the first time..

In the interview excerpts and descriptions that follow, MJ and "the researcher" identify the author of this study. Other researchers who conducted $7^{\text {th }}$ grade interviews are identified by their initials in interview excerpts and called "the interviewer" in descriptions. Jana reflected on the scene when the researcher (MJ) asked:

Beginning Appendix B1a, Jana's $7^{\text {th }}$ Grade Interview Cycle 1, Line 38
38. MJ Okay do you remember that? [Jana nods her head, yes]
39. J Uhh I was feeling bad 'cause it's like she was like, actually she wasn't saying you're wrong Jana but it made me think that she was saying that you're wrong, why you doing this, why you doing that like she could take over everything and... I was trying to like, she told me that I wouldn't get the answer but I still tried it out to see.
40. MJ You wanted to try it out and work it out yourself?
41. J Cuz most of the times I don't go by what other people say so I see it myself.
42. MJ So it makes you feel good to be able to try to figure things out on your own. [Jana nods head] Umm is there anything else that you can think of umm in terms of how you were feeling, how that made you feel, did you
think about that later on, do you think it will have any impact on how you umm, it won't stop you from trying problems your own way and trying to figure them out? [Jana shakes her head, no] Tell me about what you're thinking.
43. J About the clip?
44. MJ Want to see it again? [Jana nods head] Okay. [the clip is played again] So you were using the calculator as a tool at that point to help you, umm okay, do you use the calculator a lot as a tool?
45. J Yes, but sometimes I try not to cuz I want to like go on without using a calculator all the time just in case... sometimes if I don't have... later on in the job if I don't have a calculator and I need one, I can just use my brain, use my knowledge and what I know.

In this $7^{\text {th }}$ grade classroom retrospective interview excerpt Nammi's behavior appeared to affect Jana, perhaps making her feel bad by criticizing the way she attempted to solve the problem. Jana wanted to think on her own and work independently, as she said, to "see it myself" (41. J). Jana seemed to admit that Nammi's criticism had made her feel bad but she may have been more annoyed with Nammi's take-charge attitude, "like she could take over everything" (39. J). Nonetheless, Jana seemed to keep her confidence and belief that she was quite capable of doing [the] arithmetic without a calculator having stated "I can just use my brain, use my knowledge and what I know" (45. J). Jana also said that Carol was "one of my good friends" (51. J) which may have tempered the effect that Nammi's words might otherwise have had on Jana.

Collectively these excerpts from Jana's Cycle 1 interview (see Appendix B1a) were described as affective (feeling bad, feeling comforted), mathematical (using the calculator to make calculations), and social interactions (social learning with emphasis on affective domain, nonverbal facial expression and body language). Although the social interaction may have appeared to negatively impact her emotions and affect or discouraged her from participating, Jana continued to work with the three girls in her
group for the rest of the class period. Nammi did not seem to consider that she may have made Jana feel bad unintentionally. Despite the challenges to her approach or ability to solve the problem, to her value as a member of the group, and to her contributions to the group's work, Jana seemed to take Nammi's comments in stride and appeared to stay engaged in completing the task.

## Tyana

"We all make mistakes"

When students worked to complete the table and graph on the first day Ryan had made a graph from his data table labeled "distance traveled at different average speeds", and had tried to show all of the data for distance traveled in 1-6 hours at speeds of $50 \mathrm{mph}, 55 \mathrm{mph}$, and 60 mph on 1 graph. He had also incorrectly determined distances traveled for 3-6 hours at 55 mph , and had drawn lines connecting points on the graph, as well as dotted horizontal lines as shown in Figure 4.2.

Figure 4.2 Ryan's Plotted Points and "zig-zag" Lines


When Ryan presented his graph to the class many students had been confused by what he had done. Tyana had stated earlier that his data and graph must have been correct because the teacher had asked him to present his work to the class on the overhead projector. Tyana appeared curious to understand Ryan's graph and was impatient to ask a question when Ryan was explaining his graph. The following excerpt from the classroom videotape provides context for Tyana's interactions during the class discussion:

Ryan So, when I looked at the chart, I put time on the x -axis and distance in the $y$-axis, when I saw the distance in the chart, I looked at 1 in the time and 50 in the distance, so I thought 1 goes over there and 50 goes down there. (points) Next in the chart then next after 50 in the chart is 55 , so I thought 1 and 55 , and after 55 its 60 , and I did the same thing, and it came up to here. (barely audible)
Tyana has kept her hand raised while Ryan is talking
Mr. P What would the point be right in the middle of 50 and 100 ?
Student Um, 75?
Mr. P Why 75?
Student Because um, well if you add... (inaudible)
Mr. P OK so it's counting...OK, but...
So what do you guys think? Do you think you guys agree with his placement of the points?
Nammi No, I don't.
Tyana I have a good question!
Mr. P OK, well let me let Tyana, Tyana has a question and if anybody questions, anytime someone's up front certainly feel free to ask...go ahead Tyana.
Tyana Why you, why you put your lines like zigzag, why they not going straight up?
Ryan These? (points)
Tyana No, the zigzag lines.
Ryan Oh, cuz I just... (inaudible)
Tyana I can't hear you, huh?
Ryan I just connected the dots...
Tyana Oh, oh, oh. It looked confusing.
Unidentified Student "...like it was a design"
Ryan It's cuz of this (points)
Mr. P OK, Nammi.
Nammi My question is why did he connect all of those dots together and I just put each one in a separate line?
Tyana Yeah, because yeah because it looks like all of them together it should be it looks confusing, it looks like, it looks like 1 big graph but it's only...

As students had continued to work in small groups, Mr. P had suggested that Tyana, who was working with Shaniyah as a pair, ask Ryan to explain his graph to her again, which she did. Tyana had gone up to Ryan who was still at the overhead projector and stood by him, looking on and listening as he pointed to places on his graph to explain why he had drawn "zigzag" lines connecting the points (ordered pairs) on his graph. She exclaimed "oh!" and returned to her seat and explained what she had learned from Ryan to Shaniyah.

This video clip was shown to Tyana in order to gain insight into the affective and mathematical impact of this interaction. Tyana's graph had looked different from Ryan's and she had believed that Ryan's graph was correct. She had seemed determined to participate and pose her questions during the class discussion, and to understand the differences between her own graph and Ryan's graph because Mr. P had told the class to discuss what Ryan had done and to decide whether it was correct.

When the researcher asked Tyana how she felt about her own (and other students') incorrect answers during classroom discussions, her response, excerpted below, seems to show her comfort and ability to interact as a valued and respected member of the mathematics learning community where correct and incorrect solutions were utilized to further everyone's understanding and learning:

Beginning Appendix B2a, Tyana's $7^{\text {th }}$ Grade Interview Cycle 1, Line 47
47. MJ Well you mentioned getting things wrong, how do you feel when you get things wrong?
48. T I be feeling like oh my god, I got this wrong, they're gonna crack on me. I feel bad when I get things wrong, but people read it and it's the same thing that I got wrong, so I realize, I realize umm well its not always right to get it right, too, and if you get it wrong that's your mistake and you could do it, and you know what you did wrong when they explain it!
49. MJ So are you feeling better about when you do make a mistake or get things wrong, are you, uh, getting more comfortable?
50. T Yea, because...
51. MJ Why are you getting more comfortable? Is it because of your teacher or is it because of your classmates, or just because of you, the way that you're feeling?
52. T Yea, because of both, because I answer and everybody be like "I agree, I agree, I agree", and the teacher "you right, you right, I agree with you too", and that make me just feel good!

The interview excerpts were described as affective (feeling good), mathematics (learning from correct answers and mistakes), and social interactions (support from classmates during discussions) (see Appendix B2a). Tyana appeared to be comfortable asking questions when she didn't understand something. She also seemed to enjoy social interactions, especially those that may support her own learning.

## CYCLE 2

The final project from the unit Shrinking and Stretching involved enlarging or shrinking a drawing to scale, and writing a report as shown in Figure 4.3.

Figure 4.3 Activity for Cycle 2 (CMP2, Shrinking and Stretching, Unit Project)


Mr. P had asked students to bring a cartoon or other picture on which to draw a coordinate grid so the picture could be "scaled up" and redrawn. On the first day of videotaping there had been a lot of excitement and anticipation about the activity, and Mr. P had helped students examine, discuss and compare their pictures for easiness or difficulty of use in the activity. In order to scale up their pictures by a scale factor of at least four, students would sketch a coordinate grid onto the picture and locate coordinates of important features on the image. Mr. P would also suggest that some students use the overhead projector and grid chart paper to enlarge their picture. On the second day students had continued working to determine new coordinates and to complete their scaled up drawings.

## Jana <br> "I started to just wander around to people to see what they was doing."

A principal researcher (I) from the MetroMath affect study conducted the Cycle 2 interview with Jana who identified herself, "Well, my name is Jana and I'm 12 years old." (Appendix B1b, Line 6. J), and briefly described one sister and five brothers as "grown up" (20. J). Jana's other sister, who was closest in age was a ninth-grader at the high school. Jana also said that she liked "...laughing and talking on the phone." (28. J). The interview turned easily to discussing the mathematics lesson that had been videotaped when Jana said "And I like Ne-yo" (28. J), a popular Black male recording artist whose picture she had chosen for the scaling up activity.

Although not impossible, the picture of Ne-Yo that Jana had chosen may have made the task difficult for her, and could have hindered Jana's completion of a scaled up
picture and her overall engagement and success with the activity. Mr. P had not wanted to discourage Jana's enthusiasm for the project and had suggested that she use another picture with Ne -Yo's name as a logo.

The interviewer first showed Jana a video clip of the students coming into the classroom amidst talking and laughing, with Mr. P giving directions and answering questions. It was a busy and noisy scene and Jana's hand had been raised continuously but had gone unnoticed and unacknowledged. Then Jana could be seen leaving the classroom and returning a few moments later. The interviewer asked Jana to describe what was going on, what she remembered, and "How come your hand was up?" (50. I). Jana explained that although she had brought in a picture for the lesson, she had left it in her locker:

Beginning Appendix B1b, Jana's $7^{\text {th }}$ Grade Interview Cycle 2, Line 55
55. J I remember, I was trying to raise my hand for Mr. P because - to let me go to my locker so I could get the picture.
56. I The picture of Ne-Yo.
57. J Yeah, I forgot it in my locker.
58. I And?
59. J And I was raising my hand, and he didn't call me.
60. I And he didn't?
61. J (shakes head) Nope.
62. I And so then what?
63. J I walked out the class.

After trying and waiting to get Mr. P's permission, Jana had left the classroom without permission but had returned without incident. Jana's behavior could be viewed as an act of defiance or opposition to school rules, especially if Jana had not immediately come back to the classroom or had done something other than get her picture from the locker. The researcher interprets Jana's actions to reflect independence, self-control, responsibility, and commitment to the mathematics community. In other words, for Jana,
it was more important to get her picture so that she could participate in math class than to keep her hand up for permission (follow the rule) when she herself knew what to do.

Later during the class Mr. P had also allowed students to use the overhead projector so that an enlarged picture could be traced onto chart paper. Jana was observed to have waited patiently to do this with her picture, talking with and helping others in the meantime only to be disappointed with the outcome:
69. J And then, um, I traced the picture on the overhead, on the trans - paper, but it didn't work.

Jana was then shown a short video clip of when she was at the overhead projector:
71. I Is that what you're doing there?
72. J Yes.
74. J Well I traced it and it didn't come out right.
75. I And how did that make you feel?
76. J Mad.
81. I Then what'd you do?
82. J Uh, I got a picture of my favorite cartoon character and then Mr. P said I could do Ne-Yo's name.

During the interview Jana was shown video clips in which she appeared to have been engaged in affective, mathematical and social interactions during the classroom activities. In fact, Jana had spent much of the first day asking for help, trying to figure out how to use her picture of $\mathrm{Ne}-\mathrm{Yo}$ and trying to help others with their own pictures. It appeared that Jana felt comfortable as both a learner and resource to others in the mathematics learning community.

The interviewer showed four more video clips to Jana from the second day of the lesson. Students were working in small groups, and Jana worked with Kendall, a boy classified with special needs, and Sasha, a girl who had just been assigned to this class (Sasha did not participate in this study). The interview excerpt below is another example
of many in which Jana expressed her preference for opportunities to work with others in the classroom:
98. I Do you enjoy working in groups like that, with other people?
99. J Yes.
100. I Oh, what's good about it?
101. I Because if I'm working in a group and I need help and Mr. P's not available, one of my group mates can help me.

Jana always seemed willing to help others, even when group mates didn't help her:
104. I Does Kendall help?
105. J Not really.
106. I You help him?
107. J (nods) Yes.

In two additional video clips Jana observed herself moving about the classroom freely, talking about the mathematics task and the pictures that girls and boys in other groups had brought in, and having non-mathematics conversations as well (socializing). Tyana and Shaniyah had been trying to determine appropriate grid coordinates to use to scale up Shaniyah's picture of Mickey Mouse. Shaniyah had called Jana over to the desk where she was working with Tyana, and three two girls discussed figuring out which points to use as coordinates. Both had thought the task was not easy:
124. I And one of you said it was, the coordinates were really hard to figure out.
125. J Yeah.
126. I Was that you?
127. J No, it was her.
128. I And you sort of agreed.
129. J Mm-hmm.

Like the video clips from the first day showed, for much of the time on the second day Jana could be seen walking over to other groups, and talking or asking questions about the task (what to do), asking questions about how others approached scaling up their pictures, and having non-mathematics conversations at the same time. The
interviewer asked Jana about her ability to move around the classroom and talk to other people during the lesson, and what she felt was good and not good about it. Jana said "It's good, but, yeah, it's good" (139. J), and "Mm, I don't know, the work is easy, easier than other classes" "Other classes, like ELA, social studies" ((142. J and 143. J).

Jana seems to imply that moving around freely to work with others makes the class work "easier" and perhaps also the learning. Jana seemed to believe that she had permission to interact and work with her classmates and was expected to interact with her classmates, especially when Mr. P was helping others in the class:
146. I Does it, what about the way, what do you do now? You wander around, you talk, you work on projects, you work together?
147. J Yeah, well I don't wander around a lot, I was just asking people questions, because at first I didn't get it well. Mr. P told me, so, well, he, I asked him if he could help me and he said hold on until he's done, so that's when I started to just wander around to people to see what they was doing.

The portions of Jana's interview (Appendix B1b) above were identified as affective (disappointment), mathematical (participating - listening to and explaining to classmates), and social interactions (people oriented, social learning with emphasis on affective domain). Jana had wanted and had asked for Mr. P's help. Despite understanding that her classmates also needed help, Jana seemed disappointed and unhappy whenever Mr. P could not turn his attention to her. However, Jana also appeared to value her classmates as learning partners and resources, and to reciprocate whenever they wanted or needed her help.

The excerpts from Jana's Cycle 2 interview may provide some evidence of mathematical identity and African-American racial/ethnic identity. Jana's mathematical interactions (e.g. participating: asking questions, sharing ideas and explaining to others,
respecting others as learning resources) embody her belief that she is a valuable and valued member of the class and mathematics learning community. Jana's social interactions appeared to exhibit social/affective and communalism characteristics, suggesting an orientation for people and attention to affect. Jana's behavior may also demonstrate a sense of communalism because she seemed comfortable when asking for or receiving help from others, discussing ideas, and volunteering or helping others when they asked.

## Tyana <br> "I want everyone in my class to finish it, so, so we could perform it"

A research fellow (MD) from the MetroMath affect study conducted the Cycle 2 interview with Tyana. The interviewer seemed to put Tyana at ease while the two talked briefly about skipping jump rope before looking at the first video clip. Tyana was shown the clip of students coming into the classroom and, like Jana, she also said that she had forgotten to bring her picture to class. So Tyana had also left the classroom to get her picture but had returned empty-handed and disappointed because she hadn't been able to get the Tweety bird cartoon character picture she wanted from her friend's locker. Tyana had returned to the classroom pretty quickly but, unlike Jana, she had not tried to ask permission to leave. It seemed that Tyana had not been as concerned as Jana had been that she had decided to leave the classroom without permission. Nonetheless, Mr. P told Tyana that she could print a picture of the cartoon character from the computer which had made her feel better:

Beginning Appendix B2b, Tyana's $7^{\text {th }}$ Grade Interview Cycle 2, Line 41
41. T Yeah, because, because he told us, he was like you've got to pick a character and I was like I can pick a character? And I was like Tweety, and he was like whatever you want. Whatever you want I could have, so I was happy,
went home and printed out Tweety. I was so happy about the project.
Tyana was very happy that she could bring a picture of her choice to use in mathematics class. The researcher infers from what Tyana says, and how she says it, that her engagement with this particular task may reflect, among other things, social interaction dimensions of expressive creativity and individualism.

Tyana also commented on a video clip where she had been working with Shaniyah to select coordinate points on their pictures. When the interviewer asked about the work she had been doing Tyana remembered that she had enjoyed what she had thought to be an easy task:
49. MD Yeah? Yeah? Okay, um, so, so about the work you were doing there, uh, did you enjoy the work you were doing there?
50. T Oh yeah, yeah because, all I had to do was put dots and coordinates.

When asked further about what she was going to do with the coordinates, Tyana replied:
56. T I, Mr. P was saying that pick the dots any way you want, but then, but then he said it was going to be hard. Because he said, ...when I make the graph you've got to name the coordinates, so I was thinking it was mad hard, but then I stopped doing that and put it on that.

The excerpts above were described because Tyana had appeared to work very intently with Shaniyah, seemed to have been very confident that the task was not difficult, and had continued to discuss the task with Jana when she had come over. She seemed to think the task was difficult after Mr. P reminded her that she would need to know the coordinates of each point on her Tweety picture, Tyana then seemed to focus on working with Shaniyah and two other girls to trace pictures onto an overhead transparency for projection:
66. MD Transparency?
67. T Yeah, transparency, on the overhead. So, so all we have to do is measure, and they first told me to put it on each of the pictures on the overhead, and trace it on that.
68. MD Ok, how was it like working with Nammi and Shaniyah and Hope? Was that okay?
69. T Yeah, yeah, yeah, because they're like my three close friends.

Tyana was shown a video clip where she was using the overhead projector to project her Tweety pictures onto a large piece of grid poster paper and locate coordinates for the "scaled-up" picture. Tyana seemed embarrassed when she saw herself and stated "you had to pick that?" (Appendix B2b, Line 141. T), perhaps because she could be seen and heard laughing with Nammi, Shaniyah and Hope when they were at the overhead. The interviewer reassured Tyana that the clip had been chosen because she was working and Tyana remembered feeling very happy to be working on the task:
142. MD Yeah. Well, yeah. I didn't mean to embarrass you, I just picked that one because you seemed to be having a good time. You know, there are a lot of clips up there where you're serious and working really hard, and there you're working but you're also having a good time. So, um, how did you feel about it all day long? You spent a lot of time at the projector, and you did a lot of work. Was that, how did you feel about that?
143. T I felt, I felt it was free time.
144. MD It was free time? Yeah? How was it free time?
145. T Because usually, Mr. P would say you all can't use my projector without my permission, so he was, he was just like, open up the projector and I was like what? I'm thinking like something's wrong, something's wrong, but...I was so happy I had the projector.

While Tyana worked at the overhead, Mr. P had asked her questions to help her. Tyana seemed to appreciate and welcome questions and suggestions while working:
148. MD Yeah? Did Mr. P come by you a few times?
149. T Yeah, he came to ask questions. Even she came by to ask a question.
150. MD And ask questions? Yeah? Yeah? Any of the other students come and look at yours?
151. T Nammi and Shaniyah did. And they pointed out...you could do it that way, and I'd just be like oh, all right, but theirs is obviously better than mine. I think theirs was better than mine.

The researcher infers that Tyana is willing to critically evaluate her own work, to compare her work to others, and to respectfully critique her classmate's work.

Although Tyana had frequently talked about the benefits of working with others, she sometimes preferred to work alone. In response to the interviewer's question about working to find the grid coordinates for her picture on her own, Tyana explained why she sometimes wanted to work alone:
158. MD Okay. Okay, yeah you have to be careful in making your measurements accurate, is that the idea? All right. Um, how do you feel about, you know, doing most of these on your own, compared to when you did it in a group? Did you like it better or you like working alone sometimes than working with a group sometimes? How do you feel about that?
159. T Sometimes I like working alone.
160. MD Sometimes you do?
161. T Mm-hmm. (as in Yes)
162. MD Why is that?
163. T Because I'm doing my own work. La, la. Doing my own work, having a good time, laughing and stuff. So, well, in a group, they go like, Tyana be quiet, be quiet while I work. I'm like, oh my god, I'm thinking like oh my god, well I can work alone.

The researcher interprets Tyana's response to suggest that she values communalism and social/affective dimensions of learning. In other words, Tyana likes to learn while "having a good time".

At the end of the interview, Tyana was given the opportunity to think about the day and working on the task:
210. MD Okay. All right, anything else you want to tell me? Anything about the day? What you're doing?
211. T All I'm saying is, like, it's a really fun project, and I want everyone in my class to finish it, so, so we could perform it.
212. MD Perform? What do you mean by perform?
213. T Like, like show it to the whole class.

Sharing and discussing mathematical ideas, and presenting work to the class were frequent activities in Mr. P's class which Tyana characterized above as "performing". The researcher's interprets Tyana's thinking of presenting [mathematical solutions] as a possible example of the role of verve in Tyana's learning behaviors.

## CYCLE 3

On the first day of Cycle 3 classroom videotaping Mr. P had led a class discussion to activate students' knowledge of sphere, cylinder and volume. Jana had confidently raised her hand to offer a definition of sphere. Then students had discussed Problem 5.1 from the unit Filling and Wrapping. The goal of the lesson had been to compare the volumes of cylinders and spheres as shown in Figure 4.4.

Figure 4.4 Activity for Cycle 3 (CMP2, Filling and Wrapping, Problem 5.1)


Mr. P had provided students with transparency paper to make cylinders, and Play-Doh clay to make spheres as they worked in small groups on both days of the cycle.

## Jana

"And for this, we had to find the volume, and volume has to do with math"
When Jana saw the first clip of herself participating in the class discussion, being called on by Mr. P, and asserting a definition that was accepted by Mr. P and her classmates, she repeated what she had said during the class "I said, it's like um, a 3dimensional cir..., circle or like the shape of a ball, sort of" (Appendix B1c, Line 17. J), and said that it made her feel "Good." (21. J.). The classroom discussion had then been interrupted because some of the students were distracted with what Jana said was "Um, there was name calling" (24. J). When I asked Jana what she felt about this, she replied "It's, it's okay. Cuz', usually like, well when I was like, other grades and stuff, I really didn't like to be called names cause I was mad. But now we just play about it and stuff." (30. J). Jana went on to add that she and most of her classmates felt the names didn't make them feel good or bad:

Beginning Appendix B1c, Jana's $7^{\text {th }}$ Grade Interview Cycle 3, Line 38
38. J Um...it's not really none of those. It's just, like, when somebody calls somebody a name we just laugh. Or if they call me a name, I'll laugh and we just have fun.

Jana said they really didn't consider [it] name calling but rather nicknames, and laughed when she told me that her nickname was raccoon.

Jana was shown three more clips from the first day where she had become angry while making the clay sphere with the Play-Doh. She had thrown the clay down in frustration and had walked away from the three boys she had been working with:
89. J Uh, they was, well, not all of them, but K P. He'd be like playing around. And Ke the boss or like, the boss of the group. And B
he wasn't like listening to Mr. was acting like he was , he was okay. So.

Jana had then asked to work with Tyana and Clint:
106. J Oh. Since I didn't want to work in the, my old group with $\mathrm{Ke} \square$ and K and B . I asked Mr. P if I could work with Q $\square$ and Tyana.
107. MJ Oh, okay. How were you feeling? What made you feel that you didn't want to work with the others anymore?
108. J Cause, they wasn't really working and since it was a group project I didn't want to do it by myself. And so I just asked him, if I could like, go to another group. Because I seen that day they were working and it was only two of them so, I just went over there.

The last clip shown to Jana was from the second day. She repeated her willingness to participate with the boys in the mathematical task and her disappointment that led her to find other classmates to work with:
116. J They wasn't really working as a group. They was just doing their own thing so, and I didn't have anything to do so I just went to the other group.

Reflecting on this lesson's activities Jana recalled mixed feelings and emotional states that had resulted from the mathematical activity itself:
137. J Well, I didn't like making the clay but, but um, when we was measuring and everything, doing this, I enjoyed that.

The excerpts from Jana's Cycle 3 interview provide evidence of frequent affective and social interactions. Some of Jana's mathematics interactions may have been affected by the activity itself. Jana had disliked making the Play-Doh clay because it was messy and had wanted to work collaboratively with the boys as a group. In the video clip Jana had appeared to be annoyed that the boys had played with the clay, hadn't seemed to mind the mess or to be concerned with cleaning up their work space.

## Tyana <br> "They were saying the same different."

The researcher kidded with Tyana at the beginning of the interview and encouraged Tyana to speak more slowly:

Beginning Appendix B2c, Tyana's $7^{\text {th }}$ Grade Interview Cycle 3, Line 2
2. T Hello. My name is Tyana . I'm 12 years old.
3. MJ Geez, were we running a race? Can you say it a little bit more slowly? And you know I'm just teasing you because I know you from $5^{\text {th }}$ grade that's why!

Tyana explained that she had never made or played with Play-Doh, and that she and her classmates had looked forward to what Mr. P had planned for the lesson. Like Jana, when Tyana saw the video clip where Mr. P had stopped talking about Play-Doh when students were discussing and calling each other names, she explained the way she had felt and thought her classmates felt:
20. MJ Maybe there was some name calling. So tell me what was nickname and tell me what was name calling:
21. T (inaudible) You might not get it? But like...
22. MJ Why because I'm old? No. No.
23. T Because like, we first thought of names in science class, beginning of science. I'm called the shrimp. (inaudible) So, like so, so, they, they took it over though. It was for one day but then they were all raging and doing it for every class (inaudible) but only for like one period at a time. And they say like, everyday like, "you that, you that" and then go on and on. And they give teachers nicknames, too.
24. MJ Oh really? So how does that make you feel?
25. T It's funny. Like, it's not like you gotta get mad about it because they ask you, they be like, "would you, would you get mad if we called you this?" And, and, and if you say "yeah" they don't like (inaudible). But if you playing along with the game, they, they say it.

Tyana seemed to believe that using nicknames was a game generally accepted among her peers and was not malicious. Tyana explained further how she understood the purpose and use of nicknames and name calling:
31. T Like, like you have a, a spe, specific name. like say that you act like whatever, it would be like that. But the name, like, we, we, we be playing, we be playing. Like, like name that recognize your head or something. Like they call C "Egg" because she got the egg head. And then, it's like, like, names like it's nothing to be, it's nothing to be ashamed about it's just that. Like you got a name. It's just that you got a name. Like, like if it's a cracker name people you be like. People don't get mad, they add on ways.
34. MJ So, um, it's not that you are being called a name? It's a nickname that you say?
35. T It's not, it's not, it's a nickname, but it's like, it's like a cracker name. It's like, "you ugly". Like, "shut up Jana". Like, we be playing.

Overall, it seemed that Tyana did not believe that the verbal bantering and name calling that she and her peers engaged in was harmful or negative. When Ryan, the boy whose graph had been confusing to Tyana in Cycle, got mad about a name he was called, he was simply "...out of the game now" (Appendix B2c, Line 41. T). The researcher interprets Tyana's explanation for name calling and cracker names to mean that nicknames are intended to be playful, fun and/or funny, and cracker names are intended to be insulting or mean. In other words, a name used to "crack" on someone was meant to be hurtful, disrespectful or even confrontational.

Next, Tyana was shown a video clip where Mr. P had asked the class to think about whether volume and area were the same or different. Nammi had said that she thought that volume and area were the same. When the researcher asked Tyana what she had thought, she replied:
53. T I felt was, I was like it is but it's not because it is, it is because like, like, like you find the whole number of the, of the project. Like the whole number (inaudible). Volume is for like 4 -dimensional shape and then area is for 2dimensional shape. And like, you use it like, like area, like, how can I explain it? It's hard to explain.
54. MJ But did you understand Nammi? Do you think you are thinking um, the way Nammi is thinking? Because she said she thought it was the same thing.
55. T Mmhmm. (as in yes)
56. MJ That area and volume are the same thing. And do you think you agree with that?
57. T Yeah.

The researcher suggested that Tyana draw and label some shapes to help her explain what she was thinking:
82. MJ I just want to make sure that if, if, I want to explain your drawing to somebody else I know what you said, even though it's on the tape. Okay, so would you label any of those numbers? You have 16 here, 16 what?
83. T Is, 1 (muttering, inaudible). This could be, what's this called? Like, like, the sizes. I don't know how to label it. If I could answer it, then Mr. P. if I could answer it or whatever, (inaudible). And he, he, explain it to us on the board.
84. MJ Okay, so you are talking about area in this one. And so, if you were to explain volume, what's different about volume, from area, or is there any difference?
85. T It's different because volume is a (inaudible) like, like. He said, he said in class, like. Like a hexagon, one of them, we talk about size. But, but we do it, we do it, we still working on it. (inaudible)
86. MJ Okay, so it sounds like sometimes you really don't have the words for it. 87. T Yeah.

Tyana seemed confident that she had ideas that were valuable and appeared quite comfortable in trying to make the researcher understand what she was saying. She also appeared confused by whether her thinking or understanding had been different from Nammi's. Tyana used mathematics words, sometimes incorrectly, but had spoken quickly, confidently, and without hesitation. The researcher interpreted these excerpts to illustrate Tyana's confidence in her ability to talk about mathematics, and in her ability to be a contributing member of the classroom community.

At this point in the interview, a second researcher (AA) attempted to understand more about what Tyana knew [about volume and area] and help Tyana clarify what she had wanted to say. For the next nine minutes, Tyana answered questions from both researchers about representing and measuring area and volume:
89. AA Let me see the picture. Can I see the picture you drew? So this was, this was 3...
90. T Yeah.

Tyana appeared very comfortable and willing to share her ideas and answer questions from both researchers.
107. AA That's what. I'm, I'm, I'm, I'm. um, it could have been four times 3 which was what I thought you were talking about earlier. But, I still don't understand what you are counting. What do you talk about when you talk about area?
108. T Like, you talk about area, like, like, you trying to find the size of the shapes. Like, say, say you got graph paper right?

Tyana had asked for graph paper to use to help her explain her ideas.
130. T 1, 2, 3, 4. 1, 2, 3, 4. (Tyana is counting the boxes in a grid she has drawn on paper)
131. AA Okay, why don't you, why don't you...
132. T $3,4,5$. That's five. That's $1,2,3,4,5,6,7$. That'd be 7 . You add them all up and then five times 7 is 35 . So the, so the area would be 35 .
133. AA Okay, okay. 35 what? What are those things?
134. T Squares.
135. AA Little squares!
136. T Yeah.
137. AA So could you find the area of this floor?
138. T (Tyana looks down at the floor) That would take forever.
141. AA But what, what'd you do? Yeah. What would you do?
142. MJ What do you see down there?
143. T (gets out of chair) I would, I would count from here to down there. Then count across, to that way.
144. MJ Count what?
145. T The tiles.
146. MJ The tiles.

Tyana may have understood that she was referring to counting the tiles that cover the floor but appeared unable to access additional vocabulary that would have helped her explain what she meant (e.g. length, width, surface, surface area, covering, shell, region, section). Tyana seemed to be trying very hard to explain what she was thinking of and what she knew to the researchers.
154. AA Yeah. And so if you got an answer, would that be the area?
155. T Hmmm?
156. AA If you got the answer, would that be the area...
157. T Yeah.

Tyana had seemed to remember [length x width] as the measure of area.
165. AA Yeah. And so you were saying something about dimensions? How many dimensions are the, there in these things you were making?
166. T Like, like you got two dimensions. Like two, two dimensions like triangles, squares. Like, like, like the small shapes. but the...
167. AA The flat...
168. T Yeah, but the big shapes like, like a lot of sizes. That's 3-dimensional.

Tyana seemed to have been using the word "size" to distinguish 2-dimensional objects from those that have 3-dimensions.
205. AA Do you see anything around here that has 3-dimensions?
206. T A box.
207. AA Why?
208. T Because a box is not flat.

Tyana's responses uncover some of her understanding of and representations of 2- and 3dimensional objects.
218. T No. Cause how, how, how do you find the area. I think a circle is $360^{\circ}$, right?
219. MJ What do you mean by that?
220. T Like it go around. It'll have, it'll, it'll have like curves or nothing.
221. MJ Does it have curves?
222. T No, like, it, it, it. (inaudible) Like this. Like you know how a square is. Like it don't got none of that.
223. MJ Corners?
224. T Yeah, it just go around.
225. MJ Okay. Could you find the volume of a circle?
226. T I think so.
227. MJ How, um. Tell us what you are thinking. How could, how might you find the volume of a circle?
228. T I think, pi time something. I know it.

Again, Tyana appeared to have had some concepts and algorithms in her head but had difficulty sharing her thinking with vocabulary that explained her mathematical knowledge and ideas.

In the next video clip that Tyana saw other students in the class had been trying to explain the difference between volume and area. The researcher asked Tyana if her classmates' explanations had helped her, and how that had made her feel:
261. MJ ...was saying. Do you think it helped your thinking during, in class? When you were talking about um, volume and area. Did it help your thinking um, to listen to Nammi, to listen to...
262. T Oh yeah because, they were like, like, they were saying stuff, getting like (inaudible) They were saying the same different. (inaudible) I got it right.
263. MJ And how did that make you feel?
264. T Like I knew something.
265. MJ So during the discussion of um, volume and um, area, you felt good?
266. T Mmhmmm.
273. MJ Yeah. Have, have your feelings changed, since then? [the researcher is referring to Cycle 1 interview she conducted with Tyana).
274. T Not really. Like, um. Like, like, if I don't know the problem now, if I don't get the problem, I raise my hand, I raise my hand, I raise my hand now and say "I don't get it'. If I do get it, I raise my hand for the answer.

The researcher interprets this to show that Tyana is comfortable and willing to share both correct and incorrect answers with the teacher and classmates, and believes that her contributions to whole class and small group discussions are valued.

In the last video clip shown to Tyana, she worked with Erica, who participated in this study, and Nammi who has been described above. The girls were using the Play-Doh to make spheres:
292. T Me and Nammi and Erica. To make it um smooth and round so we could fit it into the thing. And then also (inaudible) let me do it, let me do it. I was like, I was like, let me clean my hands so I could do it (inaudible) But Nammi said, (inaudible) "I got a thing with the clay." So, so, so, I put it in, but it wouldn't fit and we were trying to roll it the other way but we had to make it a ball. So as we did that, we all, we all, got a little piece and made it, made it into a little ball and put it into the thing and then cut it, and then you measured, we measured it and something like that.
293. MJ Oh okay, so you all, you ladies were working pretty good together, you were sharing, there was no um, problem with that?
294. T And we had the best clay in the class!
295. MJ Oh (laughs) okay. Let me show you another piece of the same. This is a little bit later, um, very soon after.
298. MJ What happened there?
299. T I was mad. Because I was trying to make a sphere and they, and they took it from me!
300. MJ What did they take from you?
301. T The clay. And, and they, they said, they said I wasn't doing it right. And I was.
302. MJ And just to describe what you did, you mad a sphere that fit right into the cylinder?
303. T Yeah.
304. MJ And then what happened?
305. T And they, they took it from me!
306. MJ They took it? Why'd they take it?
307. T I don't know, they said I wasn't doing it right. But I thought I was doing it right.
308. MJ And how did that make you feel?
309. T Sad.
310. MJ And just sad? Anything else?
311. T I wanted to snatch it back but I didn't.

Near the end of the interview Tyana stated what she had learned from the activity:
315. T Yeah, I learned, I learned, I learned how to work with others.
316. MJ To do what?
317. T To, my, to, to work, to work with another person. I usually work by myself, but now.
318. MJ Even in Mr. P's class?

At different times, Tyana had said that she liked to work with others but also that she sometimes preferred to work alone. She seemed willing and able to work with one partner or several, girls or boys, but may also experience group conflict when she talked more than the other group members. The researcher infers that other students' behaviors towards Tyana may affect her ability to participate and learn in the group, and affect her feelings about herself and the others in the group.

## CYCLE 4

The 2-day Cycle 4 classroom videotaping occurred prior to the school district's preparation for the annual statewide assessment. The test was several weeks away and the district had provided guidelines and materials designed to prepare students for the test. Mr. P had continued to present challenging problems and explorations so that students maintained the mathematics learning community behaviors that had been established and fostered throughout the school year (e.g. collaborative work, multi-step explorations, open ended problem solving). Problem 25 (Investigation 2) in the unit Accentuate the Negative is shown in Figure 4.5 and allowed students to practice graphing positive and negative coordinate pairs to make a shape or figure, and generating new coordinates using a rule. On both days of videotaping the class worked on Problem 25 and discussed positive and negative coordinates, graphing ordered pairs, and following rules to change coordinate pairs.

Figure 4.5 Activity for Cycle 4 (CMP2, Accentuate the Negative, Problem 25)


## Jana <br> "I want them to know that I'm smart"

The interview began with the researcher asking Jana to describe the mathematics lesson that was videotaped in this cycle:

Beginning Appendix B1d, Jana's $7^{\text {th }}$ Grade Interview Cycle 4, Line 8
8. J Um, we was finding coordinates and trying to make a shape and this is the original shape.

Jana described the task as using the new coordinates to "make a bigger shape" (12. J) and finding new sets of coordinates using the rule which Mr. P had been showing to the class (Figure 4.5 Page 54):
19. MJ OK, and you used the coordinates on there? So you were given the first set of coordinates and then you had to find the next set? Was that easy? Did you like that?
20. J Yeah. But Mr. P messed up with some of them.
21. MJ What happened?
22. J His coordinates was wrong.
23. MJ How did you find that out?
24. J Well... because we already knew what the shape looks like because we did it earlier in the year so when we like put all the shapes together, he messed up on some coordinates and we well, Nammi and Erica, they confronted him about it. And then they fixed it and typed it over.
25. MJ Oh. So did you um, understand that there were mistakes in the coordinates? How did that make you feel?
26. J Smart.
27. MJ How so?
28. J Because... I don't know.
29. MJ Do you feel that way a lot in Mr. P's class?
30. J Yes.
31. MJ Yeah? When are the times when you feel smart?
32. J When I answer a question and nobody knows or something.

Jana seems to feel most smart when she can answer a question correctly or may know something before her classmates. Jana felt "smart", and looked and sounded proud to have understood the mistakes in plotting some coordinates. Although Jana characterized Nammi and Erica's pointing out Mr. P's mistake to him as "confronted him about it" (24.
J), she seemed to describe what happened as a typical practice in this mathematics classroom - the teacher and the students participate with respect for each other's ideas, and use mistakes as learning opportunities to strengthen everyone's understanding. For example, Jana did not think the type of task or the group work on a problem was unusual:
37. MJ What about the way you worked. Was it sort of like a typical day or was there anything unusual in the way Mr. P's class went that day?
38. J It wasn't nothing unusual.
39. MJ There wasn't anything unusual? It wasn't different?
40. J Um-um (as in no)

Jana replied "It was OK" (42. J) when asked if she'd liked the activity, and the researcher asked about other activities:
43. MJ How would you compare it to other activities and the work you do in Mr. P's class?
44. J It's not as fun as that project we did when we drew characters and stuff.
45. MJ Anything else? So there was another day when you drew characters?
46. J Um-hm (as in yes)
47. MJ And plotted them using the grid?
48. J Yes.
49. MJ And how did that go?
50. J You want me to tell you like, how it started?
51. MJ Yeah. Why don't you? It's fun.
52. J OK. Um, Mr. P told us to pick a character. And then we had to trace it on the grid and then we had to plot the coordinates and that's when we traced it on the overhead and then we made it bigger by expanding the coordinates and stuff.

Jana recalled the scaling up activity from Cycle 1 which she described as a "fun" project (44. J). Jana may have remembered and felt that way because she had been able to choose her own Ne-Yo character to plot coordinates, find a rule for new coordinates, and make a scaled up character.

The researcher asked Jana about the upcoming statewide test:
63. MJ What has Mr. P told you about the test?
64. J Um, that it was going to be a little challenging for some of us.
65. MJ How did that make you feel?
66. J Nervous.
67. MJ Nervous?
68. J Um-hm (as in yes)
69. MJ Why did it make you feel nervous?
70. J Because...I want to pass the test.

71, MJ Yeah? You want to pass the test? Why?
72. J So I can go into the next grade.
73. MJ Oh. So do you think if you don't pass this test, you don't go to the next grade?
74. J Well, no. But I want them to know that I'm smart and that I know a lot and learned a lot from this year.

Jana added that she began to "study more each night" (76. J) "on my own" (78. J). The researcher interprets this to be consistent with other examples of Jana's desire to think and learn independently whether she is working alone or with a group (e.g. Cycle 1). Jana prefers to work in a group:
88. J Because if I need help, then I could just ask one of my group members instead of Mr. P. Well, it's good that he's Mr. P but he says ask three before me about, it's better if I have a group.

Jana seems confident that her group members are a valuable learning resource in this mathematics classroom and her nervousness about the test may reflect her comfort with working with a group.

The CMP2 lesson was not a district test preparation activity (e.g. practice test book, problem worksheet, lesson on test taking strategies) but Jana believed the activity would help her:
97. MJ How do you think it might help you on the test?
98. J Because I, if we have a, a part where we have to do coordinates and stuff and...
99. MJ Anything else? Was the activity, was this activity something that, something new that you were learning or a review of something?
100. J A review.
101. MJ A review? All of it was a review?
102. J Um-hm (yes)
103. MJ Um, let's see. And you liked this activity? Do you remember anything about that day that stood out in your mind?
104. J Yeah.
105. MJ Tell me about it.
106. J Mr. P wouldn't help me.

The researcher had not shown Jana any video clips yet but she went on to explain that her hand had been raised "for a long time, and then I started calling his name and stuff. Then I went over to where he was and I was trying to get his attention but I guess he was too busy." (114. J). When Jana said things like that happened often and made her feel "um, forgotten" (118. J), the researcher asked:
121. MJ And what do you do when that happens and you feel forgotten?
122. J I just sit back at my desk and not do nothing. And try to understand. And ask one of my group members.
123. MJ Do you think that happens with other students?
124. J Not really.

Although Jana has said she believes that she can rely on her group members for help, it appears that she also relies on Mr. P and expects that he can always help her. Jana talked about trying to get Mr. P's help or attention in every $7^{\text {th }}$ grade interview and seems to believe that there isn't enough time and other students need Mr. P's help more than she does (e.g. Cycle 1: 53. J "...we didn't need his help", 55. J "...he didn't have enough time for us"). It is uncertain why Jana doesn't think other students have the same experiences, however the researcher presumes that Jana may be expressing an adolescent girl's feeling that "this only happens to me".

At this point in the interview the researcher showed Jana a video clip of students working to complete the table of coordinates. Jana knew her own challenge with negative and positive coordinates, and was confident that she could get help from Mr. P or a group member or other student in the class. Jana had gone over to where Mr. P was working with other students and explained:
129. J Martha was helping me.
130. MJ Can you tell us a little bit more about what was going on?
131. J She was um, because on this kind of, on the negative number and positive number graph, for me it's kind of difficult because I don't know which one to put it on so. I was trying to ask Mr. P which one. So. And then that's when I asked him, well, I went to the group and I asked Martha if she could help me so. She was helping me.

Martha and Erica had been helping each other, and Marie was trying to help Jana understand the negative and positive coordinates:
136. MJ And that's what you were asking Martha...
137. J Yeah.
138. MJ To help you with? Were you able to find out the answer to your question from Martha?
139. J Um-hm.
140. MJ She helped explain it to you?
141. J Yes.
142. MJ Would she, who said "don't do it for her"?
143. J Erica.
144. MJ Oh, that was Erica? And she thought she was doing it for you?
145. J Um-hm.
146. MJ But she wasn't actually doing it for you?
147. J The beginning she was. She was like, putting the beginning like the bottom of it, so I could, so she could well so I could start off and finish.
148. MJ And when Erica said don't do it for her, how did that make you feel?
149. J No way really.

Jana seemed to like the way she could "start off and finish" with Martha's help, and appeared not to be bothered by what Erica had said.

The researcher showed Jana another video clip after Martha had helped her and she had walked over to Mr. P at the computer. Jana explained:
152. J Um-hm. I was asking him for help. And he wouldn't listen.
153. MJ Were you the only one asking for help?
154. J No.
155. MJ How did it make you feel?
156. J Forgotten, again.
157. MJ Forgotten, again?
158. J Um-hm.

In the next video clip Jana saw herself sitting near Martha and Erica when Mr. P stopped to help Erica:
164. J Erica and Martha are doing their work. I guess Erica is asking Mr. P for help and he is helping her. And I was just sitting there. I was mad because he wouldn't help me.

Jana felt angry "because he wouldn't listen to me" (168. J). After Jana saw the next clip she described how she felt about not doing math in class:
184. J It wasn't math related at all.
185. MJ Oh, it wasn't math related at all?
186. J She always does that.
187. MJ She always does that?
188. J Well, yeah.
189. MJ How does that make you feel when she asks you to look at math, at work that's not related to math at all, in math class?
190. J It don't make me feel no way but I feel like this is back to Mr. P, because he's allowing us to use the computer and she's not using it in a math way in one of his class.

Jana seemed to believe that everyone was expected to do math during math class and sounded annoyed that Clara often did other work. Despite the learning community that had been fostered in this class and among the teacher and students it appears that Jana relied heavily on Mr. P for both individual help and class leadership.

## Tyana

"I'll do my work but after I do my work whiles he's talking, I put my head down"
Tyana had been shown a video clip of herself working on this task with Clint. Tyana first talked about completing the chart in Figure 4.5 and told the researcher what she understood about using a rule to find new coordinates, and then plotting the ordered pairs to make a picture of a WUMP character. The researcher asked Tyana to explain the task:

Beginning Appendix B2d, Tyana's $7^{\text {th }}$ Grade Interview Cycle 4, Line 9
9. MJ So tell me about the work. What's going on here? I see, I see coordinates and then I see graph paper. So what's...
10. T Yes, this (inaudible), we had to fill in the numbers, like we had to do like negative 4 times 2 equals negative 8 . We had to do like for each one, the (inaudible) rule. Adding the - we had to graph it, you had to use the coordinates that we did right here and make a mug.

Tyana also remembered that Mr. P had incorrectly plotted several coordinates and had had to print out another table to show on the overhead projector. She seemed to have been assured that mistakes could be made by teachers while doing mathematics, and had even referred to Mr. P in a very informal way:
21. MJ Who messed up?
22. T P . So...

The researcher had never heard Tyana refer to Mr. P or any researcher or other teacher in such an informal way. In some African-American communities, including the researcher's own immediate and extended family and community, children are often expected to address adults as Mr . and Mrs. or Miss followed by the last name or the first name in some informal situations, such as when the adult is very young. Tyana's statement may reflect a spontaneous "in the moment" feeling of confidence and autonomy that may have been fostered in this classroom, and the informal, personable and contemporary ways in which Mr. P was able to interact with students (e.g. seeing students outside of school and around town, listening to and buying hip-hop and rap music).

In the video clip Tyana could been seen comparing her work to her group mate's which may reflect Tyana's initiative and ability to evaluate the correctness of her own answers and/or to help a group mate to correct their own work. She compared her own coordinates to her group mates, and seemed to reason that Clint's work was probably
incorrect because it looked different from hers and other students'. She stated "...everybody gets in the middle like that. But he's way over there" (34. T). It is not clear whether Tyana misspoke (what she meant or the number she was looking at) or whether she herself may have been confused about using the rules in the table to find the new coordinates. The researcher asked Tyana more about working on the task:
35. MJ So what did you find that was different? Did you find that a particular set of coordinates that were different?
36. T Yeah, like a number like, he multiplied two times. Like he did, so he got 4 times 2 . He got 4 times 2 it was, equals 8 . He did another time, 2 times 8 is 16 . He was doing like that. But no can do like that. He got all wrong and I told him he was wrong.
37. MJ Oh. So how did that make you feel?
38. T Smart.

Tyana watched more of the same video clip and saw that Mr. P had come over to her group. Tyana described how she felt when Mr. P had thought she had been copying answers rather than working to find answers:
45. MJ So how did it make you feel when Mr. P thought you were copying?
46. T Like he probably thought that I copied because on that day I was tired. So he (inaudible) copied so I could get my work done. But I did my work, I did not copy.
47. MJ Does that happen often when you come to class maybe tired or with an attitude?
48. T I put my head down. I'll do my work but after I do my work while he's talking, I put my head down. I'll probably go to sleep. Then I wake up and fall into the lunch part.

Tyana said that on that day she had been tired and she appeared to be very annoyed that Mr. P had thought she was copying someone else's work. . Although Tyana had put her head down she seemed to believe that it was important to be responsible and accountable for doing her own work. Tyana commented on her own frustration and exasperation but seemed willing to persevere:
51. T Because I had all of them, I did all of them, but I put them in the wrong place. I was getting frustrated so I give up, I give up. I kept, I put (inaudible) all four in the wrong place. I had too many 4s. I had (inaudible) Clint (inaudible) look. I said oh, I give up, I give up. And Mr. P came over. He was like, (inaudible) answer like that. And I had to do it all over again.
52. MJ At one point you said you give up, but that really wasn't - do you feel like that a lot, like giving up?
53. T Yeah but $I$, you have to do but I still keep working.
54. MJ You still keep working? Um, tell me about how you felt that day. Was it a typical day?
55. T I mean it was like (inaudible)
56. MJ It's like a what?
57. T (inaudible) I came in with an attitude, but I showed them my attitude. Because when I have an attitude, I keep it (inaudible) and then Clint (inaudible) aggravated. I give up, I give up, I give up. But then he (inaudible) again.
58. MJ So it was typical in the way you feel in math class?
59. T Yeah, sometimes.
60. MJ You said sometimes. What was different about it?
61. T It's just that like he was over there telling me something. (inaudible) over there. I was getting frustrated. I was like, I was like, I was like y'all leave me alone. But that's (inaudible) kept talking but I blocked them out.

Tyana said that she had felt frustrated and aggravated, but seemed to value her own perseverance. The researcher believes that Tyana may also have been frustrated with herself because she was tired and making mistakes from putting coordinate pairs in the wrong place. Tyana's own fatigue and attitude may have contributed to her aggravation with Clint.

The last five minutes of the interview focused on the state test that would be administered in the district the following week. Tyana said the test was different: "Because this is a big test" $(97 . \mathrm{T})$ and "Like, like this is the test for the year just to show what you learned and what you need more to learn for next year" (99. T). The researcher asked Tyana how she felt about the test and how, if at all, had Mr. P's lessons had changed in preparation for the test:
101. T I don't think he's worried about it but like us be nervous because our teachers they (inaudible) you got to learn this. Mr. P, he teaches what he was teaching.
102. MJ Oh, so that was different than what your other teachers...
103. T Yeah. Because my teachers, they'd be like, test coming up so we got to go over this, go over that. Mr. P say, if we know, if we look and pay attention while he was talking and stuff, doing work, we should have no problem. But if you weren't paying attention, you might have a problem.
104. MJ How does that make you feel?
105. T I felt (inaudible) but then again, like I'm looking at what he's talking about. I hear what he's saying like later on in the day, like when he was saying (inaudible) I understand.
106. MJ So you don't think Mr. Ps classes have changed any? It's pretty much what you would normally do? Or is it different?
107. T No, I don't think it's different. I think it's the same.
108. MJ Do you do anything special to prepare for the test? Are you doing anything special?
109. T Study. I study.
110. MJ Are you studying differently?
111. T Yeah. We (inaudible) skip to but now (inaudible) the test's coming up so I just she's like go study for that test. Thirty minutes studying. I take 30 minutes a day for the test. (inaudible) like I take like all my old work that I had before and I add them up and I was like, I erased my answers and do it over. To see (inaudible). I know (inaudible).

Tyana believed that Mr. P was confident in his students' abilities, and seemed to believe that he was doing a good job to prepare the class for the state test. She seemed confident that her strategy of reviewing her previous work and tests was a good way to study, and was different from regular studying.

## Erica

"Are you gonna make a book? On us?"
Interview conducted between Cycles 4 and 5 on 4/25/2007
A principal researcher (I) from the MetroMath affect study conducted the interview with Erica who said that she had come from Jamaica with her mother and older sister and brother when she was two years old. Her grandmother and other relatives still live in Jamaica but her dad had since died. Erica lived with her mother, but her brother
and sister attended a local college and merchandising institute, respectively. The interviewer chatted with Erica who said that she had four birds and a little dog, had run cross-country track for two years before the program was reduced to relay which she didn't like, and was anxious about the family's plan to go on a cruise during summer vacation.

The interviewer asked Erica how she felt about school:
Beginning Appendix B3, Erica's $7^{\text {th }}$ Grade Interview, Line 91
91. I Yea. Umm, what's your favorite class in school?
92. E Mm...
93. I Do you like school?
94. E Yea, it's okay.
95. I It's okay?
96. E Sometimes.
97. I Sometimes. What makes it okay, and what makes it not?
98. E The kids make it okay.
99. I Your friends?
100. E My friends, yea. And I just don't - some teachers make it not. Some teachers. Not Mr. P, though.
101. I Really?
102. E Sometimes annoying, but he okay.
103. I Annoying, but okay?
104. E nods
105. I Uh, and what - what makes a good teacher?
106. E Mm, somebody that help you and understands and don't say you're wrong, I guess.

Erica also told the interviewer that she went to an after school program where she could get help with homework in ELA or math classes and "go on the computer" (114. E) but did not say if teachers were there to help.

Erica remembered some of the videotaped math lessons and was able to describe Problem 25 (Figure 4.5):
120. E I don't remember. We was trying to make clay.
121. I You remember the clay one. I think we all remember that. What was that about?
122. E And I think we had - I think you was there, but I don't think you all was interviewing when we was making the wumps?
123. I The wumps. That was the most recent one.
128. E We was umm, using the uh, umm, we was using like two to six. We was trying to make it on a grid using coordinates to make it on the grid to see like how did it change, did it flip or rotate. Stuff like that.
129. I What do you mean?
130. E Like, okay, first he would give us like a wump and it would be like in the middle. Then he like give us another set of coordinates and like, the wump would like move up, so he would ask, "Did it flip or rotate or turn?" He would ask like "How did it get there?" and "How much coordinates did it take over to get there?"
131. I $\mathrm{Mm} \mathrm{hmm}, \mathrm{mm} \mathrm{hmm}, \mathrm{mm} \mathrm{hmm}$. And so you're working on that. I do remember - that was the last time.
132. E Mm hmm.
133. I ...we were here, I think. Can you remember any of the other times we've been here, or any other things that were important that you've done in math?
134. E I probably didn't - I don't remember. I only remember clay, the wumps, and I think you all was here when we was making the carton characters.

Erica also remembered the Cycle 2 Unit Project (Figure 4.3):
158. E Yea, it was, cause we got to pick our own cartoon character, so it was okay.
159. I Yea, uhh, and that - that made it interesting for you?
160. E Yea.
161. I And do you think other people in the class thought so too?
162. E Yea, cause they was trying to find their own cartoon character was better, or - yea, it was fun.

Erica was shown a video clip and then described the difficulty she had had finding coordinates for her Stewie cartoon:
181. E I was trying to make a diamond, right? But it keep on cutting in half, so I didn't - I couldn't find the coordinated for it. See that? (inaudible) See that design went in. 1, 2, 3, 4, 5, 6... Okay... All right, cause I couldn't understand like, I couldn't understand this is 6.6 but like, right here. These.
182. I Oh the ones that weren't...
183. E Weren't on the line. I couldn't really figure out.
184. I Yea, so you got frustrated. That was - that was when you said that.
185. E I was trying to like - I couldn't understand like since it's cut in half, what would it be. And like, I don't think like kids would know like to go... But like, that's what I was trying to figure out.

When the interviewer asked Erica about working in her group, she replied "Yea, they help me sometime, when I don't understand, they help. But yea, we have new groups now".

Erica also thought that the task was easy after Mr. P had helped with her Stewie cartoon and said why she liked math:
228. E No. I like math.
229. I Do you? Why?
230. E Cause it's important. Every job you get, you have to know math. Or else you ain't gonna get a job.
242. E I don't love it, but I like it cause I need it.
244. E So I try to do my best with it, cause I know if I don't know math, then I can't get nowhere.

It appears that Erica believes that math will be most valuable to her for getting a job.
Erica remembered that Mr. P had made a series of mistakes during the Cycle 4 activity (Figure 4.5) and said "He messed up on the nose and the mouth" (287. E):
298. I How do you feel when - how'd you feel when you caught him messing up? 299. E Hmm?
300. I How did you feel?
301. E I felt happy.
302. I Why?
303. E Cause. I was happy he messed up.

It was Erica and her group members who had recognized Mr. P's mistake and she was happy "Because. He don't like admitting it, but he did. He had to." (313. E). Erica said the class often worked in groups to help each other on activities and stated what she thought made a good group: "If the person - if the person like knows about math and you talk to them a lot, they're your friend." (327. E). Erica also described how she and her classmates interacted when groups presented their work:
345. E Yea, they ask us questions like how do we come up with the answer, and why is it this, and we just tell them what we did.
346. I Yea, yea. And you sort of like doing that. Uh, how do you feel when other students don't agree with your answer? Does that ever happen?
347. E Yea, but that's their opinion, so I can't tell them they're wrong or they're right. But that's their opinion. I was right, though.
348. I You were?
349. E Yea. We was right, cause it was a group project.

The researcher believes that Erica's feelings about her own mistakes, other students' and the teacher's mistakes, and working in groups on projects reflect her belief that she is a valued member of a learning community in this mathematics class.

Erica was asked to describe what would be a perfect math class:
384. I, I mean, what would make it really good?
385. E Pretty good... umm, the problems that we do, like, if they was interesting like the clay problem or the pizza problem, when he brought in pizza. That was interesting cause there's food.
386. I So you like thing that are real?
387. E Yea. Like you get to physically do instead of with your head. Problems like that.

Erica thinks that some of her classmates' behavior can make hands-on activities frustrating for Mr. P and makes everyone's learning harder:
393. E Yea, if they're quiet when Mr . P is like trying to tell us what to do because after a while, he just get frustrated and tell us to read it ourself. If it was quiet, probably we all understand more.

Erica suggests that some student behaviors impact negatively on the learning community.
The interviewer then asked "what do you think math is?" (400. I) and "is it just numbers?" (402. I):
403. E Numbers. Number sentence. Then dividing, multiplying, and shapes, patterns, coordinates. That's it.

At the end of the interview Erica had an opportunity to ask the interview questions and she wanted to know about the research that was done in her math class and
asked "Are you gonna make a book? On us?" (409. E). She told the interviewer what she believed to be the important ideas about the class and Mr. P:
413. E Of the book? How we work together, and Mr. P of course.
415. E Mr. P, and the problems that we did.
419. E Cause. He - he understand us sometimes. And he won't tell you that you're wrong. That one - cause kids don't like hearing that they're wrong. But he won't tell you that you're wrong. He just tell you how to fix the problem. But he's a good teacher.
423. E Well, not tell you - well, he say that it's not right, but he won't be like, "Oh that's wrong", that like snap in your face or something. But just tell you like "That's not really right" and then tell you what to do to make it better.
425. E Yea, he ask us question, make us think. Sometimes. After a while, you'll get it.

The researcher interprets "snap in your face or something" to refer to teachers (and other adults) who may focus on students' mistakes, maintain control of the classroom without student input, or often yell at students in ways that hurt their feelings. The researcher believes that Erica appreciates "good" teachers who don't control classroom activities and learning by telling students that they are wrong without helping them "fix the problem" or telling how to "make it better". It seems that Erica also believes that "good" teachers make mistakes, sometimes do not hear what students are saying, and that the research conducted in her $7^{\text {th }}$ grade mathematics class is important enough to put in a book.

## CYCLE 5

The final cycle of classroom videotaping took place at the beginning of June with just days remaining in the school year. Mr. P had presented the combinatorics problem shown in Figure 4.6 to the class and had asked them to work on it in groups of three or four, and to prepare a presentation of their solution.

Figure 4.6 Activity for Cycle 5


On the first day students worked in small groups to discuss strategies for finding the solution to the problem and ways the group's solution could be shown in a presentation to the class on the second day. Mr. P had promised that the class would be treated to pizza for lunch after the presentations. Jana and Tyana worked together with three other students on this problem.

## Jana

"And then we ate the pizza"
The researcher had conducted three of the four previous interviews with Jana and started the interview by asking Jana to reflect on lessons she thought were the years' most memorable. Jana recalled that she had liked the Cycle 2 scaling up "project" (12. J), "the, umm, the one with the cartoons? Where we had to do the cartoons?" (14. J).

Jana was shown a classroom video clip of students busily working in small groups on the pizza problem. Jana remembered the activity:

Beginning Appendix B1e, Jana's $7^{\text {th }}$ Grade Interview Cycle 5, Line 23
23. J I think, umm, we was doing - we was doing a project. Well, it wasn't a project, but we was doing a problem, and it was about pizza, and it had four toppings, and we had to, umm, and we had to see how many combinations we could make with those four toppings.
24. MJ Oh, okay. Did you have any ideas about that before you started working with your group?
25. J About the answer?
26. MJ Uh huh.
27. J Uh, yes.
28. MJ You did! What ideas did you have even before you started?
29. J You mean my strategies?
30. MJ Mm hmm.
31. J Oh. I was gonna - I was gonna start with one topping first and then do all of them and then start with the next topping until (inaudible).

It seemed that Jana first thought about the answer (e.g. predicting, estimating), and then about a strategy for getting the answer. Jana seemed to have considered The Pizza Problem to be a "project" since there were many ways that she and her group members could solve it and show their work, and maybe because there would be pizza for everyone after presentations.

The next clip that Jana watched showed Mr. P addressing the whole class. Jana explained:
34. J He was saying cause I guess some groups was getting mad that he didn't get to them yet to help them, so he was just saying that he was gonna get to every group, and he was yelling at (inaudible) talking back or something.
35. MJ Now you were working in a group. Who was working in your group for this, uh, problem?
36. J Martha, Tyana, Jan, and Rick.

Jana had spoken about waiting for help from Mr. P when he was working with other students and groups in each of the previous four interviews. In Cycle 4 interview, Jana
seemed to have believed that few if any other students in the class, if any, felt as if they had been "forgotten" like she had felt. Jana may have realized that "projects" and working in groups made math class fun, but she and her classmates sometimes got "mad" when they couldn't get Mr. P's help and attention.

Jana said that she had recently been working with a different group of students but did not seem bothered:
41. MJ So how do you feel about that? This wasn't your normal group for working on a math problem. How did that make you feel? To have a change in the groups.
42. J I don't know.

Jana was most likely not bothered because Mr. P had asked the class to work in groups that had been assigned for an upcoming school-wide activity.

The next video clip showed Jana's group working and then sending Martha to ask Mr. P a question. Mr. P had stopped working with one group and told to the whole class that he would get around to help each group but only if he was not interrupted to answer individual questions:
48. MJ Ohh. You sent her to go up and ask Mr. P a question, huh. Oh. So how do you feel about how he responded to, umm, Martha and to the whole class?
49. J I felt okay, but he always say that, and he always gets to the group I'm in last.
50. MJ He always gets to the group you're in last?
51. J Mm hmm.
52. MJ You think? How does that make you feel?
53. J Bad.
54. MJ Aww. So even though this was a different group, it - it seems like he always gets to your group last?
55. J Mm hmm.

Jana may feel and be resigned that she or her group will be "forgotten" whenever she works in a group. When Jana sees the next video clip she remembers how she felt when Mr. P came to her group:
60. MJ Ahh... check it out. We see Mr. P came over to the group and pulled his chair up and sat down. So how does that make you feel?
61. J Better. But he still got there last! [Bell sounds]
62. MJ Okay, let's wait until the bell... Okay, I'll ask you again. So Mr. P is at your group. We're seeing he pulls up a chair and sits down. How does that make you feel?
63. J It makes me feel good, but - it made me feel better, but we was still last. I mean, he still got there last.

Each member of Jana's group had been writing down their own solutions but together they had been "putting our information on a poster" (65. J). Jana's group had decided that Jan's answer was right and that she should tell Mr. P:
84. MJ Okay. So she was talking to Mr. P about her solutions? Was it a solution that all of you understood, or...
85. J Yeah, she explained it to us. Then we understood it. And he got over there, so she - since we was using her solution, umm, she was the one that explained it to him.

The researcher asked Jana if she could explain Jan's strategy. Jana said that she understood but couldn't explain it because "it's like, long, but I understand it, but I can't explain it back" (90. J). Jana did explain her own strategy but seemed unsure why she had still made mistakes:
92. J I, umm, I was - since the toppings, I mean, the pizza toppings is on the paper, I was tallying them up every time I did a combination.
93. MJ When you say tallying them off, how...
94. J I - I had the sheet, then I got a sheet of paper, and I did like, pepperoni and peppers and mushroom and...
95. MJ Sausage was the other one.
96. J Yeah.
97. MJ Pepperoni, sausage, peppers, and mushrooms. Those were the four choices for the toppings.
98. J Mm hmm.
99. MJ Mm hmm.
100. J So, I did a peppers and mushrooms, then I tallied it, cause that was a combination, and then peppers and pepperoni, and then I just found them all.
101. MJ Oh. Did you actually write out the combinations?
102. J No. Well, at first, I did, but then, I kept on starting over cause I messed up.
103. MJ What do you mean, you messed up? Why did you have to start over cause you messed up? What does that mean?
104. J Cause... I don't know. I was - I think I was counting them wrong.
105. MJ What do you mean?
106. J Mm... I don't know
107. MJ I think of the end [of the clip], when he was still sitting at your group, Mr. P asked you, umm, how do you know you have them all? Or how do you know you didn't repeat any? Can you tell me a little bit about what you were thinking about how to answer those questions? How do you know you have them all, and how do you know you didn't repeat it?
108. J If you write them down.

The researcher showed Jana several video clips of groups presenting their solutions to the class on the second day. Students had moved their chairs to the front of the room to create an audience for the group that was sharing their strategy and solution poster. During one group's presentation, Tyana had asked whether the group's final answer was 19 or 16. It is not clear whether Jana really had the same question:
127. MJ So Tyana, who was in your group, asked the question. What did you, uh, did you have the same question?
128. J Uh... yeah.
129. MJ Do you remember, uh, what the response was?
130. J I think he said cause they had - they added cheese. Well, it was a - cheese was a basic topping, but yeah, I think that's what he said.

The next clip showed Jana and Tyana holding their group's poster and solution. Jan spoke for the group and even showed how Jana had been writing out the combinations.

The researcher asked how this made Jana feel:
156. J It made me feel, like, okay, well, since I - I really understood it when we was at the group. It really didn't make me feel (inaudible) but, umm, now I really - I can't understand it no more, cause when she was explaining it, it was kind of different from when she was explaining it at the group.

Jana seemed to be trying to make sense of her group member's explanations and seemed to be comfortable in the group. For example, Jana appeared to be persistent and not embarrassed that she hadn't finished her own work:
162. J Umm, it made me feel okay, cause I really wasn't done with my strategy yet, well, with my answer.
163. MJ So you think you could have worked more?
164. J Mm hmm.
165. MJ You would have been willing to work more, umm, cause you weren't sure that you'd finished?
166. J Mm hmm.

Jana tried to make sense of her group member's strategies and of the presentations but had difficulty explaining what she had seen them do or heard them say. For example "well, it's a little similar, because she took the, umm, the toppings and - and she, like, I don't - I can't explain" (191. J). However, Jana believes that listening to others other strategies and solutions helps her own thinking.

Jana would not have wanted to work on this problem by herself:
205. J I would feel slow, but I would feel like, you know, like all the groups are getting done before me. Or maybe I would have felt like fast, sort of, because people, like, it was a lot of people in my group, and they was like talking a lot and - and they was talking a lot, and maybe that just got me off track or something.

Jana still prefers to work "with a group" (209. J).
The researcher asked Jana about the problems she did in math class and math problems outside of school:
234. MJ Ohh. Umm, do working on these kinds of problems in math class, umm, make you think about anything that you experience outside of school, outside of Mr. P's math class?
235. J Pizza.
236. MJ Pizza? So now every time you go order a pizza, you're gonna remember - you're gonna think about this problem, huh?
237. J Mm hmm (yes)
240. MJ Any other real-life situation that it makes you think of when you think of figuring out how many combinations?
241. J Mm mm (no)
242. MJ No? So this was an interesting problem for during class, right. During school. School mathematics. But not so much outside?
243. J Mm hmm (yes)

Jana had enjoyed the pizza "project" and eating real pizza from a popular downtown restaurant with Mr. P and the class. Jana was not able to "mathematize" any other realworld mathematics situation during this interview.

## Tyana

There was no Cycle 5 retrospective interview with Tyana.

## Summary of Retrospective Interview Critical Events

Themes that emerged from the critical events identified in $7^{\text {th }}$ grade retrospective interviews as interpreted by the researcher are summarized in Table 4.1:

Table 4.1 Summary of $7^{\text {th }}$ Grade Critical Event Themes

| Theme | Girl | Cycles |
| :---: | :---: | :---: |
| Community of math learners <br> Everyone in the class is a learning resource and member of the math learning community. The teacher and everybody can help me, and I can help them. It's OK to have wrong answers, to make mistakes, and to ask each other questions. | Jana | 1, 2, 4 |
|  | Tyana | 1,2, 3, 4 |
|  | Erica |  |
| Group work and "projects" <br> Working in groups is usually a good thing. <br> Figuring out a problem on your own is good, too. <br> Hands-on activities and real problems can be fun projects Socializing can make learning fun | Jana | 1, 2, 3, 4, 5 |
|  | Tyana | 2, 3, 4 |
|  | Erica |  |
| Time with Mr. P <br> Mr. P can't help [me/my group] because there isn't enough time. <br> Mr. P doesn't think [I/we] need help. <br> Mr. P thinks other students need his help more than [I/we] do. | Jana | $1,2,3,4,5$ |
| Emotions affect behavior in math class. <br> I'll just sit or put my head down and won't do anything when the teacher thinks I'm not working or when I feel like I'm forgotten. | Jana | 2, 4 |
|  | Tyana | 4 |
| Tools <br> Using a calculator and making drawings on graph or chart paper helps me figure things out and explain my work to other people. | Jana | 1,2 |
|  | Tyana | 2, 3 |
|  | Erica |  |
| Explaining thinking <br> I can't explain what I mean. <br> I can't explain what she/he means, but I understand. | Jana | 5 |
|  | Tyana | 3 |
|  | Erica |  |
| Mathematics: <br> Math is numbers and shapes <br> Math is know or memorizing formulas <br> Studying more can help you pass tests <br> Math is useful to get a job or used on the job | Jana | 4 |
|  | Tyana | 3 |
|  | Erica |  |

## 4.3 $7^{\text {th }}$ Grade Affect Study Student Surveys

The Affect Study Student Survey was administered at the beginning and the end of the $7^{\text {th }}$ grade school year. The responses to items that pertain to identity are presented below for each of the five girls who participated in this study. Items that may reflect stable dimensions of the girls' mathematical identity are highlighted. See Appendix C for full surveys.

Table $4.27^{\text {th }}$ Grade Affect Study Student Survey: Jana

| Survey Item | Grade 7 Entrance <br> (age 12) | Grade 7 Exit <br> (age 12) |
| :--- | :--- | :--- |
| 2. I don't expect to use much <br> math when I get out of school. | Disagree | Neither |
| 3. I'm not the type to do well in <br> math. | Strongly disagree | Disagree |
| 8. I study math because I know <br> how useful it is. | Agree | Neither |
| 13. My family would be proud <br> of me if I were a good math <br> student. | Neither | Neither |
| 14. I expect to use math lots of <br> ways when I'm an adult. | Agree | Strongly agree |
| 19. My grades aren't very <br> important to my family. | Strongly disagree | Strongly disagree |
| 21. I am good at doing hard <br> math problems. | Agree | Agree |
| 24. My life outside of school <br> makes me want to do well in <br> math class. | Neither | Neither |
| 26. I am sure I can learn math. | Strongly agree | Strongly agree |
| 27. It would mean a lot to me to | Strongly agree |  |
| get A's in math. | Disagree |  |
| OE40. How do you think you <br> will use math when you are an <br> adult? | If I don't have a calculater (sic) then I could <br> count my money. or I can see if a cashier at <br> the store is trying to short. | When I count my <br> money or at work. |

Items that may reflect stable dimensions of Jana's mathematical identity are highlighted
in Table 4.2:

- 3 Jana believes that someone like herself can do well in math
- 13, 19 Jana's family may play an important role in Jana's mathematical identity development
- 21 Jana believes in her own ability
- 24 Jana feels neutral about the value of math to her life outside of school
- 26 Jana believes in her ability to learn math

Table 4.3 $7^{\text {th }}$ Grade Affect Study Student Surveys: Tyana

| Survey Item | Grade 7 Entrance (age 12) | Grade 7 Exit (age 12) |
| :---: | :---: | :---: |
| 2. I don't expect to use much math when I get out of school. | Neither agree or disagree | Disagree |
| 3. I'm not the type to do well in math. | Strongly disagree | Strongly disagree |
| 8. I study math because I know how useful it is. | Agree | Agree |
| 13. my family would be proud of me if I were a good math student. | Agree | Strongly agree |
| 14. I expect to use math lots of ways when I'm an adult. | Agree | Agree |
| 19. My grades aren't very important to my family. | Neither agree or disagree | Strongly agree |
| 21. I am good at doing hard math problems. | Agree | Neither agree or disagree |
| 24. My life outside of school makes me want to do well in math class. | Disagree | Strongly disagree |
| 26. I am sure I can learn math. | Strongly agree | Strongly agree |
| 27. It would mean a lot to me to get A's in math. | Agree | Strongly agree |
| OE40. How do you think you will use math when you are an adult? | By working with a cash [illegible] say if, I, I on a [illegible] I [illegible] count money | When I am a vocation I count the [illegible] [illegible] count money |

Items that may reflect stable dimensions of Tyana's mathematical identity are highlighted
in Table 4.3:

- 3 and 26 Tyana believes that someone like herself can learn and do well in math.
- 8 and 14 Tyana believes that math is important and will be useful to her as an adult

Table $4.47^{\text {th }}$ Grade Affect Study Student Surveys: Shaniyah

| Survey Item | Grade 7 Entrance (age 12) | Grade 7 Exit (age 13) |
| :---: | :---: | :---: |
| 2. I don't expect to use much math when I get out of school. | Strongly disagree | Strongly disagree |
| 3. I'm not the type to do well in math. | Disagree | Disagree |
| 8. I study math because I know how useful it is. | Neither | Neither |
| 13. My family would be proud of me if I were a good math student. | Strongly agree | Strongly disagree |
| 14. I expect to use math lots of ways when I'm an adult. | Agree | Agree |
| 19. My grades aren't very important to my family. | Strongly disagree | Strongly disagree |
| 21. I am good at doing hard math problems. | Neither | Neither |
| 24. My life outside of school makes me want to do well in math class. | Strongly agree | Agree |
| 26. I am sure I can learn math. | Neither | Neither |
| 27. It would mean a lot to me to get A's in math. | Neither | Agree |
| OE40. How do you think you will use math when you are an adult? | In my job or using my car for gas | with my job |

Shaniyah's responses on the two surveys were almost identical and seem to reflect stable
dimensions of Shaniyah's mathematical identity. However, Shaniyah responded strongly agree at the beginning of the $7^{\text {th }}$ grade school year and strongly disagree at the end of the school year to item 13 highlighted in Table 4.4. It is unclear what factor(s) caused the different responses to items 13 and 27 or whether the responses may be related in some way. Shaniyah responded "disagree" that she is not the type to do well in math (item 3) but may be uncertain about her ability since she twice responded "neither" that she is sure that she can learn math (item 26).

Table 4.5 $7^{\text {th }}$ Grade Affect Study Student Surveys: Erica

| Survey Item | Grade 7 Entrance (age 12) | Grade 7 Exit Absent |
| :---: | :---: | :---: |
| 1. I usually like doing math. | Agree |  |
| 2. I don't expect to use much math when I get out of school. | Strongly disagree |  |
| 3. I'm not the type to do well in math. | Disagree |  |
| 8. I study math because I know how useful it is. | Strongly agree |  |
| 13. My family would be proud of me if I were a good math student. | Strongly agree |  |
| 14. I expect to use math lots of ways when I'm an adult. | Strongly agree |  |
| 19. My grades aren't very important to my family. | Strongly disagree |  |
| 21. I am good at doing hard math problems. | Strongly agree |  |
| 24. My life outside of school makes me want to do well in math class. | Strongly agree |  |
| 26. I am sure I can learn math. | Strongly agree |  |
| 27. It would mean a lot to me to get A's in math. | Strongly agree |  |
| OE40. How do you think you will use math when you are an adult? | To see how mush (sic) oz go in a bottle |  |

Erica did not complete the exit survey. Her responses at the beginning of $7^{\text {th }}$ grade seem to indicate that she holds strong beliefs since she responded strongly agree or strongly disagree to all but 2 items. Erica appears to believe that she is the type to do well in math (item 3) and usually likes doing math (item 1).

Table 4.6 $7^{\text {th }}$ Grade Affect Study Student Surveys: Pamela

| Survey Item | Grade 7 Entrance (age 12) | Grade 7 Exit (age 13) |
| :---: | :---: | :---: |
| 2. I don't expect to use much math when I get out of school. | Strongly disagree | Neither |
| 3. I'm not the type to do well in math. | Neither | Strongly disagree |
| 8. I study math because I know how useful it is. | Agree | Strongly disagree |
| 13. My family would be proud of me if I were a good math student. | Strongly agree | Neither |
| 14. I expect to use math lots of ways when I'm an adult. | Strongly agree | Agree |
| 21. I am good at doing hard math problems. | Strongly agree | NR |
| 24. My life outside of school makes me want to do well in math class. | Neither | Neither |
| 26. I am sure I can learn math. | Strongly agree | Strongly agree |
| 27. It would mean a lot to me to get A's in math. | Strongly agree | Neither |
| OE40. How do you think you will use math when you are an adult? | When you are in a store and they will not give you all the meony (sic) and you will know. Or your job will not give you all your meoney and than your know. | Counting money! |

Items that may reflect stable dimensions of Pamela's mathematical identity are highlighted in Table 4.6:

- 24 Pamela has neutral feelings about the value of math to her life outside of school
- 26 Pamela believes in her ability to learn math


## Summary of $7^{\text {th }}$ Grade Affect Study Student Surveys

Table 4.7 Summary of $7^{\text {th }}$ Grade Affect Study Student Surveys - Focus Girls

| Item | Girl(s) <br> (same response on both $7^{\text {th }}$ grade surveys) |
| :--- | :--- |
| 3. I'm not the type to do well in math. | Tyana: strongly disagree |
| 8. I study math because I know how useful it is. | Tyana: agree |
| 13. My family would be proud of me if I were a good math <br> student. | Jana: neither |
|  | Shaniyah: strongly disagree |
| 14. I expect to use math lots of ways when I'm an adult. | Tyana: agree |
| 19. My grades aren't very important to my family. | Jana: strongly disagree |
| 21. I am good at doing hard math problems. | Jana: agree |
| 24. My life outside of school makes me want to do well in math <br> class. | Jana: neither |
|  | Pamela: neither |
| 26. I am sure I can learn math. | Tyana: strongly agree |
|  | Shaniyah: neither |
|  | Pamela: strongly agree |

Table 4.8 Summary of $7^{\text {th }}$ Grade Affect Study Student Surveys - Non-Focus Girls

| Item | Girl(s) <br> (same response on both $7^{\text {th }}$ grade surveys) |
| :--- | :--- |
| 3. I'm not the type to do well in math. | Shaniyah: disagree |
| 8. I study math because I know how useful it is. | Shaniyah: neither |
| 13. My family would be proud of me if I were a good math <br> student. | Shaniyah: strongly agree <br> Erica: <br> Pamela: |
| 14. I expect to use math lots of ways when I'm an adult. | Shaniyah: agree <br> Erica: <br> Pamela: |
| 19. My grades aren't very important to my family. | Shaniyah: strongly disagree <br> Erica: <br> Pamela: |
| 21. I am good at doing hard math problems. | Shaniyah: neither <br> 24. My life outside of school makes me want to do well in math <br> class.Pamela: neither <br> 26. I am sure I can learn math.Shaniyah: neither <br> Pamela: strongly agree |

### 4.4 Protocol 1 High School Affect Study Student Surveys

Table 4.9 High School Affect Study Student Surveys

| Survey Item | Jana <br> Grade 9 <br> (age 15) | Tyana <br> Grade 11 <br> (age 16) | Shaniyah <br> Grade 11 <br> (age 15) | Erica <br> Grade 11 <br> (age 15) | Pamela <br> Grade 11 <br> (age 15) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 2. I don't expect to use much math when I get out of school. | Strongly disagree | Disagree | Disagree | Agree | Strongly disagree |
| 3. I'm not the type to do well in math. | Strongly disagree | Strongly disagree | Disagree | Strongly disagree | Strongly disagree |
| 8. I study math because I know how useful it is. | Agree | Disagree | Agree | Strongly disagree | Agree |
| 13. My family would be proud of me if I were a good math student. | Agree | Agree | Strongly agree | Agree | Agree |
| 14. I expect to use math lots of ways when I'm an adult. | Agree | Neither | Agree | Agree | Strongly agree |
| 19. My grades aren't very important to my family. | Strongly disagree | Strongly disagree | Strongly disagree | Agree | Strongly agree |
| 21. I am good at doing hard math problems. | Neither | Agree | Neither | Disagree | Strongly agree |
| 24. My life outside of school makes me want to do well in math class. | Neither | Agree | Strongly agree | Disagree | Strongly agree |
| 26. I am sure I can learn math. | Strongly agree | Strongly agree | Agree | Neither | Strongly agree |
| 27. It would mean a lot to me to get A's in math. | Strongly agree | Strongly agree | Agree | Strongly agree | Strongly agree |
| OE40. How do you think you will use math when you are an adult? | One way I will use math when I am an adult is calculating my money. another is if I get my own apartment or house and I want a new would (sic) or tile floor. | I use math when I'm adult by going food shopping and paying my bills. | when I am an adult I will use math on my job because what ever I do I know Imma (sic) need my math, also shopping and of course taking care of business. | I woulduse mathevery daywhen I goto thestore andwhenI <br> need to <br> pay my <br> bills.. | I will use math when I'm an adult when my cousins need help with whatever work they have. And since I'm going in a science field science and math go hand in hand. |

## Summary of $7^{\text {th }}$ Grade and High School Affect Study Student Surveys

Table 4.10 Summary of $7^{\text {th }}$ Grade and High School Affect Study Student Surveys

| Item | Response <br> response |
| :--- | :--- |
| 3. I'm not the type to do well in math. | (4) strongly disagree* <br> (1) disagree |
| 13. My family would be proud of me if I were a good math student. | (1) strongly agree <br> (4) agree* |
| 19. My grades aren't very important to my family. | (3) strongly disagree* <br> (1) strongly agree |
| 27. It would mean a lot to me to get A's in math. | (4) strongly agree* <br> (1) agree |
| 8. I study math because I know how useful it is. | Jana: agree, neither, agree <br> Tyana: agree, agree, disagree |
| OE40. How do you think you will use math when you are an adult? | "taking care of business" <br> (shopping and paying bills) |
| (1) | work <br> (calculating pay, performing <br> job duties, using in science <br> career) |

### 4.5 High School Interviews Protocol 1

The following interview descriptions are presented in the first-person narrative. The researcher interacted with five young ladies and asked questions to illicit feelings about their racial identity as Black girls, their experiences in mathematics class, and how they perceived themselves as Black girls who learned and who could "do mathematics". At times, the researcher interacted with the girls who might have been daughters or
nieces, or endeared students and neighborhood girls. The interviews are presented in firstperson narrative to better express and convey the mood and story of the interactions.

## Jana <br> "like if the teacher asks the question every hand in the class goes up"

The interview with Jana took place on May 21, 2009 several weeks before the end of $9^{\text {th }}$ grade when she was fifteen years old. Several days earlier I had contacted Jana via text message to make arrangements for the interview (see Appendix G, Text Message Log, May 19). I arrived at the library early and had seen Jana walking away from the library entrance. I was concerned that she had forgotten our appointment and sent a text message to her. Jana replied that she was on her way to the library to meet me.

Jana did arrive a few minutes later and her sister, a junior at the high school had walked with her from the high school because they had something to do together after the interview. I did not have a blank survey but rather than postpone the entire session, Jana agreed to videotape the interview and meet again the following day to complete the survey. The three of us walked together to a private study room on the lower level of the library where I set up the equipment to videotape the interview. Jana sat at one end of the table, and her sister and I at the other out of camera range.

Refer to Appendix D1 (Jana's Protocol 1 Interview) for the full interview transcript.

## Jana's Interview Description

The interview began with Jana describing the current mathematics topics in her $9^{\text {th }}$ grade Algebra 1 class. Jana stated that the class was currently working on "slopes and putting slope form and stuff" and "exponents and stuff" (Appendix D1, Line 6. J). She also remembered working on "percentage and you know turning it into a fraction form and decimal" at the beginning of the year, and felt that she had already "learned" exponents in an earlier grade, unlike the point-slope method [to find the equation of a line] which was new to her (8. J).

When I showed Jana several portions of $7^{\text {th }}$ grade classroom videotape, she recalled and described the class as "fun" (27. J). The desks had been arranged in small groups and students talked to each other and worked together. Jana recalled that Mr. P expected everyone to be learning resources for each other stating that "if you needed um help with something he would tell you to ask $3 "(27 . J)$ before coming to Mr. P for help. Jana enjoyed and felt comfortable being a member of the learning community, and stated that she "liked it better working in group stuff" which allowed her to "just ask somebody sitting next to me" (27. J). Jana most often sat with other girls in the class and only remembered sitting with a boy "once for a project" (33. J). She felt no differently about working with boys or girls and stated "it was the same" (37. J).

When I asked Jana if she remembered any specific lesson from $7^{\text {th }}$ grade she immediately shook her head and laughed:
38. MJ Um maybe you don't remember specifically about this lesson but is there a specific lesson that you can recall when I say Mr. P's class in $7^{\text {th }}$ grade? Yeah? You shook your head right away.
39. J (laughs) yeah it was a lesson where we had a big graph paper and we had to choose like an object or something and like draw it on the graph paper like name the coordinates yeah it was, that was a nice project.
40. MJ And you describe it as being a nice project...
41. J Well it was fun...
42. MJ It was fun? Is that why you remember it?
43. J Yeah

Jana went on to explain that it was the only lesson she remembered from $7^{\text {th }}$ grade, and that it was fun because she and her classmates could "use any object we wanted" (47. J). For Jana, being able to choose "a hat cuz at the time I liked the singer $\mathrm{Ne}-\mathrm{Yo}$ and he always wears those hats" (53. J) made the lesson fun, engaging, and memorable even two years later. She described her current $9^{\text {th }}$ grade class as "different" (67. J), since "we don't do any projects". However, Jana believes that she is learning mathematics because "He gives us work, he teaches it and yeah. He teaches it very well, like I understand but it's different than Mr. P's class" (69. J). Jana could not recollect a specific lesson from $8^{\text {th }}$ or $9^{\text {th }}$ grade mathematics class.

Jana did recall that she worked with one or two other students during $8^{\text {th }}$ grade "cuz that's how the tables were, it was three people to a table so I worked with two people or I worked by myself. That's how it was" (71. J). She also believed that she learned a lot of mathematics during $8^{\text {th }}$ grade:
76. MJ Um, how do you think, what kind of class do you think helped you learn more math?
77. J My $8^{\text {th }}$ grade
78. MJ Can you tell me why?
79. J It's, it's just the way that my teacher teach, like the math, like he would explain it on the board and like he would give examples, like other examples if you didn't understand it. And like he would talk to you one on one if you didn't understand it. I don't know I just, I learned a lot in that class.

Even though Jana said that the project during $7^{\text {th }}$ grade was the most memorable mathematics lesson for her, she indicated differently when I asked in which year she had learned the most mathematics and replied "umm...this year. It's between $8^{\text {th }}$ grade and
this year. I learned a lot this year, um, yeah." (85. J). Jana tried to describe something that she had learned very well but spoke uncertainly about triangles and angles saying "I don't know what it's called" and "I forgot what it's called" (87. J). However, she remained confident in herself as someone who can learn and have fun in mathematics class and stated "...math is easy to me, once you learn how to do a certain thing and it's very important and like it could be fun" (93. J).

Jana had talked about the differences between $7^{\text {th }}, 8^{\text {th }}$ and $9^{\text {th }}$ grade mathematics class, and believed that she had learned a lot in those classes. Next, she tried to describe what "the perfect math class [for her] would look like" (96. MJ). Jana first explained that charts with formulas, words, and definitions would be posted on the walls, and described what student participation would look like:
97. J (laughs) Umm, wow...it's like, certain problems are easy for me if I see the formula. I could do it, like point slope form or like dealing with negative numbers. I would say that on the wall it would be a whole lot of like charts with formulas and stuff and like all the definitions of words like linear and stuff and I don't know...it would be big numbers all around the ceiling going from 1 to 10 and the doorknob would be a 0 . And what else, the teacher, like if the teacher asks the question every hand in the class goes up and um...

When I encouraged Jana to provide even more detail, she couldn't think of anything until I asked "Umm, what about your classmates? Who would be [with you] in your perfect math class?" (102. MJ). She quickly responded "my friends" (103. J), and explained why everyone's hand would go up when the teacher asked a question saying "Cuz everybody would know the answer. Everybody would understand how to get the answer..." (109. J).

It was difficult for Jana to imagine this hypothetical mathematics classroom as the following exchange shows:
112. MJ Well one of the reasons you said um that you remember a specific lesson from Mr. P's class was because it was the graph paper and you could use anything you wanted as your object um so graph paper or something would be in your room, anything else?
113. J A number line
114. MJ Ok...
115. J Um... shapes and stuff
116. MJ Umm...so let me ask you another question about, still on this fantasy classroom, "Jana's perfect class perfect math class". How would the teacher know if you were learning? What kinds of things do you imagine the teacher would do? So that they would know that you were learning
117. J Just pop out with a question to ask anybody, see if you know it, if you were paying attention when he was teaching it umm...

Jana also said that a class of "maybe about 16, 17" of her friends (119. J) would be ideal, despite saying that the eighteen students in the $7^{\text {th }}$ grade was "a pretty big class" (123. J). When asked about the importance of school mathematics Jana referred to counting "my money and stuff" (129. J) but made not explicit disconnection to job or career. When asked about other reasons for knowing mathematics, Jana talked about baking or inventing (133. J), and gave an example of how family members or friends could use mathematics (169. J):
133. J Um if you want to become a baker or something or an inventor, whatever materials and ingredients you need in your stuff to make it taste right or make it be right you would need to know the certain amount of things you need to make it invention good or the best
169. J Um I don't remember but I guess I could give an example if like you have a sleepover with all your cousins and friends and you guys decide to play tug of war it would you would count how many people it is I mean how many people it is all together and then you would separate each other so it would be a fair game...yeah...(laughs) I guess...

Jana said again that she believed that she was "pretty good at math" (175. J) and felt that other students in the class could feel the same way:
185. J Yeah...I think...yeah cuz some cuz I had witnessed that if we was in class and a student next to me or someone else in the classroom would say that the teacher was teaching a certain subject they would say "oh I don't understand this,

I hate math, I hate math" but then when, when the teacher comes to them and really like explains it they're like "oh, this is easy!" umm, yeah

Jana also believed that her classmates should be patient when they don't understand the mathematics: "like you have to get to understand things, I don't know, well, it's a, (sighs) umm yeah...you have to understand things, well, get to understand things before you make judgments on them" (187. J). And when asked what she believes makes mathematics different from other subjects Jana replied "I guess I could say there's always like a formula for something so like if you think you got something wrong or something then you could always check to see if the formula is like..." (193. J)

Jana recalled that her elementary school teachers were women who taught most subjects including mathematics but that "all my teachers was males in middle school" (217. J). I asked Jana if she had any thoughts about gender-based teacher differences but she had not considered this:
218. MJ Have you ever thought about that, whether it would make a difference?
219. J Nah...uh uh... (No)
220. MJ Um you have lady teachers in other subject areas?
221. J (shakes head) Yeah...
222. MJ But you never really thought about, "hmm if my math teacher were a lady it would be different."? I'm just curious...
223. J Nah I never thought of that

In the last few minutes of the interview I asked Jana about the mathematics classes she might take during the rest of high school. Although she was not sure of the course title, Jana had already made a schedule for $10^{\text {th }}$ grade and seemed sure that she would take a mathematics class every year of high school:
231. J Oh! No! no! it's....I forgot! It's something, something...I either put algebra 2 or something, something else in math I forgot what it's called 232. MJ Trigonometry?
233. J Yeah, wait...
234. MJ Or....I don't know what it might be cuz you said you already had geometry last year...with the shapes, you like that
235. J Yeah...
236. MJ With the shapes and you like that...so um algebra 2 or maybe trigonometry?
237. J Yeah, I think I put algebra 2
238. MJ Do you plan on taking math all 4 years of high school?
239. J (nods head yes) Um hum.

## Summary of Jana's Interview

- Jana remembered and liked lessons or projects that allowed her to bring something personal to the learning experience (e.g. scaling up a picture of $\mathrm{Ne}-\mathrm{Yo}$ as described in Cycle 2 critical event). Jana and her classmates had been motivated with the opportunity to make the lesson personal, meaningful, and even culturally relevant.
- Jana believed that she was more motivated to engage with and learn mathematics through projects. Jana believed that she did not have these opportunities during $8^{\text {th }}$ (or $9^{\text {th }}$ grade so far) and sometimes worked with one or two other students only because "that's how the tables were". While she believed that her $8^{\text {th }}$ grade teacher "...teaches it very well", and that she had learned a lot of mathematics, she could not remember any specific lessons - only that she was given work and it was different than Mr. P's class.
- Jana said repeatedly that Mr. P's mathematics class was memorable and fun and believed her classmates felt the same way.
- Although Jana has learned to value learning community and problem-solving behaviors (collaboration, respect for different ideas and approaches, etc.), she believed that getting the answer is valued. For example, when she described her
perfect mathematics classroom she stated that "everyone would understand how to get the answer".
- Jana had difficulty imagining that mathematics classrooms would typically look and sound like Mr. P's although she believed that she can remember lessons, she enjoys it more and, she has more fun.
- Jana believed that mathematics and knowing mathematics is important for counting money, as well as other common contexts such as ingredient proportions in baking or balancing the number of people in a tug-of-war game.
- Jana had not thought about whether a man or woman mathematics teacher created any barriers to her mathematics learning opportunities or had any other impact on her learning.
- Jana believed that she studied math because it was useful and she would use it as an adult to manage money earned and spent on living expenses. She also believed that she would be able to do this without relying on a calculator.


## Tyana <br> "I'ma ask for help even if you get aggravated"

Tyana's interview took place soon after she began $11^{\text {th }}$ grade on $9 / 14 / 2010$ when she was sixteen years old. Refer to Appendix D2 (Tyana's Protocol 1 Interview) for the full interview transcript.

## Tyana's Interview Description

When I showed Tyana video clips from the $7^{\text {th }}$ grade mathematics class she immediately noticed that she was always asking questions. When I asked if she remembered the $7^{\text {th }}$ grade mathematics class set up Tyana said "I was asking mad
questions" (Appendix D2 Tyana's Protocol 1 Interview, Line 4. T). Tyana noticed that she often had her hand raised to ask questions, and that in many of the clips she and Shaniyah were working together:

Beginning Appendix D2, Line 12. T
12. T That is a good question, why me and Shaniyah always paired up?
13. MJ Um, I don't know...
14. T I never thought about that.
15. MJ It didn't seem to bother you or Shaniyah.
16. T Yeah... but ... we was all lonely.

Tyana also remembered the $7^{\text {th }}$ grade Cycle 1 activity and asking Ryan about his graph and the zig-zag lines:
29. T Like like, like I won't be shy... at first I be shy to ask questions but once I answer the question right I kinda go around, check everybody else's answer.

I believe Tyana's statement reflects how she tried to be a resource as a member of the learning community. As Tyana watched the classroom video she appeared to be nostalgic and talked about how little she and her classmates looked. Tyana hadn't noticed how much the seating arrangements had been changed during the year:
95. T Yeah, I didn't notice that we were always moving, and me and Shaniyah were always together. Everyone was in a group.

Tyana and I enjoyed watching the classroom video while she made comments about how much younger she was and about some of her classmates. I decided to let the video play uninterrupted "since we're having a good time looking at the videos" (100. MJ).

I asked Tyana to describe her $8^{\text {th }}$ grade math class:
103. T We sit in groups but we really didn't graph, we did when we was talking about slopes and stuff equations like $\mathrm{Y}, \mathrm{X}$ all that other stuff, we graphed a little bit but not really a lot. In Mr. P's class we used to always graph and all sorts of stuff.
104. MJ And what about working together? Were you still expected to work together? Or...?
105. T Nah sometimes like if we work together it's for like a project but usually it was individually.
106. MJ It was individual? Even if you were sitting in groups?
107. T If we were sitting in groups, we probably sit in tables like this it would be a long table and we would do our work and after we were done... and Mr. $\mathrm{G} \quad$... I mean what was his name? Mr. G was talking we used to do all the work ourselves and then he would start asking questions here and there

I asked Tyana to describe her $9^{\text {th }}$ grade class:
114. MJ That was the first year at the high school?
115. T Yeah like the way she taught like is no way you could fail her class you couldn't fail I don't think cuz like she used to like if you didn't know it she would give us an example like something that we could relate let's say like texting she said well if you text this many numbers and this time that number what would be... we would learn it too

Tyana said it was an algebra class taught by Ms. T $\square$ and she had two math classes that year "one $3^{\text {rd }}$ period and the one I had $8^{\text {th }}$ yeah $8^{\text {th }}$ period" $(129 . \mathrm{T})$, the second a course called "math modeling". She thought that students who didn't have high test scores needed extra help and had to take two classes. Tyana believed that it helped:
149. T Yeah but it was confusing because one was the way he teach it wouldn't go with what the other would teach, cuz I would go to his class well my teacher said... and he be like no because now he do it like it was a competition but it wasn't a competition it was like you don't know who to listen to him or her because you don't wanna be wrong.
151. T Yeah it was like confusing a little bit... but I remember it was one time I learned something in that class that I used in my next class and I was like up to date I wasn't I wasn't I was like higher up cuz I knew what was going on I learned it in my other class so.
153. T It happened like a few times here and there.

I asked Tyana to describe her $10^{\text {th }}$ grade mathematics class:
155. T $10^{\text {th }}$ grade I had (inaudible) math and I had geometry. Math (inaudible) was like, like, like if you was late for class you're not gonna know what was going on cuz you were late.
157. T Yeah and then you ask her and she was like "well you should've been here" it was like it was kinda hard like it wasn't hard but it's hard if you wasn't there all the time if you was late you wouldn't know what the lesson was but if you was there on time it was easier but she let us work on our own first and then she'll come around and show us what we did wrong and what we did right.

Tyana had also been assigned to take two math classes in $10^{\text {th }}$ grade, one called "math $10 ":$
159. T No the first one was called geometry and the last period they said it was algebra but on the paper it said math 10 in that math we were dealing with slopes and stuff and in geometry we were dealing with shapes.

I didn't ask Tyana who "they" were but assumed that she referred to guidance counselors who scheduled classes or the teachers. Tyana seemed to be skeptical about the course name and may have been doubtful that the course really was really an algebra course.

Tyana didn't remember the grades she had received (math 10 and geometry) and guessed at her passing grade in Mr. P's $7^{\text {th }}$ grade class stating "Um I thought it was like in the $80 \mathrm{~s} "(168 . \mathrm{T})$. Tyana guessed her $9^{\text {th }}$ grade math grades:
170. T I remember in modern math I had like a 73 and in my algebra class, $6^{\text {th }}$ uh $8^{\text {th }}$ period I had like a 82 but if I talk it'll go down so like and I like talking so it...

Tyana seemed to believe that her grades might have been higher had she not talked in class so much. She told me that when she was a freshman many classes were held in the old building of the high school and that she had math class with many of her friends.

Tyana said that math classes in the new building had been different:
172. T I was like now I noticed since we got to the new building cuz like in the old building you had class with all freshman like and like in the new building you would be with all the seniors or sophomores and like you well like me I don't wanna be wrong so I just sit there, it's like anybody know the answer? I say it if it's right that's why I ask every question if I get it wrong I look around like but other people get it wrong too so I'll volunteer but you don't always gotta be right you're gonna be wrong at some point but I be shy sometimes there be mad people like usually $I$ be in class with my friends like ever since up to like $6^{\text {th }}$ grade I be in class with my friends when I went to the new building it was juniors, seniors some freshman, sophomores, it was a whole mixture of kids and like some people try to be the class clown cuz they, they don't wanna, feel me, they don't wanna be wrong so instead of being wrong they make jokes and stuff I laugh like my laugh it don't stop it it was confusing it wasn't confusing like people didn't wanna be
wrong everybody's looking around so nobody raise their hand they didn't wanna get it wrong so no one raises their hand so she just start picking and no one wanna go and people get scared to get it wrong.

Tyana's description provides some insight about what happens in mathematics classrooms where only correct answers are valued, incorrect answers are not opportunities to deepen understanding - Tyana's experience shows that students become uninterested and inattentive in class. Her description of how she felt in Mr. P's math class was very different:
176. T Like Mr. P's class like all they was my friends like some of them I went to school with since elementary and Mr. P he made it as like you can't be wrong if like you be wrong is always a right answer to that you could be wrong but not in this situation like maybe in the next question it'll be the right answer cuz he be staying quiet but you probably answer he made it seem like you did right but then like you went off topic a little bit but he don't like put you down like he only bring you up that's why like I wasn't scared to raise my hand cuz like I always right or I was right a little bit or I was wrong, that's what I like, that class was nice.
177. MJ So a class like that and the way he let you, the way he talked to you and the way he answered your questions and the way he made you feel did it make you feel like you could do math better?
178. T Yeah it felt like I knew what I was doing all the time like I knew what I was doing and like nobody tell me I was wrong like I just go to math do all the work and be done.

Tyana had not always felt confident in her ability to do math:
183. T Like I always had a struggle like once again I used to be scared to answer questions and like I used to be like if I get it wrong I'd be like well I got it wrong so I might as well I had been talking if I get it wrong then I'ma get it wrong all the time but Mr. P broke me out of that mentality because if you get it wrong but you could still get it right the next question.
187. T I feel confident cuz like even though I get it wrong in my head I got it wrong this question I'll get the next question right.

Tyana attributes her attitude that wrong answers are a part of doing math and a strong belief in her ability to do math to her treatment and experiences in Mr. P's math class.

As a third year high school student Tyana was taking algebra 2. Two weeks into the school year Tyana hadn't received a textbook yet but believed she would do well in the class. She described why:
205. T Because I don't think it's enough to go out right now but we like we work problems like here and there and like my teacher right now like he the type of teacher like he love doing his job like if you ask him a question he gonna do it fast for you like he like he like working with children like all right let's do number 1 together how about number 2 how about number 3 then we like aight we got it we got it then he like aight then do it and like he like he like a teacher like that love his students he always like if we don't understand he'll go over it till we understand it so like it's good I think I'm gonna do good in his class.
209. T Yeah. One thing about him, one thing about him that I don't like like I like but then like it's a right way like he do it the long way like he don't do shortcuts like he make he make us break it down to the a point like you can't break it down no more and like I like to do the shortcuts like just to get to the answer he make us show our work where we get it from how did we get it he break it down to like the last number that's too long.

Tyana also said that in this class everyone sits "in rows like we sit in alphabetical order" (211. T). Tyana guessed that the reason might be "since we like 16 and juniors now you gotta be serious because then we be doing our work by ourselves cuz when you in college you gotta work by yourself most of the time it's what I'm thinking" (217. T).

Tyana liked to work in groups but also believed that she needed to work by herself sometimes:
219. T Sometimes I do sometimes I don't because I wanna be independent like like cuz I can't just work in a group every time and expecting if I don't get the answer right I know she got it right cuz some people they just copy like some people they don't learn like that because like if one person doing the work they just copy it but if you work by yourself that mean you have to do the work there's no way you could get out of that.

Tyana believes that she has not seen many new mathematics concepts in her high school courses:
223. T It don't feel like that cuz knowing what you know from middle school it's still like it still basically it's still the same in high school but it's just bigger in
numbers it's not like a whole different concept it's still the same concept which is like say you were working with 5 now you working with 25 you just go up it's the same numbers like so it wasn't hard like if I was in middle school I do all my work then I would know what was going on now because I be confused because they all the same but middle school I used to work with these numbers like breaking it down bringing it back to elementary and then it's easy to com... it's easy to get on schedule because all you doing is working with bigger numbers it's the same, same concept.

When I asked Tyana to describe what would work for her in a perfect math class she said that she would have two teachers $-\mathrm{Mr} . \mathrm{P}$ and Ms. T $\square$ "them two teachers one in the front of them one in the back of them" (225. T). Tyana explained:
229. T Because like like I choose Mr. P because even if you have time to do something he gonna make you have time to help you like even if you can't even if you can't explain it like he gonna find a way to explain it even if you have to come back tomorrow and Ms. T like she make sure you understand like you not gonna leave the class without understanding the problem ... both them teachers in the same room with you like with all my friends... that would be a perfect class to me
231. T If I had a class like that it would make me feel good I would wanna go to class like every single day... but me if I was in that class I would never skip class I would be in there the whole time I'd probably be there after school it would be a fun class and I know I'd pass all the tests.
(I didn't ask Tyana whether she sometimes skipped math class)

Tyana said she thought math was really important for keeping track when grocery shopping and knowing the difference between $\$ 30.00$ and a $30 \%$ discount so that no one could "jip" you (233. T). Tyana will sometimes use a calculator when shopping and knows that her mom uses one to help her do taxes. Tyana likes to use the calculator in class to "check my answers I only use a calculator to check my answers because then I won't learn nothing, I'ma get used to the calculator (239. T).

I asked Tyana to tell me how she thought of herself in terms of mathematics:
259. T I like math a lot because like it's like easy for me to comprehend like I'd rather be in a math class than in English class like my mind is set like in all my math classes and all my math teachers they always tell me you're gonna need math so I like math because I know I'm gonna need it if I know something that I
know I need something I'm gonna get it like I'm gonna try to stick to it because I'ma need it in the future that's I like math like like math class I don't really have a problem with math class unless there's someone in there disturbing the class but math is a good subject to me...

Finally, I asked Tyana if she thought of herself as someone who does math:
269. T Sometimes I be doing a lot of problems in math I know what I'm doing that's what I be thinking in math class but if there's a problem that I don't know like I'll ask for help... that's one thing like if I need help I'ma ask for help even if you get aggravated I'ma keep asking questions until I get it when I get it I got it I can't get rid of it

## Summary of Tyana's Interview

- Tyana believed that the math she'd done in high school is like middle school math with "bigger numbers"
- Tyana understands why students are afraid to participate in math class; she isn't afraid to get a wrong answer or to ask questions because Mr. P "broke" her out of "that mentality"
- Taking two math classes can be confusing if the teachers expect students to do things differently but two classes can help when extra help is needed. Tyana liked to work with others and worked a lot with Shaniyah but believes that working independently is better preparation for tests and college
- Tyana believed that she could be motivated to go to math class every day, pass all of the tests, and even do math after school if she had
- Tyana believed that math is important for shopping and because all of her math teachers have told her so.
- Tyana sometimes uses the calculator and other tools in class
- Tyana believed that teachers can help students learn math by valuing right and wrong answers, and show students they care by making sure they understand "before they leave the class".
- Tyana likes math and is confident that she can do well in math classes.


## Shaniyah <br> "I have to learn when she teaches us"

Shaniyah's interview took place on $6 / 1 / 2009$. Shaniyah was fifteen years old and just finishing $9^{\text {th }}$ grade. Refer to Shaniyah's Protocol 1 Interview (Appendix D3) for the full interview transcript.

## Shaniyah's Interview Description

I began the interview by asking Shaniyah to tell me what her $9^{\text {th }}$ grade math class had been like. She explained that she liked the algebra class but thought that the pace was a little fast:

Beginning Appendix D3, Shaniya's Protocol 1 Interview, Line 6. S:
6. S ...I like it but the teacher to me seems like she teaches a little bit fast...like she's a good teacher but sometimes it's like I don't always get it and then but I usually get it later on while she teaches I usually get it later on but it's kinda fast when she teaches...

Except for elementary school teachers, Shaniyah said this is the first time she has had a female math teacher. She described some of her classmates:
14. S Um... the students are very easy they keep up with my teacher and some of them are very fast learners and some 'em could just sit there and just observe and some of 'em could just don't really be like in the discussion that we have so it's pretty... we have a bit of everything in our class. I sit and do like I observe and I do stuff in the class too.

Shaniyah describes a class of about one dozen students with a range of abilities and some who appear to be learning faster than she is. Shaniyah said it was a full-year algebra course and they were working on equations and slopes, and learning new content:
26. S I think I've seen the slopes but the direct and indirect variation is new to me so I'm just like taking notes so I can learn it more.

Shaniyah has learned strategies that she used:
28. S I usually takes notes when my teacher's right there sometimes I summarize in my own words so I could get it more in my writing and I just write, not write draw pictures of it just so mainly I could get it more so when I read my notes I know what I'm talking about.

Shaniyah appears pay close attention to the teacher during lessons and takes notes in her own words. But she also described having difficulty with the pace:
30. S Um to me if I have to learn like to me if I feel like I have to learn at that moment instead of cuz like she go over it but it's like it's like she basically teaches us something different everyday so I have to learn when she teaches us.

As Shaniyah spoke about the way she had learned during $9^{\text {th }}$ grade math class she seemed to be unsure about her achievement:
32. S Kind of sot of cuz like in my other math classes like junior high school, I liked it there better in a way not because it was like the students or the teacher, it's just basically cuz I felt like I got it more but this year I get math "I feel like I'm slacking a bit" but, I don't know I feel like I'm slacking a little bit.
34. S Oh when I get it I feel like I could tell other people or help other people or sometimes I just know when I get it cuz I be like anxious to know more about it but when I don't get it it it's like I gotta ask the teacher or ask a peer more about it or like read my notes more cuz it's like I don't get it I don't know or I might ask her to do what she did again on the board or demonstrate it in another way.

Shaniyah described many of the characteristics of a mathematics learning community and behaviors - taking, rewording and re-reading class notes, asking her peers or the teacher
to show her again or in another way, sharing what she knows and helping others.
Shaniyah seemed to enjoy participating during class:
38. S I usually, when she write a problem I usually am the first to answer it or like when or I might explain how I got the answer or give her or I might go up to the board and stuff or like, I don't know, just have fun with it I guess.

Shaniyah said that it was good that both her $8^{\text {th }}$ and $9^{\text {th }}$ grade teachers gave a test every week because it "shows her how much I've learned or how much I need to learn" (42. S).

Some of Shaniyah's friends were in her $8^{\text {th }}$ grade pre-algebra class which she enjoyed:
44. $\mathbf{S} 8^{\text {th }}$ grade math class I really liked cuz my teacher he like made me understand what we was doing. I did really good in $8^{\text {th }}$ grade. He was another one we got tests every Friday or like every week it was just good because I don't know, the environment that was around me made me have fun with math and my teacher was also he made me have fun in math so I really likes $8^{\text {th }}$ grade math and I really understood it so...
50. S. We had a good amount of students. It wasn't a big class, I've never had a big class so it was a good size and some of the people that were there I was with my friends so we had fun while we was doing our work and stuff so it was fun.

When I asked Shaniyah if it helped to have friends in the class she said she thought it did "cuz that would give me a more hunger of learning what I need to know cuz sometimes friends could distract me so sometimes I feel like I need to separate myself or something but I never did that cuz there was no need to.

Shaniyah likes math and believes that she stays focused on the classroom lessons not letting classmates distract her. But Shaniyah also relied on her $8^{\text {th }}$ grade pre-algebra classmates and teacher to help her when she missed a class and would "usually stay after school with that teacher and catch up" (70. S)

When I showed Shaniyah some videotape from the $7^{\text {th }}$ grade math class she recalled working with Tyana a lot and described how she felt about the class:
80. S It was like full of different people with different ideas and sometimes we be like it would be like half the class would get something and then another part of the class would go against that so we all just had different ideas. And then we combine then all and then we would seem to work it out and then at the end of the day we all had different ways of solving a problem. So it was just different, sometimes we would have just different stuff going on but...

Shaniyah seemed to miss the environment in the $7^{\text {th }}$ grade where she had worked with others to solve problems in different ways, and learned by asking each other questions. For example, she said "sometimes I'd ask my friend how did she get that or why does she think that cuz it was like sometimes it seemed impossible but then she or he would end up explaining it to me and then I'll understand it (86. S). in $8^{\text {th }}$ and $9^{\text {th }}$ grades she usually worked alone except for "a certain project" $(90 . S)$ or when she worked with a partner on a problem in the book (96. S).

Shaniyah seemed to prefer working with a partner or in a group:
106. S I think in a group it makes me learn better because when I work by myself sometimes it gives me like, I could sometimes think too hard and then I could sometimes think I'm wrong or like sometimes I lose concentration cuz I'm working by myself but when I'm working with a group it depends who I'm working but I don't know, it helps me because I have these ideas so it's like giving me more ideas like it helps me when I have other people like helping me.

Shaniyah described getting to know math:
110. S Um getting to know math for me is getting to know math the way I picture math like big numbers and just different stuff a fun way of getting to know math not the boring math like I don't know like a good experience in math like having fun in math but doing math at the same time good math is getting to know math to me

Shaniyah couldn't explain why she preferred to have a man but her fantasy math class would have only 8 or 9 girls and boys with the same "hunger" for math and "on the same level" (114. S). Shaniyah also said that in addition to "x and y problems" and graphs, students could tell the teacher what they wanted to learn (116. S). The teacher would
work with individual students while the rest of the class did other work "fulfilling what everybody needs" (124. S).

Math is important to Shaniyah:
129. S School math is to me very very important because I really know what I wanna do when I get older and I know that's gonna have a big effect on what I wanna do and even if it didn't I just feel like math is still very, very important like you could get places without math but you can't get places like really far to achieve what you want to achieve I think you would really need math.

Shaniyah did not name a job or career that she was interested in but seemed to believe that math achievement was important and valued.

Shaniyah also seemed to be confident with herself in terms of mathematics:
133. S I would have to say that me and math we do really good together like I don't get confused when somebody throw it at me I don't get confused like I don't back down from it. I look at it at first and then decide what I would do as of then. I don't just back up from it.

Shaniyah's math learning habits and attitude towards learning math seemed to reflect assertiveness and confidence as a math learner.

## Summary of Shaniyah's Interview

- Shaniyah thought that it was easier for her to learn math when she was in middle school and had difficulty "learning" something new every day in $9^{\text {th }}$ grade. This may have caused her to feel like she was "slacking a bit"
- Shaniyah seems confident with her mathematics learning habits (note taking/writing, drawing, using different representations, using the teacher and peers as learning resources, teaching others)
- Shaniyah believes that weekly assessments inform the teacher and herself what she knows and needs to learn
- Shaniyah believed that math class was fun when she could work with friends if she didn't let them distract her
- Shaniyah believes that she learns from her peers and the teacher and they help her when she needs to "catch up"
- Shaniyah's description of the $7^{\text {th }}$ grade math class included characteristics of a mathematics learning community (using different ideas to solve problems in different ways). Shaniyah remembered working alone in $8^{\text {th }}$ and $9^{\text {th }}$ grade except for certain projects.
- Shaniyah believes that men are better math teachers for her, and they should listen to students and teach math that they want to know.


## Erica <br> "I let them be 'right'"

Erica's interview took place on $6 / 2 / 2009$ as she was completing $9^{\text {th }}$ grade. Refer to Erica's Protocol 1 Interview (Appendix D4) for the full interview transcript.

## Erica's Interview Description

I began the interview with Erica by showing her video from the $7^{\text {th }}$ grade mathematics class. Erica described how she felt about doing mathematics in Mr. P's class:

Beginning Appendix D4, Erica's Protocol 1 Interview, Line 10. E:
10. E His math class was I guess fun like it was better than it is now cuz like he would sit down with us and do problems. It was like a group effort when we had to do it, it was like a friendly environment to do math rather than it is now.
12. E Um, like just to get down to the problem. I guess the time we had to figure out an answer and like kids would be helping us along with him. So it was better and you felt comfortable even if you was wrong or right.
18. E ...But even if we wasn't right I guess he wouldn't be like "oh you're wrong". He would just try to maybe understand it more to help you get the answer, he wouldn't just give it to you.

Erica said that it was easy to ask each other questions because students sat "beside...and across from each other" and believed that it was "better to sit in a group" (22. E). Erica said this made it easier for others to tell you if "you were going in the right direction basically" (24. E)

In the video clip that Erica watched she had been sitting in a group with several girls and one boy. When I asked her about working in mixed groups, she replied:
32. E No I think it was the same. I think with boys they always think they're right so it was a kind of a challenge, I guess.
33. MJ And what did you do when um the boys said they were right?
34. E I let them be "right"

When I asked Erica if she responded differently to girls who thought they were right, she said:
36. E No, I didn't act differently cuz girls always think they're right too! So, cuz I'm a girl and I think I'm right. But boys think they're right too, so I really just didn't care. I just stuck with my answer and let them stick with there's.

Erica appears to believe that non-confrontational discourse is important for maintaining a comfortable mathematics learning environment and may reflect a commitment to a harmonious community.

Erica described her $8^{\text {th }}$ grade mathematics teacher as the "best teacher ever" (44. E) but didn't remember whether the course was pre-algebra or algebra. Erica described Mr. P's $7^{\text {th }}$ grade math as "comfortable and friendly and persistent and determined" (52. E) and then talked about the $8^{\text {th }}$ grade math class and teacher:
56. E His class was more of, his class was comfortable I guess. But like sometimes... I don't know if it was because we got older but sometimes when you got the answer wrong they like would try to make fun of you or whatever. But still it was kind of ok, it was similar to Mr. P's just because he was like he didn't let nobody say that the answer was wrong because he didn't think that was
their place to decide whether you're wrong or not so his class was comfortable too and he was really determined to get our work done in his class because he would explain the work very well so.

Erica seemed to believe that both classes provided good environments for her mathematics learning:
58. E Um I was basically the same just trying to get my work done. I liked math a lot in [ Middle School]. It was comfortable, it wasn't easy but it seemed like it cuz when you pay attention to it and really understand it seems easy then to others it might seem harder. Cuz like me, Nammi and Shaniyah coming out of Mr. P's class we knew most of the work already and like other kids come from another class they was kinda behind so we kinda realized that and we tried to do our best in Mr. G class...

Erica had taken the same two math classes as Tyana - algebra and math modeling - and said that "math modeling is a back up basically to algebra stuff that you're, it's kinda to make you understand the work better. Algebra, that's all they really did." (74. E). Erica didn't know for sure but assumed that she had been assigned the classes because of test scores:
84. E No... I guess it went by the testing grades because I got above perfection in English so they placed me in Honors English and Honors History and I guess I just have to take two math class. I guess cuz I didn't do too well on the tests probably.

Erica looked and sounded annoyed when she described to me what she did in the algebra class:
108. E We don't do anything in that class, we should do math problems, worksheets and stuff but we don't. We just sit there and talk and he sits there and watches.
112. E I like to be learning math new like $9^{\text {th }}$ grade problems, not like $9^{\text {th }}$ grade problems but like more advanced math that we like need to do at high school. I'd like to be doing group projects, like stuff like that. Homework, we don't get homework, um. I'd just like it if we worked on math problems basically and doing what we're supposed to be doing in that class other than just sitting there cuz it's a waste of 40 minutes.

I felt very sad for Erica as she told me how she felt. Clearly, she believed that her assignment to this algebra class was a barrier to her mathematics learning and a wasted opportunity.

Erica seemed to have mixed feelings about the math modeling class:
118. E Um math modeling we have Mr. Bullock, he's ok teacher. I guess he gives us a lot of work but he helps us, he's more better. Basically we get worksheets, he explain the work on the worksheets and then probably two Fridays or the next Friday we take a test and that's about it. We don't really do group projects or anything like that, we don't do nothing but worksheets and tests but he explains the work and he really ain't determined to get you the answer. But if you listen, you listen if you don't you don't he looks at it like if you wanna fail you fail and come back to his class the next year. And if you want to listen you're quiet and you do what you have to do.

Erica seemed frustrated and believed that she had missed an opportunity to learn math and that an opportunity to teach math had been missed by the teacher:
122. E I think we should be doing... I don't even know what we should be doing. We still do work that we did last year that I already know. I don't know if the other kids know it but we just basically... the whole year we did everything we did last year. I wasn't introduces to anything new, like I would like to be introduces to what we're supposed to be introduced to, I don't even know what we're supposed to be introduced to, like algebra I know I did some of it last year like exponents and stuff like that but like...

Erica told me that the class had also worked on slope and run but had not done much so "it's nothing to even talk about" (124. E). Erica had wanted to do new things in mathematic class so I asked her how she would feel if a new topic were introduced in class and her frustration with the past year of mathematics class was evident:
128. E Um it'll be interesting I guess, but it wouldn't even get through to me because of the kids in the class. Like I know you're supposed to be thinking about yourself but how can you be thinking of yourself when like everybody else is talking over you and you don't have enough discipline to like quiet down like so it would be hard to learn.

It appears that some of the students in Erica's class had been disruptive and the teacher may not have been able to present more engaging lessons or projects. Erica also seemed to believe that "thinking about herself" was a necessary strategy to learn in the class but seemed to have felt powerless with no recourse during the year to improve her opportunity to learn new mathematics.

When I asked Erica to describe the mathematics classroom that would be perfect for her own learning she replied:
154. E Um I would like my class to be a little longer. 40 minutes is not enough to elaborate a lot of stuff, 40 minutes is not enough so I would probably wanna make it 80 minutes like it was in [name of middle school], um, I probably want students that can get what you're...
156. E OK, (laughs) I'd probably want students that like I'm comfortable with that is as determined to learn math just as I am and that gets along with each other and that always doesn't think they're right but they try to help you either way. And I want a teacher that's just there for you like Mr. P he had a good, I don't know how to say it but like we had a good connection with him. He was like a good person we had a friend connection and a teacher connection. It was like comfortable to like understand him and work with him because sometimes teachers like ok you're not respecting them so they're not gonna respect you but still they're gonna yell at you cuz they're the teacher. And I would want the strategy like the, I'm gonna say outline of the schedule to be like first we come in and do like a sample problem then we um then we get down to whatever we gonna do like the new problem of the day or something like that and then the elaboration... yeah and then solving and stuff like that, that's what I can think of.

Erica went on to tell me that she would prefer 18-20 classmates so that everyone could talk to each other about the problems and that a class with even fewer students might give the teacher more time with every student.

The last thing that Erica told me was how mathematics was important to her:
165. E Um school mathematics has a lot of importance to me because when I grow up I want to be a veterinarian so I think that calculation and stuff and plus when you're an adult you have to pay a lot of bills and you just have to be on your own so you would have to know math cuz of course you're not gonna walk around with a calculator and stuff. So you need to check stuff and make sure
you're paying your bills right and when you go to the grocery store make sure you got the right change. So I think mathematics is very important in life, period.

Erica had a part-time job after school in a small clothing store downtown and said that she loved keeping track of her hours and calculating her paycheck. Erica also "mathematized" her sense of fashion:
167. E ...then sometimes I like doing my wardrobe, like this shirt and go how many skirts. So I think math with myself is very important, I do it a lot by myself when I'm home so I like math. I just don't like it this year (laughs)

Erica believes that she did not learn the mathematics that she needs for the rest of high school. She told me that she planned to do "a lot of catching up" and to "be up to date with the standards that we're supposed to be in the $10^{\text {th }}$ grade" (171. E). However, Erica did not seem to recognize the mathematics necessary beyond high school, even with her career aspirations:
173. E Math I think of my career which is a veterinarian. I don't really think of math because I'm mostly gonna work with animals but I don't know, I don't really think of math like that. I know I think of it beyond high school as in me being on my own and stuff that but I don't think about it further than that I guess.

## Summary of Erica's Interview

- Erica believes that she missed an opportunity to learn [new] mathematics in her first year of high school.
- Erica believes that longer math classes are needed to work on problems
- Erica believes that it is important to maintain a comfortable environment in the mathematics classroom (respect for different ideas about finding solutions and correct answers).
- Erica believes that boys behave differently than girls in mathematics class (e.g. want to be right), and may think they are smarter than girls.
- Erica likes to know how she's doing and believes that weekly tests are useful for her and for the teacher.
- Erica would like to have smaller classes so that she and her classmates, and the teacher had more time with each other to talk about and solve problems.
- Erica believes that math is most important for everyday life and less related to future job or career aspirations.


## Pamela

"I just explain it the same way the teacher explains it"
Pamela's interview took place on $6 / 5 / 2009$ as she was completing $9^{\text {th }}$ grade. Refer to Appendix D5 for the full transcript of Pamela's Protocol 1 Interview.

## Pamela's Interview Description

I told Pamela that I was conducting the interview to learn about her mathematics classes and what she thought about learning mathematics. When I asked her if there was anything interesting she wanted to tell me about herself she replied:

Beginning Appendix D5, Pamela's Protocol 1 Interview, Line 2. P:
2. P ...interesting facts about me, I'm... except that I am a really good math student especially so math is like one of my strongest points.

It seems probable that Pamela described herself in terms of math because of the interview context. Pamela has two sisters and one brother who are older. Pamela had been assigned to a $9^{\text {th }}$ grade algebra class all year:
18. P Algebra is basically like the beginner's algebra that we learned in, well that I learned in fifth grade, so it's pretty much like it's easy to me so it's pretty much the same so I like it.

Pamela said that the teacher asks her to help other students in the class, "so that's what I do" (22. P). She said that she had learned about the Pythagorean theorem and solving for variables in equations in fifth grade and described how she was introduced to mathematics in her class this year:
35. P Um he just basically put it on the board to see whether or not we knew it or had an idea of how to do it and then he went over it. He just basically taught us that the number without the X you have to subtract it from the number that's um behind the equal sign. So then we did that he said subtract from both sides and then bring down the number with the X and um divide them which is different how I learned from fifth grade though.

Pamela told me she had thought the teacher was wrong at first the teacher was wrong but seemed satisfied that she had been able to get the same answer as the teacher. Pamela said that her $9^{\text {th }}$ grade class of fewer than 20 students had been different than Mr. P's:
61. P It's very much different because now we work individually, sometimes we work in groups but most of the times when we work in groups I work alone mostly because I usually work better when I'm working alone but other people, like here my work doesn't get done because everyone keeps on talking so I usually work alone.

Pamela remembered that she had also worked alone in Mr. P's class and went on to say that she hadn't had many opportunities to work in groups in $9^{\text {th }}$ grade:
65. P No we don't. the only time that we really work in a group is like a game thing that he does to try to help other people in your class that don't really get it during the game so, but other than that we really don't do anything in groups.

Pamela seemed to believe that she could not rely on her classmates when she didn't understand or know how to do something:
72. MJ You ask the teacher...are there times when you ask your classmates? Or somebody else in that group?
73. P Yeah just like not often

As Pamela had already stated, she had been a resource for others in the class when they asked her for help:
81. P I just explain it the same way the teacher explains it because well that's the way he wants it written on the test and if they don't get it that way I teach them how I used to do, um how I used to do it.

I asked Pamela about times when she explained something or asked someone to explain to her. She remembered explaining how to find the area of a rectangle to someone else but not asking a classmate for help:
86. MJ Do you remember a time when you when you didn't know how to do something and you weren't sure and you asked a classmate?
87. P No.

Pamela repeated that she most often asked the teacher questions rather than her classmates. Pamela said that she had often worked in groups in Mr. P's $7^{\text {th }}$ grade class but it seemed that working in groups was not always best for her:
93. P No I don't work a lot when I'm working in groups than when I work by myself because I'm more of a visual person and in groups you talk so that wouldn't work.

When I asked Pamela to imagine the perfect mathematics classroom, her feelings about working in groups was evident:
95. P Ok it would pretty much be a classroom pretty much two of these rooms and everybody in separate rows like I do in my class now...
99. P Separate desks and basically the teacher goes up to the board and he or she explains the uh problem that he wants us to do and if we don't get it then we ask him but if we do get it then we sit there and we do it and the people that do get it he writes more problems on the board for us to do and basically work out of books (laughs). I know that sounds weird but work out of books because (inaudible) and the students, quiet, not disruptive and basically more like me (laughs)

Pamela said that she had had fewer woman teachers since middle school and seemed to be sure about the role of gender in teaching and learning:
107. P I think that they pick more males because they feel that the male can handle the class more if not handle the class better but in my perspective since a woman is a better caretaker with children since they're the ones who have them then it would be better for the women to teach the class, yeah. So I feel that more women should be math teachers but there aren't so...

Pamela shared more of her overall perspective on teachers with me:
111. P Yeah I see a big difference I see the fact that more than likely since the female teachers tend to be more motherly with the class that students respond better than they would with a male because the male in my experience, the male is just there to be teacher and nothing else. They don't feel they have any type of concern except for my teacher this year, yeah.

Pamela didn't believe that there was an affect her own learning if the teacher was a man or a woman which may reflect her own stable mathematical identity.

Next I asked Pamela about the importance of school mathematics to her:
117. P School math has a great importance for me because math is there in life whether you realize that it's there or not so I feel that school math that they teach you in school is very beneficial for you

Pamela was unable to say how school math connected to things outside of school but repeated how she thought of herself in terms of mathematics:
125. P I would say that I'm good at math. I would say that math really just comes to me, I would say easy but not easy, easy but it comes to me...

I told Pamela that I waned to know more about her $8^{\text {th }}$ grade mathematics class which she said was a "mixture of both" (131. P) algebra and geometry. Pamela's mathematical identity seemed to have been supported by her teacher:
138. P He told me that I was a very good student in his class and that the work that I have shown him was basically work that he hasn't seen in a student. He told me that come $9^{\text {th }}$ grade that I should be in an honors algebra class but I may or may not be in an honors algebra class which I'm not but...
When I asked why she had not been placed in honors algebra, Pamela was "really not sure, I'm just not" (140. P).

Pamela told me about a time when she had questioned her own achievement:
144. P Yes, yes I have, yeah especially this one time I was taking a test. I think it was last year and I received a 100 on it. I really questioned my teacher because I really didn't feel that I should have that I had so many faults in my work but he said that the faults in my work weren't actually faults because I thought that some numbers were a little off considering the fact that he didn't let us use calculators. So I thought that my own math calculator in my head wasn't all that well so I really thought that it wasn't good work.

Pamela seemed to believe that her own standards may have been different and higher than the teacher's.

I asked Pamela what she did to make sure that she learned math:
152. P When I'm doing math... really I actually take heart into what I'm doing in math. I take down a lot of notes mostly because I don't want to forget it and I, that's its I take down a lot of notes and when I go home I basically um read it over and try to explain it to my mom to see if I got what I was saying and what I was doing.

Pamela told me that she often talked about mathematics with her mom and used on-line websites that "shows you how to do the math problems" (162. P). Pamela said that she had a friend that also used on-line resources but again described her preference for working alone:
172. $\mathbf{P}$ Yeah it would have its difficulty but more than likely if we was in a class together then I don't think we'd get much work done but it's, we're pretty much the same. We work alone and then that's it we work alone.

Pamela seemed to believe that working in groups did not interfere with her ability to work alone because:
176. P ...we'll each do what we think we have to do for the math problem and then we'll all come together...

At the end of the interview Pamela told me that she planned to continue to do math after high school and intended to go to college and pursue a "medical scientific field" (182. P):
188. P I have always felt that way. I'm a very stubborn person so my view doesn't change on that.

## Summary of Pamela's Interview

- Pamela identifies herself as a capable mathematics learner.
- Pamela believed that she had seen ("learned") much of the $9^{\text {th }}$ grade algebra class material in fifth grade
- Pamela appreciates different strategies and believes that she can get the same answer as the teacher [in way that she might have learned in fifth grade]
- Pamela did not have an opportunity to work in groups during $9^{\text {th }}$ grade like she had had in $7^{\text {th }}$ and $8^{\text {th }}$ grade class. However, she believes that working in a group may not always be best for the way she learns.
- Pamela believes that women make better teachers and more women should be math teachers.
- Pamela expects to do well on tests and has high expectations for her work (e.g. accurate calculations)


## Summary of Protocol 1 Interviews

Table 4.11 Summary of Themes from Protocol 1 Interviews

| Theme | Girl(s) |
| :--- | :--- |
| Group work and "projects": <br> Working with peers in groups is fun and helps learning | Jana <br> Tyana <br> Shaniyah |
| Teacher: <br> Sometimes the pace of math instruction is too fast <br> Tests are good because they let the teacher know what you know and need to learn | Shaniyah <br> Erica |
| Emotions affect behavior in math class: <br> Students will participate in math class when the environment is comfortable and <br> supportive of learning (e.g. right and wrong answers are valued) | Jana <br> Tyana <br> Shaniyah <br> Erica |
| Tools <br> It's good to know how to use the calculator and other tools in math class |  |
|  | Jana <br> Tyana |
| Explaining thinking" <br> It's hard to explain what I mean. <br> I can't explain what she/he means, but I understand. | Tyana |
| Mathematics: <br> Sometimes the math taught in high school was taught in earlier grades <br> Math is important and useful in everyday life for counting money and shopping and <br> taking care of business | Jana <br> Tyana <br> Shana <br> Erica |

### 4.6 Protocol 2 MIBI-t Responses

Table 4.12 MIBI-t: Jana 6/22/2010

| Centrality Scale |  |
| :---: | :---: |
| 1. I feel close to other Black people. | 3 |
| 2. I have a strong sense of belonging to other Black people. | NR |
| 3. If I were to describe myself to someone, one of the first things that I would say is that I'm Black. | 3 |
| Ideology Scale |  |
| Minority |  |
| 1. People of all minority groups should stick together and fight discrimination. | 5 |
| 2. There are other people who experience discrimination similar to Blacks. | 5 |
| 3. Blacks should spend less time focusing on how we differ from other minority groups and more time focusing on how we are similar to people from other minority groups. | 5 |
| Nationalist |  |
| 1. Black parents should surround their children with Black art and Black books. | 4 |
| 2. Whenever possible, Blacks should buy from Black businesses. | 4 |
| 3. Blacks should support Black entertainment by going to Black movies and watch Black TV shows. | 3 |
| Regard Scale |  |
| Private Regard |  |
| 1. I am happy that I am Black. | 5 |
| 2. I am proud to be Black. | 5 |
| 3. I feel good about Black people. | 4 |
| Public Regard |  |
| 1. Most people think that Blacks are as smart as people of other races. | 2 |
| 2. People think that Blacks are as good as people from other races. | 2 |
| 3. People from other races think that Blacks have made important contributions. | 2 |
| Ideology Scale |  |
| Assimilation |  |
| 1. It is important that Blacks go to White schools so that they can learn how to act around Whites. | 1 |
| 2. I think it is important for Blacks not to act Black around White people. | 4 |
| 3. Blacks should act more like Whites to be successful in this society. | 1 |
| Humanist |  |
| 1. Being an individual is more important than identifying yourself as Black. | 3 |
| 2. Blacks should think of themselves as individuals, not as Blacks. | 1 |
| 3. Black people should not consider race when deciding what movies to go see. | 4 |

(1) really disagree
(2) kind of disagree
(3) neutral
(4) kind of agree
(5) really agree

## Summary of Jana's MIBI-t Responses

Centrality responses suggest that:

- Being Black is important but not central to her identity (did not respond to having a sense of belonging to Black people)

Ideology responses suggest that:

- Jana believes that Blacks and other minorities face similar issues
- Jana doesn't believe that Blacks have to assimilate to be successful in society
- Jana believes the way that Blacks behave around White people can be negative


## Regard responses suggest that:

- Jana is happy and proud to be Black
- Jana feels good about Black people
- Jana believes that people of other races do not hold Blacks in high regard.

Table 4.13 MIBI-t: Tyana 9/15/2010

| Centrality Scale |  |
| :---: | :---: |
| 1. I feel close to other Black people. | 4 |
| 2. I have a strong sense of belonging to other Black people. | 5 |
| 3. If I were to describe myself to someone, one of the first things that I would say is that I'm Black. | 4 |
| Ideology Scale |  |
| Minority |  |
| 1. People of all minority groups should stick together and fight discrimination. | 1 |
| 2. There are other people who experience discrimination similar to Blacks. | 4 |
| 3. Blacks should spend less time focusing on how we differ from other minority groups and more time focusing on how we are similar to people from other minority groups. | 5 |
| Nationalist |  |
| 1. Black parents should surround their children with Black art and Black books. | 5 |
| 2. Whenever possible, Blacks should buy from Black businesses. | 5 |
| 3. Blacks should support Black entertainment by going to Black movies and watch Black TV shows. | 4 |
| Regard Scale |  |
| Private Regard |  |
| 1. I am happy that I am Black. | 5 |
| 2. I am proud to be Black. | 5 |
| 3. I feel good about Black people. | 5 |
| Public Regard |  |
| 1. Most people think that Blacks are as smart as people of other races. | 1 |
| 2. People think that Blacks are as good as people from other races. | 2 |
| 3. People from other races think that Blacks have made important contributions. | 2 |
| Ideology Scale |  |
| Assimilation |  |
| 1. It is important that Blacks go to White schools so that they can learn how to act around Whites. | 2 |
| 2. I think it is important for Blacks not to act Black around White people. | 1 |
| 3. Blacks should act more like Whites to be successful in this society. | 1 |
| Humanist |  |
| 1. Being an individual is more important than identifying yourself as Black. | 3 |
| 2. Blacks should think of themselves as individuals, not as Blacks. | 2 |
| 3. Black people should not consider race when deciding what movies to go see. | 4 |

(1) really disagree
(2) kind of disagree (3) neutral
(4) kind of agree (5) really agree

## Summary of Tyana's MIBI-t Responses

## Centrality responses suggest that:

- Being Black is central to Tyana's identity

Ideology responses suggest that:

- Tyana believes that Black people and other minorities face similar issues
- Tyana believes that Black people should stick together
- Tyana doesn't believe that Blacks have to change the way they behave around people of other races
Regard responses suggest that:
- Tyana is happy and proud to be Black
- Tyana feels good about Black people
- Tyana believes that people of other races do not hold Blacks in high regard.

Shaniya's MIBI-t Responses ${ }^{3}$
Table 4.14 MIBI-t: Shaniyah11/11/2010

| Centrality Scale |  |
| :---: | :---: |
| 1. I feel close to other Black people. | 5 |
| 2. I have a strong sense of belonging to other Black people. | 5 |
| 3. If I were to describe myself to someone, one of the first things that I would say is that I'm Black. | 1 |
| Ideology Scale |  |
| Minority |  |
| 1. People of all minority groups should stick together and fight discrimination. | 5 |
| 2. There are other people who experience discrimination similar to Blacks. | 5 |
| 3. Blacks should spend less time focusing on how we differ from other minority groups and more time focusing on how we are similar to people from other minority groups. | 5 |
| Nationalist |  |
| 1. Black parents should surround their children with Black art and Black books. | 3 |
| 2. Whenever possible, Blacks should buy from Black businesses. | 5 |
| 3. Blacks should support Black entertainment by going to Black movies and watch Black TV shows. | 3 |
| Regard Scale |  |
| Private Regard |  |
| 1. I am happy that I am Black. | 5 |
| 2. I am proud to be Black. | 5 |
| 3. I feel good about Black people. | 5 |
| Public Regard |  |
| 1. Most people think that Blacks are as smart as people of other races. | 2 |
| 2. People think that Blacks are as good as people from other races. | 5 |
| 3. People from other races think that Blacks have made important contributions. | 5 |
| Ideology Scale |  |
| Assimilation |  |
| 1. It is important that Blacks go to White schools so that they can learn how to act around Whites. | 1 |
| 2. I think it is important for Blacks not to act Black around White people. | 1 |
| 3. Blacks should act more like Whites to be successful in this society. | 1 |
| Humanist |  |
| 1. Being an individual is more important than identifying yourself as Black. | 3 |
| 2. Blacks should think of themselves as individuals, not as Blacks. | 3 |
| 3. Black people should not consider race when deciding what movies to go see. | 5 |

(1) really disagree
(2) kind of disagree
(3) neutral (4) kind of agree
(5) really agree
(Note: Shaniyah completed the MIBI-t just prior to the group interview)

## Summary of Shaniya's MIBI-t Responses

Centrality responses suggest that:

- Black identity is central to Shaniyah's identity

Ideology responses suggest that:

- Shaniyah believes that minorities face similar issues and should stick together
- Shaniyah doesn't believe that Blacks have to assimilate to be successful

Regard responses suggest that:

- Shaniyah is happy and proud to be Black
- Shaniyah feels good about Black people
- Shaniyah believes that people of other races do not hold Blacks in high regard


## Summary of MIBI-t Responses

Table 4.15 provides a summary of themes that emerged in Protocol 2 MIBI-t responses:
Table 4.15 Summary of MIBI-t Scale Responses

| Scale | Girls |
| :--- | :--- |
| Centrality | Jana - neutral <br> Tyana - high <br> Shaniyah - high |
| Regard: Public | Jana - low <br> Tyana - low <br> Shaniyah - low |
| Regard: Private | High - Jana <br> High - Tyana <br> High - Shaniyah |
| Ideology: Assimilation Ideology | Jana - low (exception Blacks should not <br> act Black around Whites) |
|  | Tyana - low <br> Shaniyah - low |
| Ideology: Humanist | Jana - neutral <br> Tyana - neutral <br> Shaniyah - neutral |
| Ideology: Minority | Jana - high <br> Tyana - high (exception Blacks and <br> other minorities should stick together) |
|  | Shaniyah - high |
| Ideology: Nationalist | Jana - neutral <br> Tyana - high <br> Shaniyah - neutral (exception Blacks <br> should support Black businesses) |

### 4.7 Protocol 2 Interviews

## Jana

## "Black girls do mathematics"

I conducted this interview with Jana at the end of the school year on 6/22/2010. Before I began the interview I reminded Jana that I was going to ask her questions about herself and how she thought of herself as a mathematics learner. Following the protocol I'd planned, I asked Jana a general question to start the conversation:

Beginning Appendix E1, Jana's Protocol 2 Interview, Line 5. MJ:
5. MJ What do you think makes someone good at math in school?
6. J Studying, practicing, asking questions if they don't understand something, going over the problem a lot.

Jana seemed to believe that someone could understand a concept but not be able to solve many problems:
8. J Um like, if you're working with a certain problem and you don't, like say you get the concept but it's like you still stumble like maybe you need more practice with it at home like, homework or something and then you practice the problem but... different problems but similar. You practice it so you can get better at it.

Jana described what she had had to do as a mathematics learner during the full year geometry course she had just completed:
10. J I have, I had geometry this year, $10^{\text {th }}$ grade and it was... some parts was difficult but I like math, like math is one of my favorite subjects so... it was... some parts was easy to me but some parts I had to ask a little more questions and get a little more help with it.

Jana's willingness to ask questions and get more help appears to illustrate behaviors that she believes makes someone good at math. Jana said that using the Pythagorean theorem was easy and that she'd liked "working with interior angles and exterior angles and you know finding $x$ and stuff" (18. J). Jana said that she felt good when she got a "rule" and could use it to get answers in class.

Jana believes that everyone can be good at math in school:
34. J Because math is like... it's a subject that like you... it's a rule for everything and... I don't know how to explain but it's like a rule for everything. Like all you have to do is study a lot and practice and everybody can be good at math cuz like it's numbers like everybody's familiar with numbers

It seems that Jana believes that being good at math comes from a person's hard work and lots of studying, rather than their race.

I asked Jana what else she believed about people who are good at math:
36. J That they're really smart and they practice, I don't know yeah I think that they're really smart and if you give them like any problem, like off the top of their head they could answer it or do the problem in a short time.

Jana believes that people who are good at math are smart and able to get answers quickly because they practice. Jana named family members who she believed were smart she named her father, her cousin and her mom's best friend. Jana believes that her father is good at math because he helps "a lot with my work" (40. J) and that her mom's best friend is good at math because she is "just smart all the way around" (42. J). Jana said that another cousin who attends the same school is also a hard worker and "real good at math" (48. J).

When I turned the conversation to President Obama and The First Family Jana said that she and her family were affected:
54. J Yeah he paved the way for um for Black men, for a Black man to be a president. Um I don't know, I know he hard working and stuff.

I asked Jana if she thought that President Obama had also paved the way for Black women Jana responded "his daughters" (62. J):
64. J Yeah maybe one day they'll be the president of the White House and if that's the case then any other hard working Black girl can be the president of the White House.

Jana seems to believe that President Obama has something to do with Black men and women, and imagines that his daughters Sasha and Malia are smart:
72. J Um, I think they are smart, I think they're like respectful, I think that they're hard working and disciplined because I hear that Miss Michelle, that she keeps them like, she makes them make their bed still even though they're in the White House and they have maids that they still have chores and stuff. So I think they're gonna grow up to be, well right now I think they're good kids and I think they're going to grow to be wonderful adults mhmm...

I've observed Jana to be respectful, hard working and disciplined - the way she described the Obama girls. Jana referred to Mrs. Obama as "Miss Michelle" which is a typical term of respect that a child uses to address adults in some African-American communities. I think that Jana believes Sasha and Malia Obama are much like she is because Mrs. Obama appears to treat them the same way as many other mothers, and possibly Jana's own mother.

In contrast, Jana believes that school life for the Obama girls is very different from her own:
74. J I think it's kinda awkward for them a little bit just cuz of the fact that their dad's really famous, he's the president, like he runs the United States and that they have secret service like with their... with their every move with them. So I think it's kinda difficult, not difficult but like awkward for them sometimes and like they get a lot of attention...

Jana didn't know anything about the school that the Obama girls attend but believed that they probably had different mathematics books, and got lots of homework and help because they have "smart parents so if they're not good at math yet they will be" (88. J).

Jana also believes that people who are good at math don't need calculators. She compared her own experience with using calculators in elementary school to students in Jamaica where her dad is from:
94. J Because like when we were little like, like in elementary they just put calculators in our hand so that's what we used and I know in other countries they don't... like my dad's from Jamaica and he told me that they really don't use that much technology instead so from young they already know how to calculate with their, in their head, with their heads, mental math and stuff. Cuz I think the calculator just mess our mind up like that's all we depend on calculators now.

Jana may use and be expected to use calculators in class but seems to believe that she can be good at math without relying on a calculator because it "gives like the answer" (104. J).

I asked Jana to tell me more about how she believes the Obamas might use mathematics. She believed that the girls may like mathematics when they get older because they "don't want to get cheated out they money" (114. J). She also believed that Mrs. Obama may use mathematics as a lawyer if she has a case that "has something to do with money" (132. J). Jana believes that "math is like very important in life" (138. J) but that it is not required to be successful - she believes that President and Mrs. Obama may have become more successful because they are probably good at mathematics.

I asked Jana if she knew that one school in the district was re-named the Barack Obama Academy in the spring of 2009. Jana said "I think it's cool, I want my school to be named that" (144. J). Jana also believed that Mr. Obama was proud to have a school named in his honor and said "I guess it should be important to me too because I'm Black and... I don't know" (156. J). However, Jana did not think that changing the name would change the school or improve tests scores and seemed concerned:
170. J Yeah because it's like you have a school named after the president I know it's like just the name of the school but it does reflect the president and if say that the test scores are poor like so what are you saying about the president cuz like we should care about the school and I don't know...

Despite the fact that Jana did not respond to the MIBI-t item [I feel close to other Black people] I interpret Jana's statements and the way she said them to reflect her feeling of closeness, as a Black girl, to the Obama family.

I asked Jana to tell me what she thought about the items on the MIBI-t. She commented on two items:
180. J Cuz when people say "act Black" like in general they mean like loud and ghetto and obnoxious and stuff but I don't know... that's just how people view it and around White people it's you know... some White people already think that every Black person is like that. I don't know, it says is it important for Black people to not act Black in front of White people... I really don't know what acting Black is instead of the things I said but that's not really acting Black. That's just a, it's a personality like not all Black people act Black as they say. Some White people act that way and different races so I mean, I think it's important for anybody of any race not to act obnoxious around other people.
182. J No like it was easy to respond cuz I already knew like what they meant, what they mean to act Black around White people but that's just what I had to say about it (laughs)

I believe that Jana's statements reflect stable dimensions of public regard as she indicated on the MIBI-t. Jana expressed her belief that some Black people "act" in ways that are perceived negatively by White people and others, and knows that Whites and others also act in ways that are "obnoxious". When I asked Jana whether she believed that there was a relationship between being Black and doing or being good at mathematics, she replied:
186. J Yeah I guess like... I really don't know... Black girls do mathematics... I don't know.

Jana appeared and sounded matter-of-fact which suggests that Jana was not aware of possible connection between being a Black girl and doing mathematics:
190. J Yeah I think I'll be kinda proud like when I see a Black person on top of their game in school and doing their work, getting good grades because that's not what other people see of us. They see, the people of other races they see us failing and they see you know us being out in the streets you know and not being successful. So I, I am kinda proud like when I think of Black people and
mathematics cuz you know other people think we're dumb. So I do be kinda proud.

Jana seemed to be very certain when she articulated her understanding of how Black people are perceived. I asked Jana if she could name a famous Black person who she thought was "on their game with mathematics" and made her proud:
194. J Oprah
195. MJ How do you know she does mathematics?
196. J I mean she doesn't do it, she probably doesn't do it she had to at one point in her life you know through school and college and she has her own show so she had to, probably had something to do with math, like making her show, creating her show and she has other things that she do too.

Jana believes that mathematics plays an important role in life and school success but may not pursue high school mathematics or be able to pursue a mathematics-related job or career:
209. MJ I know senior year is 2 years away but what math do you see yourself taking when you're a senior?
210. J Uh it's only 3 years of math so in high school it's just algebra, geometry and algebra 2.
212. J (shaking head, no) Calculus I heard is beyond hard so I don't know, I think it's a pre-calculus class but I don't think I'ma take it.

Jana was also concerned about grades and said "I don't wanna get bad grades and mess up my GPA so" (216. J) and "I don't wanna choose nothing that, like I don't want to choose nothing hard" (222. J). Although Jana may have believed that mathematics could help her to be successful, she was not sure that she could be successful in pre-calculus and calculus.

## Tyana

## "we don't care about your background, we care about math"

I conducted the interview with Tyana on $9 / 15 / 20010$ soon after she began $11^{\text {th }}$ grade . Tyana seemed to enjoy our conversation and spoke very candidly about her beliefs and
attitudes towards mathematics and race. Tyana was confident, friendly, and assertive during the interview. I began by asking how her day at school was and she told me that the day had ended with an assembly:

Beginning Appendix E2, Tyana's Protocol 2 Interview, Line 8. T:
8. T Um it was Barack Obama's speech, back to school speech when he was in Philadelphia giving a speech tone of them schools.

Tyana didn't sound or look especially moved by the speech and said that she hadn't been able to hear. Tyana believed that the message was to "keep going in school" and "when you fall off then you get back up again, stuff like that" (14. T). I thought the assembly was a timely event for this interview and asked Tyana what she thought about Barack Obama becoming president:
18. T When I first heard he was president I thought like there was gonna be more opportunities for the African-American people. I was thinking like we were gonna really could be something if we try so I was thinking about it but then I was thinking again did people just vote for him cuz he's Black or did people vote for him because they know what he about and so that's what I was thinking... but when he became president I was souped up cuz he's African-American. Like I'm Black I was jumping up and down I was just happy I was souped I was jumping up and down. Matter of fact I was at a party when the announcer ba ba ba President Obama is the new president, it was good.

Tyana was proud and seemed hopeful believing that President Obama represented opportunities for all African-Americans:
20. T Because like you know how people be like you can't be the president of the United States. People say no Black person's gonna be president. Now people will look at it like it's possible to do anything if a Black person is president it's possible and I know a lot of people who try really hard because it teaches you that example Barack Obama is a Black president and look what he doing and that will inspire kids more because like he's Black and people look at it like well if he could do something then I could do something too.

When I asked Tyana what she imagined the Obama girls to be like she said:
26. T I be thinking like I don't think they be getting as much work as we do cuz when they in school people entertain them and say hi like they get like they
famous... not famous but like they part of something big. So I think they get so much attention the probably thinking like I don't have to go to class. I don't have to work because they be like my dad Barack Obama, so I think that's what they be like.
30. T Yeah I think they school would try to make them look good by like pushing them hard trying to get new books. I think they like show off so they could get new books new computers so they kids go home and say that my school we learned we got that we got this and like brag about it because they don't want them to go home and be like daddy I didn't learn nothing today and then he go back to school and be like why my child didn't. And yeah I think their teachers do their best to make the kids smart.

Tyana believed that the Obama girls' status affords privileges, and the school they attend benefits with materials and teachers that "do their best". Tyana also thinks that teachers may not make the Obama girls work as hard as other students. Tyana continued to say that she believed that the Obama girls probably received had the same classroom instruction but received special attention. Unlike Jana, Tyana believed that she was very different from the Obama girls. Tyana described to me what she thought makes someone good at mathematics:
42. T Me? I don't think someone's good at math is like it's not how you answer a question, cuz you know I could answer a question one way and they could answer a question the same way but you're still gonna be right. But I think you can't be good you could be good at math but it's still something you could be wrong at math. See what I'm trying to say like people they could do math a certain way like I could do it this way and they do this way... people are probably like I'm not good at math they probably say cuz they got a test wrong... so I think someone's good at math cuz someone tried math, yeah if you don't try you're not gonna be good at math...
44. T Yeah like you can't just sit there and look at the board and expect to learn math like that, you don't learn like that.

Tyana seemed confident that she knew how to be good at mathematics. She also used to believe that boys were better at math than girls:
50. T I used to have a mentality as like girls are good at English and boys are good at math, that's how I would think sometimes but when I started doing math good I didn't think about that no more

Tyana liked "seeing other females doing good in math" (56. T) and explained why she felt that math was important for girls:
56. T I think girls and math I think that's a good combination cuz you need math in life like girls always shop, girls they gotta hold the household down, they gotta shop clothes, they kids they gotta go food shopping

I asked Tyana who she thought was good at mathematics and she may likely have responded "you" (60. T) just because I was there. But then Tyana said she thought her cousin was good at math because she would "argue down" (76. T) with her about a mathematics problem. This suggests that Tyana is confident and enjoys mathematics discourse. It is consistent with $7^{\text {th }}$ grade classroom videotape that shows how Tyana participated in class and group discussions, worked with Shaniyah and others in small groups. Tyana added that some girls didn't think they needed math or would act shy and "dumb and ask for help" $(80 . \mathrm{T})$. Tyana told me that she remembered asking a girl who "answered all the questions" (82. T) to help her in middle school. Tyana said that it had felt good to have a friend who could help her with mathematics. It seemed strange to me that although Tyana had said that she was proud of girls and women who were good at mathematics she didn't think that women made good mathematics teachers:
90. T_Yeah cuz I never expect a woman to be coaching math over a man... I always had a male math teacher but then my math teacher in $9^{\text {th }}$ grade it was like is she gonna know what she doing, is she gonna do it right?

Tyana explained that she felt that way because all of her mathematics teachers in middle school $\left(6^{\text {th }}-8^{\text {th }}\right.$ grades $)$ had been men which made her believe that men are better mathematics teachers. Tyana did remember that her sister talked about a teacher at the elementary school they attended from kindergarten through fifth grade:
118. T ...from what I hear about her is that she was the best math teacher ever, everybody always say she was the best math teacher ever in S
122. T I think she was good and plus she was like one of them cool teachers, like if you get it wrong she won't be like no you got it wrong, this is what you gotta do. She'll probably make a joke about it so you could laugh to make you more motivated.

Tyana seemed to believe that a good mathematics teacher pays attention to students' feelings which helps to motivate them.

Tyana told me that she likes competition in mathematics class and described how she believed boys and girls acted differently:
138. T Well boys try to go hard like they be trying like no she wrong.
140. T When girls compete they would end up connecting, when boys compete you can't tell them they wrong, they wanna throw a fit like I ain't wrong.

Tyana believes that it's easier to work with girls, especially in groups, but thought that there were advantages to having boys in the class:
150. T Yeah like if you have boys in the class like me I like to show off my math, boy or girl. I be like well and I ask questions about math and they be like oh she smart, you think you smart... It feel good to me if a boy ask me "yo, how did you get the answer?" I be like well I ain't telling you but I'll help him out figure out why.

Tyana seems comfortable working with groups of boys or girls, and reflects her confidence to be an active participant in mathematics class.

When we started talking about Mrs. Obama, Tyana said that she didn't know much about her but said that she imagined she was good in math. She also believes that the Obamas have motivated kids, especially Black kids, to "do they work in math" and to think beyond high school (160. T):
160. T ... like in class everybody be raising they hand so how they get work done, like today we had homework and most kids they was like they was getting it done in class"
162. T I think like I think it's like they probably think like it's my $3^{\text {rd }}$ year in school they probably think now colleges are gonna be looking at me now and now I gotta do this.

Tyana was also aware of larger education issues and seemed to think that other students were aware and impacted:
166. T ...but this year was the best school year, the first week of school that people did great, like people were in they classes, the hallway was kinda clear what we had like 5 stragglers but like people probably like remember that no child left behind? That probably stayed with them and they didn't want to be the one that do and I know like no people want to repeat a math class cuz I wouldn't repeat a math class.

I asked Tyana to tell me about the students in her class and she described a mixed group of Black and Hispanic boys and girls. Tyana said that she and several other girls were friends and answered "questions a lot" (186. T) but that other girls were "just laid back... and don't volunteer like me and my friend" (186. T). There are two Hispanic teachers, "one that be in the back and one that be in the front" (194. T) because two classes had been scheduled together.

When Tyana and I began to talk about the MIBI-t, she was proud to identity herself as Black and described how she believed Blacks are perceived by Whites and Hispanic people:
198. T I'm Black and then it like it like some people like if some people like it be Spanish kids around White people around and when we act they be like stop acting ghetto we got people here. I be like I don't care I'm not changing the way I act for them like that's not how I am. Like people get around White people like Black people and they be trying to act more proper and not they selves, they try to change it up. Me I don't do that I act the same way I always act like if they look at me I be like what, what I do.

Tyana remarked that she was confused by the inventory item "I have a strong sense of belonging to Black people" and said "I like being around them, I put I put "really agree"
cuz I like being with my own kind, like it's just fun" (208. T). Tyana suggested that there should have been an "open question saying like what do you think people do you think happens when a White person see a Black person in a White store. To me they probably think oh she stealing or he stealing" (219. T). It seems clear that Tyana has first-hand experience or knows of others with first-hand experience of what I've also experienced and call being "Black while shopping".

I wanted to know more about how Tyana thought about being a Black mathematics student:
222. MJ ... let's turn that same sort of scenario towards the math class. Do you think that say for example a Hispanic teacher or a White teacher when they see Black students in their class...
223. T I think if a White teacher see Black students in they class they say 'oh my god it's gonna be a rough year. They probably think they're gonna have to stay after school and help, once, I think once a teacher see a Black person doing good in math they're gonna be shocked... like my mom always tell me don't judge a book by its cover".

Tyana continued by describing how she believed teachers should judge Black students:
223. T ...let her explain it first, see if we could do it and then explain it if we get it wrong, you gotta try it first and then you go over it and then you'll be able to see what we did wrong, what we did right

Tyana believes that her peers are valuable resources for mathematics learning and that she "learned more cuz the kids put it in they language like say you was texting this amount of people..." (223. T). Tyana also expressed her dislike when teachers compare students to themselves:
223. T ...they say something they be like well I grew up here and start telling about they background. We don't care about your background, we care about the math.

I interpret what Tyana said to reflect the way many adolescents feel when teachers (and adults) believe that their stories are meaningful to children of all ages. I've heard many
young people complain that teachers and adults often "preach" and yell at them which is discouraging to them, and makes them feel disrespected. Tyana said that mathematics teachers should give students a chance to explain their own understanding and thinking before telling students how to do a problem and giving answers. Tyana appears to be describing how teachers and students interact in a mathematics learning community which she experienced in Mr. P's class. Tyana knows that some students can treat teachers in "rude" and "disrespectful" ways (229. T) and believes that some teachers "gonna say all the kids" (233. T)

Tyana's descriptions and expressed beliefs are consistent with her responses on the MIBI-t which suggest stable dimensions of Centrality, Public and Private Regard, and Ideology.

Table 4.16 Summary of Identity Themes from Protocol 2

| Mathematical Identity |  |  |
| :--- | :--- | :---: |
| Being good at math has less to do with race and more to do with hard work and study. | Jana |  |
| Black girls do math | Jana, Tyana |  |
| Most math teachers are men but women can be good math teachers if they prove <br> themselves. | Tyana |  |
| Math is rules that are used to get answers | Jana, Tyana |  |
| Math is important in life | Jana, Tyana |  |
| Getting good grades in math is important | Jana, Tyana |  |
| Hard work and lots of studying makes someone good at math | Jana, Tyana |  |
| Relatives and friends who are good at math are good resources for help. | Jana |  |
| High school is only three years of math and calculus is hard. | Jana |  |
| Calculators can keep someone from learning math and shouldn’t take the place of <br> mental math | Jana, Tyana |  |
| Math problems can be solved in different ways | Tyana |  |
| Good mathematics teachers think about students' feelings and don't just tell them that <br> they're wrong | Jana, Tyana |  |
| Good [mathematics] teachers listen to students rather than "preach" at them | Jana, Tyana |  |
| Racial Identity | Successful Black people are good role models for African-Americans (e.g. Oprah, <br> President Obama) |  |
| I'm proud to be Black. Seeing successful Black people make me proud to be Black. | Jana, Tyana |  |
| Whites and people of other races don't think that most Black people are smart or <br> successful. | Jana, Tyana |  |
| White or Hispanic math teachers are put off by Black students and may have low <br> expectations for their ability | Tyana |  |

### 4.8 Protocol 3 Group Interview

## Lead-in to Group Interview

The group interview took place after school on Veteran's Day, November 11, 2010 with Jana, Tyana, and Shaniyah. All of the previous interviews had been conducted to the public library that was conveniently located adjacent to the high school building. Each time I had met the girls after school and found a private study room in the library. I had planned the same for this group interview but had not anticipated that the library would be closed for the holiday since the district schools were not closed. At 2:55pm I had already parked in the library's small lot when I received a text message from Jana asking that our interview meeting begin at $3: 30 \mathrm{pm}$, rather than $3: 15 \mathrm{pm}$. I appreciated that she had taken a role to communicate with Tyana, Shaniyah and Erica to arrange the group interview - it was Jana who had suggested that the interview be scheduled at a time when she, Tyana, Shaniyah, and Erica were all available. It was important that every possible accommodation be made for the girls, so I responded that I would be at the library at 3:30pm but that the interview would have to take place at my home.

Rather than leaving the library parking lot I decided to enjoy watching the young people who were all around. Furthest away I could see part of the high school building and there were many students in and around the park that occupied the square block behind the library. I could also see the busy main street where many students were heading in the direction of a small strip mall with pizza shop and the downtown area beyond. I stepped out of my car with excitement when I saw Tyana walking across the library parking lot with several other girls. I could not hear her voice but she appeared to be immersed in conversation - communicating with hand and arm gestures, and using her
body (as if to show or act out what she was saying). When Tyana saw me she called out "Ms. Jones, I'll be there in five minutes!" and kept walking, out to the street in the direction of downtown. The time was $3: 10 \mathrm{pm}$ and I wanted the girls to be focused and distracted as little as possible during the interview, so I called after her saying "Take your time!", confident and assured that she would be back at $3: 30 \mathrm{pm}$.

At $3: 30 \mathrm{pm}$ I began looking around and expected the girls to be within sight and coming towards the parking lot. I saw Tyana on the street but now she was walking with a purpose in the opposite direction and past the library out of sight. I waited patiently for her to reappear, assuming that she'd lost track of time and didn't know that it was 3:30pm. A few minutes later as I'd hoped, I saw Tyana and Jana walking towards the parking lot. Jana and I greeted each other and I asked if the two other girls were coming. I was disappointed when Jana told me that although Erica had agreed to meet for the group interview, she was not going to participate after all.

I was elated when Jana said that Shaniyah was on her way from a dentist appointment. A few moments later Shaniyah arrived in a car, giving me the opportunity to meet her mother and express my thanks for her daughter's participation and time.. Erica and Pamela did not contribute to this group interview.

Refer to Appendix F Protocol 3, Group Interview for the full interview transcript. I am (MJ), Jana (J), Tyana (T) and Shaniyah (S) in the transcript and excerpts below.

## Group Interview Description

I reminded Jana, Tyana and Shaniyah that the purpose for this group interview was for me to learn more about how they perceived themselves as mathematics learners
and that it would help to think of responses in terms of "I feel" and "I think". In addition, I told them to feel free to talk to each other. The girls were open and candid throughout the interview as they talked about themselves, their experiences, and their beliefs about mathematics and about being a Black girl. The interview began when each of the girls said that they were 16 years old and then I asked them what they thought of my study.

Tyana said that she liked [the study]. Shaniyah had just completed the MIBI-t and said that she liked "these questions" because they made her "think about certain stuff and certain situations as far as like Black people and all of that". (Appendix F Protocol 3 Group Interview, Line 12. S). I asked Jana, Tyana and Shaniyah to discuss the MIBI-t inventory and they spoke briefly about an Ideology subscale item:

Beginning Appendix F Protocol 3 Group Interview, Line 14. S
14. $S$...it said "a Black parent should surround their children with Black art and Black books". I put neutral for that because like just cuz you Black you should just oh everything should be Black, Black, Black. Like, that child should know all... they, like, I don't know how to say it but...
15. J ...get to know about other things?
16. $S$ Yeah
17. T She said they not gonna know about other races if it's just Black, Black, Black...
18. S Yeah
19. T Because you being racist to other things

Jana, Tyana and Shaniyah agreed that Black parents should expose children to art and books about other races, and Tyana even believed that not doing so was racist. Tyana asked Jana and Shaniyah what they thought about a Centrality item:
25. T Ya'll don't think this is um weird, how you be all Black.
26. S Yeah, that was a weird one.
27. J What?
28. T This one right here "when I describe myself to someone the first thing I say is I'm Black".
29. J No.
30. S Yeah I don't say that.
31. T They probably be like...
32. S They know that!
33. T What's the problem, is there a problem? How you know I'm Black cuz my name Tyana?
34. S (laughing) Yeah.
35. T It sound crazy right?

All three girls responded to the measure of the importance of being Black to one's identity presuming that Jana didn't comment on Tyana and Shaniyah's remarks but seemed concerned with a Regard subscale item:
37. J Um, yeah that question that say "most people think that Blacks are as smart as other races"...
45. J Yeah that stood out because I don't think so.
47. J Oh, I don't know, I don't think that other races think that we are capable of certain things or achieving anything.

When I asked the girls how this may be related to mathematics all of the girls agreed with Tyana immediately said that she hadn't had any Black teachers at the high school and Jana added "there are some, but I don't have one" (51. J). All of the girls had talked in the first interview about the same $7^{\text {th }}$ and $8^{\text {th }}$ grade mathematics teachers in middle school. Shaniyah said that Mr. G $\square$ in $8^{\text {th }}$ grade was "the last time I had a Black math teacher" (57. S) to which Tyana exclaimed "that's crazy" (58. T). I believe that Tyana was expressing general disbelief that she and other Black students had had few opportunities to have Black teachers since middle school. Tyana and Shaniyah's $9^{\text {th }}$ grade teacher had been a woman and the girls discussed some of their experiences and beliefs when I asked them if they believed that there were differences between female and male mathematics teachers:
74. J I had one last year, she was good, I passed.
75. S In a way yeah
76. J I don't know...
77. T One thing about a male teacher he won't show you short cuts, he will do the whole thing out with no short cuts, a lady teacher will.
78. $\mathbf{J}$ That is not true, it depends on the teacher you have.
79. T Mr. G [from $8^{\text {th }}$ grade] would do all, he never did none [short cuts]
80. J It's not a male vs. female... Mr. F $\square$ gave us short cuts.
81. T My math teacher don't give us short cuts.
82. J Mr. G gave us short cuts.
83. T Nah, he would give us short cuts at the, at the end.
84. J He gave me short cuts.
85. T And he did the long part.
86. J Tyana!
87. T He was like "oh, do this", not easy but he was like cuz "I want you to learn the long way"

In the individual interviews each of the girls had said that they had become used to male teachers and even believed they may be better than female teachers.

Next, I showed some $7^{\text {th }}$ grade video and asked the girls to compare Mr. P's mathematics class to $8^{\text {th }}, 9^{\text {th }}$ and $10^{\text {th }}$ grade mathematics classes. The girls remembered that "it used to be fun" (108. T) and Shaniyah said:
117. S Well, for me I could say it's different now because now we don't really, we discuss what we do bow but more we just pick it up and we just do like, I don't know for ya'll... I just be doing math, I don't really, we'll have discussions but like my teacher he'll teach it for like 10 minutes and after that the whole class will get it and we just do it!
118. T Now I be on my own.
119. S Yeah, that's what I'm saying.
120. T When I participate it be like do your work
121. S Yeah.
122. T In that class we discuss problems, we used to do problems together I think. 123. J Mhmmm.

Jana hadn't said much but agreed with what Tyana and Shaniyah described. The girls seemed to miss working on problems together in class as they'd done in Mr. P's class and believed that they were expected and required to do work on their own. They continued to talk about how they had learned in $7^{\text {th }}$ grade and seemed to convey what they believed to be best practices in mathematics classes:
129. T I like when I was in groups.
131. T Cuz I feel like in groups when you wrong the other person helps you explain how you got that answer. Now when you wrong by yourself you're just wrong by yourself.

Shaniyah agreed that her mathematics classes had been different since $7^{\text {th }}$ grade and stated:
135. S Like, yeah I don't know, like yeah. I just be by myself now, I just be doing my own. I don't really... if I'm not getting something I just ask the teacher, like I just be asking the teacher and then he'll help me. And I'll just take it from there, like try to work it out by myself.

I don't know whether Jana felt the same because she did not say anything. But Shaniyah and Tyana were able to recognize a benefit from working alone:
137. S I think that's helping me because now like if I take a test I'll know how to solve that problem and like I made it like step by step. So it'll help me, so that way I could know if I did that or do that or something...
138. T It helped me too!
142. T Because usually we always working in a group. I could do it in a group but now I could do it by myself, now not, without a group, you know when the test come you can't be in a group. When the test come you gotta do it by yourself, so now I know how to do it by myself and I don't need a group.

All of the girls had talked about doing well on tests and getting good grades during interviews and seemed to believe that working together on problems was good but that it was also important to learn on your own.

Tyana and Shaniyah had been assigned to an algebra 2 and geometry class while Jana had been assigned to algebra 2. I asked the girls if they had any thoughts about whether mathematical identity and racial identity were related in any way. Shaniyah and Jana said they hadn't considered possible relationships and Tyana asked what I meant:
161. S I never really thought of stuff like them two together but I think it...
162. T You talking about like work with a, a Hispanic student?
163. MJ Well um no I just wanna get and I appreciate you saying that you never thought about it together, Shaniyah.
164. J Yeah me either...

I explained again to the girls that I was trying understand how they perceived themselves as mathematics learners and as Black girls, and whether they believed there was any connection between the two aspects of their identities.
171. $S$ Um well um some connection could be like well in math well with your race you like when you're born you're automatically what you are. But as of math you have to learn it so like aight. Well as you get older you learn more and more like types of math and then as you get older, also with race like you start to learn who you are as a person so I think that's one way I guess be similar like I don't know.
172. T Oh I get it now.

Shaniyah made a distinction between racial identity which is "what you are" and mathematical identity which is learned. Shaniyah also seemed to imply that both are learned as part of one's identity.

The following exchange captures the girls' beliefs about the value and role of mathematics in their lives:
176. T I'm like the same it might not even make sense at one point but then it get there
177. MJ Um what about your identity and thinking about math in the future.
178. T People tell me like I learned that on day I might go to the store and buy some (inaudible) or a (inaudible). I'm not gonna do like how much am I gonna spend, stuff like that.
179. J That is not true.
180. T I know, that's what I be saying to people.
181. S I know what she talking about like how they like be having discounts or they'll have sales and the percent and then like you'll... I know what she saying.
182. T Well you're gonna have to know how to do math in the future.
183. S Well I know I'ma always be math cuz regardless of what I do rather if it be dancing or just a job you're gonna need math cuz you're gonna need to count you're just always gonna need math.
184. T If you don't know math people could jip you out your money.
185. S I know I'm gonna need math to take me wherever I wanna go.
186. T You're gonna need math for taxes.

When I asked the girls what role mathematics would play in their lives, Shaniyah said "money" (191. S), while Jana said "I wanna be a scientist so I'm gonna need math to do that" (192. J).
193. $S$ Yeah and I wanna be an investment banker so that's gonna play a big part.
194. T I'm gonna be a nurse, I don't know how that's gonna be a part with that besides getting checks and stuff.
I took this opportunity to share my own daughter's experience as a nurse and told Tyana that she makes calculations for medication dosages. Interestingly, Jana said "You still wanna be a nurse?" (198. J). Tyana said that she still wanted to be a nurse and asked Jana if she still wanted to be a scientist (203. T), to which Jana replied "Yeah" (204. J). My intention was to inform all of the girls awareness of the role of mathematics in a job or career such as nursing. I was surprised at Jana's question to Tyana but it seemed consistent with her not wanting to take mathematics in her senior year even though she liked mathematics (refer Jana's Protocol 1 Interview). When the girls briefly discussed English classes Jana even said "but I don't like English, I love math" (220. J).

The girls next talked to each other about teachers who they believed were "good" teachers and whose classrooms they had liked:
230. S I'm sorry for me it was my $8^{\text {th }}$ grade teacher, he was like...
231. J Mr. G
232. T Mr. G right?
233. S Yeah
234. T I said that.
235. S He was like the best math teacher I had like...

The girls said that they had fun in the $8^{\text {th }}$ grade mathematics class and that $\mathrm{Mr} . \mathrm{G}$ was fun, and funny:
248. S I think it was just his way of teaching
249. J Yeah I don't know how to explain it
250. $S$ When we were in that class you knew it was gonna be something funny, like you could learn and like...
251. T We multi task
252. S Yeah.
253. T We used to learn and have fun.
256. T He gave a chance.

The girls' had repeatedly described positive experiences in both $7^{\text {th }}$ and $8^{\text {th }}$ grade mathematics classes, including how they had worked together with the teacher and peers to solve problems and how the class was fun. In this interview the girls seemed to agree that their $8^{\text {th }}$ grade teacher was the best. I believe that the girls may have been expressing a sense of racial connection to Mr. G , a Black man because when I asked them to describe who they pictured as good at math, the girls said:
284. T A Black African man
285. J High cheek bones.
286. T A beard, big head, I think he African, too.

The girls continued to chat freely with each other about the male and female teachers they had had:
299. S Yeah it was different for me cuz I don't know I just always used to a male math teacher, so I just wanted to see how she was gonna...
300. T ...do it.
301. S Yeah.
302. MJ Does that influence you in any way?
303. S Honestly no.
304. MJ Do you think about yourself? It's like, ok this is a lady doing math, she's a math teacher.
305. S Yeah, well I know girls are capable of doing anything but it was just like aight.
307. S Yeah and she wasn't Black either, she was...
308. T Hispanic
309. S Yeah Hispanic so it was like yeah... but it didn't influence me because I failed her class and something about how she talked, she was a good teacher but she didn't hit it off for me.
310. MJ Mhmmm, so just the fact of her being a woman didn't necessarily make it a good...
311. S No, I think she, I don't know how, like I think she talked too fast or maybe it was just me, I don't know.

I wanted to give the girls an opportunity to tell me what other questions I might be interested in. Tyana suggested a question directed to Jana and Shaniyah which led to a discussion about working in groups:
319. T I have a question, if ya'll go to math class right, everybody get in groups, they all get in groups but a Black group...
320. J It depends who's in the class, I don't know.
321. S Nah, I don't think like that.
322. J I don't think like that either.
324. T Like would you get in an all Black group, like I don't know, me if everyone get in groups I would be in an all Black group, I didn't plan for it.
325. J It depends who's in, who my friends are or who I'm next to or who I wanna be with that day. I don't know cuz in my math in my algebra 2 class I sit with a Black girl and a Spanish boy so...
326. T Me I can't like in a group I can't work unless my friend there like you gonna get in a group with someone you ain't know, like you be sitting there like if I'm with somebody I don't know cuz you don't know what they're gonna say.
327. S Yeah, sometimes it don't happen purposely but sometimes I don't be like wanting, I don't know it depends cuz I know I don't be wanting to use people but I know if I go with a certain culture or whatever, like if I go with a Hispanic group I know they get their work done so I go with them but...
328. T They crack jokes and stuff.
329. S I just be getting my work done, that's it, I get my work done then I move back to my seat.
330. T So you use them.
331. S Nah, it's just you wanna get your work done.

Shaniyah appears to believe that it is important to do whatever supports her own learning and will choose to work with students who she believes will benefit her own mathematics learning. Jana likes to work with friends but can work well in a mixed group but Tyana prefers to work with Black classmates. When the girls talked about differences when working with groups of boys or girls, there seemed to be more general agreement:
334. MJ What do you think about what happens in a group with all girls?
335. T I don't think nothing, I think we still get our work done.
336. MJ Is there any preference, do you think it has any influence on the way you work?
337. S Sometimes we stall, we'll like, we'll talk about...
338. T You talk about girl things.
339. $\mathbf{S}$ Yeah it's not always like that cuz you can be with a boy and a boy will distract you too.
340. J Yeah, I'd rather be in a group with girls, I don't know why, I mean it don't matter but I don't know it's just with me it depends on the people.
341. T I can't work with a boy I like either.
342. S You will definitely not get any work done.
343. T Try to be cute but not get my work done.
344. S You won't get your work done.

Jana, Tyana and Shaniyah believed that girls are sometimes distracted by boys. They also seemed to believe that girls sometimes behaved differently towards boys in the mathematics classroom:
348. T Yeah say you're doing a math problem you don't want him to feel like he dumb, oh you got that answer, oh I got the same answer knowing that he wrong and you right.

They preferred working with girls and friends and believed that they could get more of their work done. All of the girls said or inferred their belief that girls are capable mathematics learners but still seem to be bound by stereotypes about boys, girls, and mathematics.

During the last minutes of the interview, Jana, Tyana and Shaniyah talked to each other about the mathematics class they might take in senior year:
361. S (nodding her head) I feel math is important and you should, that's what it is, it's important, yeah I like math. Wait senior year, what we learn calculus?
362. J If you want you can take pre-calculus but it's really, you take three years of math but you don't have to take pre-calculus unless you want to and I'm not.
372. S I think I might do it.
373. T I think I might try it, yeah I'ma try it cuz I might need it for college
374. S Yeah I think I might try it cuz...
375. T But if I do a make up class I ain't gonna try it
376. S Yeah I think I'ma try it
377. T It depends on like if I need an extra class or not

Jana had said in an earlier interview that she did not plan to take a mathematics class in her senior of high school but I was glad that Tyana and Shaniyah were willing to try.

Although all three girls seemed to believe in themselves as mathematics learners and believed that mathematics was important in their daily lives and for future jobs and careers, they did not appear to believe that taking a fourth year of mathematics in high school would be necessary for them.

## Summary of Group Interview

Themes that emerged from the group interview pertaining to racial identity and mathematical identity are summarized in Table 4.17.

Table 4.17 Summary of Group Interview Identity Themes

| Theme | Identity |
| :--- | :--- |
| It would be better for Black students if there were more Black math teachers. | Racial <br> Mathematical |
| It's important to know how to learn and work on math problems alone. | Mathematical |
| It's important to work together on problems in math class. | Mathematical |
| Male math teachers are the norm and are probably better than female teachers | Mathematical (gender) |
| Math is important in everyday life for things like shopping and taxes | Mathematical |
| It's hard to see the connection between school math and math that is used on the job <br> or needed in careers. | Mathematical |
| Good teachers make math class fun and make students feel good | Mathematical |
| White people and people of other races think that Black people are less capable [in <br> math] than people of other races | Racial <br> Mathematical |
| Friends can influence how and what you learn in math class | Mathematical <br> Racial |
| It's can sometimes be easier or better to work in a group with girls rather than boys <br> who can be distracting | Mathematical |
| Girls try to avoid making boys feel dumb or stupid in math class | Mathematical (gender) |

## Chapter 5 <br> Conclusions, Discussion and Limitations

### 5.1 Introduction

As stated earlier, the purposes for this study were to identify and describe affective, social and mathematical interactions related to identity, and to describe - in their own words - the mathematics classroom experiences of two focus girls, particularly during middle and high school. The researcher was especially interested in learning about and trying to understand the girls' perceptions of themselves as "Black girls who do mathematics" having observed her own daughter's racial, academic and mathematical identity development while attending the district's other middle school and the same high school as the girls in this study. Therefore, this study posed the following research questions:
4. What can be inferred, if anything, from $7^{\text {th }}$ grade and high school interview data about the development or co-construction of two African-American girls' mathematical identities and racial identities in a small urban school district? In particular, in what ways do they see themselves as effective mathematics learners, and how do they perceive their school experiences having contributed to this? How do they perceive themselves as Black girls, in their own eyes and in the eyes of others? Do they see any relationships between their developing mathematical identities and their racial identities? What light is shed on these questions by information gathered from peers with whom they interact?
5. What "critical events" identified in $7^{\text {th }}$ grade retrospective interview videotapes support these inferences? A "critical event" is an affective, social, and mathematical interaction pertaining to identity that occurred during $7^{\text {th }}$ grade.
6. What stable dimensions of the girls' racial and mathematical identities can be documented in data concerning their experiences since $7^{\text {th }}$ grade, particularly experiences during $8^{\text {th }}, 9^{\text {th }}$, and $10^{\text {th }}$ grades, described by the girls themselves?

First, case stories for the two focus girls in this study, Jana and Tyana, are presented. These are based on the detailed report in Chapter 4, and summarize the researcher's perceptions and inferences about the girls, taking into account the researcher's own cultural background and identity as a Black woman studying mathematics education.

Next, conclusions for each research question are presented, beginning with the sub-questions posed in the first research question. Aspects of the mathematical identities of Jana and Tyana are inferred from the four major sources of data used in this study: affect study student surveys, critical events identified in $7^{\text {th }}$ grade retrospective interviews, MIBI-t responses, and high school interviews.

Next, the significance and limitations of this study are presented. Finally, the researcher offers a note to readers of this dissertation in order to share her personal motivation, significance, and meaning for the study.

### 5.2. Case Stories

The case stories of Jana and Tyana that follow were developed in the context of one small city where the researcher lived for nearly forty years. At one time the city and
school district had been a place to where working and professional Black families moved from larger cities in order to own homes and provide quality public school education to prepare their children for careers and college. Over the last several decades the city's population changed from a diverse mixture of White and non-White working and professional families to a majority of African-American, Black, and Hispanic families. In recent years the quality of the public school system declined with decreasing numbers of students demonstrating academic proficiency (as measured by state test scores). In addition, families began to move away or to send their children to private schools, and the expectations for the public school students' ability, particularly in mathematics, became low.

When the researcher was a MetroMath doctoral fellow researcher, she met Jana who, at that time, was in $7^{\text {th }}$ grade. The researcher was a school district mathematics coach from 2001 until 2006 and first met Tyana when she was in fifth grade.

## Jana

Jana was identified as a focus student in the 2006-2007 MetroMath study and impressed me as a soft-spoken girl with big, bright eyes and a big but shy smile. Jana had come to the United States from Jamaica with her mother, sister and five brothers when she was two years old, and had been attending public school in this small urban district since $2^{\text {nd }}$ grade. Jana told me that her father passed away but she still visits her grandmother and aunts in Jamaica.

The elementary school that Jana attended through $6^{\text {th }}$ grade is located at the border of an historic part of the city with large homes, some of which are designated as historic, a few blocks away from the high school on the main street that divides the city into "east
and west ends". When I interviewed Jana for this study, she was living with her "mom" and sister in a handsome, mid-size apartment building located just blocks away from the elementary and middle school she had attended, and the high school where she was completing the $11^{\text {th }}$ grade at the time of this study. Her brothers were "grown up" and living on their own.

I didn't know Jana when she was in elementary school but aspects of her mathematical identity were apparent during $7^{\text {th }}$ grade. Jana liked mathematics and believed that she was capable of doing well. She was motivated and participated in mathematics activities and lessons that were challenging and fun - lessons she called "projects" that required her to work together in groups, with boys and girls, on problems over the course of several class periods. Jana said that this was new to her and usually helped her to "learn better". Jana frequently wanted the teacher, Mr. P., to help her or her group and had often felt as though he didn't give her or her group enough attention. However, Jana came to understand that Mr. P. often spent time with students who he believed needed his help more than she or her group did, and came to rely on her group members as learning resources who could help her. Jana remembered learning from Mr . P. that she could "ask three" before asking [the] teacher for help and that she was also a resource for her peers. Nonetheless, Jana felt "forgotten" when she believed that she needed the teacher's help.

Even though Jana enjoyed working in groups, she sometimes had to persevere and remain focused on the mathematics task, even when the other students' didn't help her or when they tried to discourage her. For example, in $7^{\text {th }}$ grade when one of Jana's group members criticized her problem-solving strategy, Jana hadn't stopped what she was
doing. When she reflected on the incident, she stated "most of the times I don't go by what other people say so I see it myself". Another time when Jana thought the boys in her group were "doing their own thing", she went to work with another group. Jana stated "since it was a group project I didn't want to do it by myself".

During $7^{\text {th }}$ grade Jana also came to believe that everyone in the classroom was a valued learner and could be a "teacher" in the mathematics classroom. For example, during one mathematics lesson she recalled, Mr. P. had been working on a problem with the students and had "messed up". Jana (and her classmates) liked working alongside the teacher who made mistakes because it made her feel "smart" and confident as a learner and "doer" of mathematics.

Although Jana believed that her peers could help and teach her, when teachers don't provide individual attention, Jana often feels neglected. During our first interview, Jana remembered several times when Mr. P. did not help her while working on a mathematics problem. Mr. P. had told Jana to rely on her group members, which she did. However, Jana stated that she felt "forgotten" even though she understood that others in the class sometimes needed help more than she did.

In the high school interviews I conducted with Jana, she reminisced about the $7^{\text {th }}$ grade mathematics learning experiences that had helped her to develop a positive mathematical identity. Jana hadn't had many opportunities to work together with other students on "projects" after $7^{\text {th }}$ grade. But she still liked mathematics and retained a positive mathematical identity during high school. She still wanted to show "how smart" she was and that she could work with others in a group. For example, Jana said that she
had no problem working with the "Black girl and Spanish boy" she sat with in her $11^{\text {th }}$ grade Algebra 2 class.

Jana has had classmates who lack confidence in their own ability to do mathematics. In her opinion, her peers are as able as she is, and thinks they should be patient and persevere as she does to "get to understand things" before they make judgments about themselves as mathematics learners.

Jana believes that she must do well on state tests to demonstrate that she is a Black girl who can do mathematics. Jana knows that she is judged by tests scores and that not getting high scores affect how she is perceived as a mathematics learner. However, she also believes that her self-confidence, perseverance, and ability to work together with others on mathematics problems and "projects" are important aspects of her mathematical identity.

Jana has developed a positive Black self-identity and mathematical identity. For Jana, her mathematical identity (belief in ability) is not connected to her Black selfidentity. For example, Jana said that "Black girls do math" and people of other races can be obnoxious because of their personality or "act ghetto", the term that Jana offered to instead of "act Black". In other words, Jana believes that anyone can behave "obnoxious and stuff" but that Blacks are more often negatively described that way. Jana avoids behaving in ways that may cause others to think that she "acts ghetto".

Jana perceives President Obama's girls, Sasha and Malia, in ways that she perceives herself. She knows that there are obvious differences. However, Jana has heard that like her, they are expected to make their own beds and do chores. Jana probably believes that they behave in ways that she, as a child, is also expected to behave. For
instance, when Jana talked about Mrs. Obama, she called her "Miss Michelle". It makes me believe that Jana has grown up with some "traditional" Black cultural values that I also hold, such as the practice in which children show respect to adults by addressing them as Mr., Mrs. or Miss.

Jana is a sensitive and independent young lady who is confident in her ability and likes to work on complex mathematics problems in social groups. Jana has developed a strong sense of being a Black girl along with pride in Black culture, and has developed a positive mathematical identity despite fewer opportunities to develop further during high school.

## Tyana

Tyana's mathematical identity had begun to develop in fifth grade when she was energetic, talkative, outgoing, and independent. Tyana's teacher was Mr. A., a young Black man with school-aged children of his own, who had always seemed able to develop a rapport with his fifth grade students who were African-American, Black, and Hispanic, and sometimes Asian. In fact, Mr. A. had been my mentor when I was hired as the second fifth grade teacher in the elementary school which had one of the district's highest numbers of students receiving reduced or free breakfast and lunch, and other in-school social services. During our years together as fifth grade teachers, Mr. A. and I often targeted our academic and social instruction - I taught mathematics and science, and held all-girl meetings while Mr. A. taught language arts and social studies, and met periodically with the boys. Mr. A. and I were purposeful in our approach to helping and
preparing our students of color, academically and socially - developing academic identity and racial identity.

When I became a district mathematics coach and returned to my former elementary school to co-teach a few standards-based mathematics lessons with Mr. A., Tyana was a student in his class. I remember telling Tyana that her ability to ask lots of questions and talk fast were skills she should consider using as a lawyer. Tyana had already developed a confident and positive self-identity and academic identity, which had been fostered by Mr. A, to be sure.

Tyana attended the public elementary school where Mr. A. and I taught because she lived in the apartment complex, named for a Black civil rights leader, that was walking distance to the school and downtown, and just a little further walk to the middle school on the "west end" where Mr. P. was the $7^{\text {th }}$ grade mathematics teacher. Black and Hispanic families lived in the garden-type complex, and most if not all children who lived there attended the public elementary school.

Aspects of Tyana's developing mathematical identity were apparent in $5^{\text {th }}$ grade and developed further during $7^{\text {th }}$ grade. Tyana was still very outgoing and friendly with her peers and with Mr. P., and thrived in the classroom where she was expected to work together with her classmates. This was different from her $5^{\text {th }}$ grade mathematics class where she loved to ask questions and talk to her classmates, but had been expected to do much of the class work on her own.

In $7^{\text {th }}$ grade Tyana loved to participate during class discussions and felt safe to ask questions without feeling embarrassed. Tyana had believed that only correct answers and few questions were valued during class discussions, but said that Mr. P. "broke me out of
that mentality". Tyana now values a mathematics classroom environment in which she can make mistakes and have wrong answers without the teacher telling her "you're wrong". Tyana learned that "we all make mistakes" and became more confident in her ability to learn from both right and incorrect solutions and answers. She also believes that mathematics teachers should try to understand what she thinks and why, and what she is doing when trying to solve problems.

Tyana has become confident in her own ability and expects to be treated as a competent mathematics learner. She is affected by how teachers treat her. In $7^{\text {th }}$ grade when Mr. P. misinterpreted her attitude and behavior in class, Tyana became discouraged which caused her to "just put my head down". Tyana described the best teachers for her as those who show that they "care about" the students in the class - teachers who care about who their students are as much as caring about themselves as a learner and a teacher. It surprised me when Tyana said "we don't care about your background, we care about the math" because Black teachers often share backgrounds in an effort to develop a rapport with Black students and to provide a context for their students' motivation to do well in school.

Sharing mathematical ideas and representations in a social environment contributed to Tyana's mathematical identity development. For example, during one $7^{\text {th }}$ grade activity Tyana finished her own work and then helped others so that everyone could "perform" [pictures they had scaled up] in front of the whole class. I'm not surprised that Tyana described and enjoyed individual and group presentations or "performances" of their work because she had always displayed a lot of energy and "verve" when I worked with her in both fifth and seventh grades.

By the time of this study, Tyana's third year in high school, her mathematical identity was less positive than it had been in $7^{\text {th }}$ grade. During high school, Tyana didn't believe that her mathematics teachers got to know her or that she had opportunities to work on problems with her classmates and to learn from mistakes. In other words, Tyana didn't describe her high school mathematics classes since $7^{\text {th }}$ grade as social learning communities for her. Except for her $8^{\text {th }}$ grade mathematics teacher, a Black man, Tyana did not feel that her mathematics teachers since $7^{\text {th }}$ grade had tried to develop a meaningful rapport with her or her classmates. Tyana had fewer opportunities to work alongside her classmates to discuss, solve, represent and "perform" mathematics problems and solutions. Tyana said that she is now often reluctant to raise her hand in class if she is not sure that her answer is correct. However, Tyana's strong belief in her own mathematical ability has not changed.

Tyana expressed strong views about "good" mathematics teachers. She recalled that she felt important and respected in Mr. P.'s class - everyone's ideas and strategies for solving problems were valued, and Mr. P made great effort to listen as much as he talked during lessons. Tyana believes that good mathematics teachers provide learning opportunities for everyone and doesn't like teachers who don't seem interested in her or her peers, and don't appreciate who they are - as individuals and as mathematics learners. Tyana said that teachers who spoke too much about their own mathematics success in school annoyed her - she wanted to tell them "we don't care about you, we care about the math".

Tyana has developed a strong and positive Black self-identity. For example, she believes that her name sounds Black and that she "acts Black" - confident, outspoken,
and proud of Black culture including dress, speech and music. And the fact that a Black man "runs the country" gives her even more pride in being Black. Interestingly, even though Tyana feels a strong allegiance with Black people, she wonders about the role that race played in the 2008 presidential election and whether people voted without considering who each candidate would be as a leader. Tyana expresses the tension between being Black and being American but clearly the former is salient to her own identity.

Tyana's mathematical identity as a Black girl became important to her during middle school - she used to believe that "girls are good at English and boys are good at math". Tyana wants to be a nurse and says that mathematics is important. But her perception of the value of mathematics in women's lives is still limited. For example, she thinks that girls and mathematics is a "good combination" because girls "always shop", "hold the household down", and "go food shopping". And Tyana didn't know much about Mrs. Obama's professional life other than her "good speeches". Despite Tyana's ideals about mathematics she perceives real barriers to mathematics learning and careers because she is a girl.

Tyana is an extremely self-assured young lady who is confident in her mathematical ability and likes to work on complex mathematics problems in social groups. Tyana developed a positive mathematical identity despite fewer opportunities to develop further during high school. Tyana embraces all aspects of her own Black identity, culture, and community.

## Summary

Jana and Tyana developed similar mathematical identities because of their common $7^{\text {th }}$ grade experience, and similar racial identities, likely because they have grown up in a Black community and have attended schools with few White children. Their perspectives on Black assimilation and minority ideology differ when they talk about their own Black identity and is reflected in their responses on the MIBI-t. Jana is more concerned with the way she acts because Black people's behavior is often perceived negatively by Whites. In contrast, Tyana is comfortable with her "Black" name and the way she sounds and acts because it reflects her Blackness and culture. Jana and Tyana also differ in their perspective that Blacks should feel united with other minorities to fight racial discrimination. While Tyana believes that Black students to "stick together" in school and that Black people's struggles are our own, Jana interacts more comfortably with the Hispanic students in her classes and perceives overall benefits when minorities work together to challenge common inequities that they face as non-Whites.

I'm proud and happy with the similar and different ways that Jana and Tyana express pride in their Black identity and culture, as well as their ambition and selfconfidence as mathematics learners. As a Black person, it is no surprise to me that they perceive that many White mathematics teachers have low regard for the abilities of Blacks, even though a Black man is President of the United States, and a Black family occupies the White House. The President's family - the First Lady, her mother, and Sasha and Malia - provide Black women and girls with one role model for Black family Life and achievement. Jana and Tyana's Black identity and academic identity appear to have been improved. As they said, they have been inspired and believe that they have
opportunities that they themselves can control through their own ambition - if they "try really hard", as Tyana said (Protocol 2, Line 20.)

I am surprised that Jana, Tyana and Shaniyah said that they had not considered how their racial identity and mathematical identity had been related or had been codeveloped. In fact, during the group interview Tyana said that she did not believe that her Black and mathematical identities were connected, nor did she believe that her Black identity affected her mathematical or academic identities. Understandably, the reason is likely because the girls have attended elementary, middle and high school in an urban district with few White students. When my daughter completed $9^{\text {th }}$ grade in a suburban high she was very conscious of being one of the few Black students in the algebra class. But when she completed $10^{\text {th }}, 11^{\text {th }}$ and $12^{\text {th }}$ grades at the same high school as Jana, Tyana and Shaniyah, she attended mathematics and other classes with peers who shared her own Black and non-White identity.

I'm not surprised that their Black identity had been positively impacted by President Obama, Mrs. Obama, and their daughters. I am impressed that Jana and Tyana's mathematical identities are strong and positive despite fewer opportunities for development in high school.

### 5.3 Conclusions

### 5.3.1 Research Questions

## Research Question 1

- How did Jana and Tyana perceive themselves as Black girls, in their own eyes and in the eyes of others?

Jana is proud of her identity as a Black girl. Jana believes that people of any race can "act ghetto" and is concerned that Whites believe that she may also behave that way. Tyana is proud of her identity as a Black girl, and of the Black community and culture in which she lives and goes to school, including the ways in which she and her peers express them. Jana and Tyana are both confident in their ability as mathematics learners but believe that oftentimes Whites and people of other races do not hold Black girls or Black people in high regard. (Protocol 1, 2 interviews, MIBI-t)

- Did Jana and Tyana see any relationships between their developing mathematical identity and their racial identities?

Jana and Tyana indicate strong identities as Black girls and believe that they are the "type" to do well in mathematics. However, they do not perceive relationships or connections between their mathematical identity and their racial identity. Both girls believe that since a Black man "runs the country", the regard that Whites and people of other races hold for Black people may have improved. (survey, Protocol 2 interview, group interview)

- What light was shed on these questions by information gathered from peers with whom Jana and Tyana interacted?

Shaniyah, Erica and Pamela expressed many of the same sentiments about their school mathematics experiences. Like Jana and Tyana, they felt confident in their own ability as Black girls who could "do mathematics". Shaniyah, who completed the MIBI-t and participated in the group interview, was proud of her Black identity and also held the belief that Whites and people of other races did not hold Blacks in high regard. (MIBI-t, Protocol 1 interview)

## Research Question 2

- What "critical events" identified in $7^{\text {th }}$ grade retrospective interviews supported the inferences made?

Mathematical Identity:
Jana perseveres when working on mathematics problems in a group, even when a member of the group criticizes her ideas or strategies. (Cycle 1)

Jana likes "projects" but gets discouraged when members of her group don't work together. (Cycle 2)

Jana enjoys the ability to move around the classroom to see what other students are doing or to help other students. (Cycle 3)

Jana wants to do well on high-stakes tests (e.g. state tests) to show others that she is smart. (Cycle 4)

Jana enjoys a mathematics classroom community that includes mathematical and social interaction. (Cycle 5)

Tyana believes that incorrect answers and mistakes are valuable learning opportunities. (Cycle 1)

Tyana enjoys working in groups and likes to "perform" solutions for the teacher and her peers. (Cycle 2)

Tyana is confident to ask any questions she has, respects different ideas and ways of solving mathematics problems, and likes to participate in class discussions. (Cycle 3) Tyana is affected by the way she is treated by the teacher and classmates. (Cycle 4) Racial Identity:

Jana and Tyana like to work on "projects" that afforded them opportunities to work in harmonious, social groups to discuss mathematical ideas. (Cycles $1-4$ )

Jana and Tyana enjoy social interactions that supported their mathematics learning. (Cycle 1-4)

Tyana enjoys "performing" solutions to mathematics problems (i.e. verve). (Cycle 2)

## Research Question 3

- What stable dimensions of mathematical identity and racial identity did Jana and Tyana describe and were documented in the data? Jana and Tyana described themselves as mathematics learners and exhibited confidence in their ability to do mathematics. (survey, MIBI-t, Protocol 1 interview) Jana and Tyana described their belief that mathematics knowledge was important. They described how mathematics knowledge was important to for them in everyday contexts. (survey, Protocol 1 interview)

Jana and Tyana did not believe that high school mathematics knowledge (i.e. four years) was necessary for their career choices or for their everyday lives. (survey, group interview)

Jana and Tyana described classrooms that had afforded them opportunities for mathematics learning in middle school ( $7^{\text {th }}$ and $8^{\text {th }}$ grades), and classrooms in high school that had afforded them fewer opportunities to learn mathematics $\left(9^{\text {th }}, 10^{\text {th }}\right.$ and $11^{\text {th }}$ grades). (Protocol 1 and group interviews)

Jana and Tyana were motivated and persistent in pursuing school mathematics knowledge. (Protocol 1, 2 and group interviews)

Jana and Tyana described pride in their Black identity but believe that Whites and other races may think that they are less capable of being good at mathematics because they are Black. (MIBI-t, group interview)

Tyana described her belief that her name, culture, and behavior identify her as Black. (MIBI-t, group interview)

### 5.3.2 Mathematical Identity: Jana and Tyana

The findings from this study help to tell a story of the mathematical identity of two African-American girls who attended middle and high school in a small urban public school district:

1. Jana and Tyana believe that they are capable mathematics learners. (survey, Protocol 1 interview)
2. Jana and Tyana believe that mathematical knowledge is important for everyday life (e.g. shopping, managing money) but school mathematics is less significant. (survey, group interview)
3. Jana and Tyana experienced meaningful (to them) mathematics learning opportunities in a mathematics learning community ( $7^{\text {th }}$ and $8^{\text {th }}$ grade) but had fewer opportunities in high school. (Protocol 1 and group interview)
4. Jana and Tyana believe they have opportunities to pursue mathematics-related careers and intend to do so. Jana wants to be a scientist and Tyana a nurse, and they spoke confidently about reaching their goals. (group interview)

### 5.4 Significance and Limitations

This qualitative study - consisting of case stories which are presented from the researcher's perspective - uses the girls' own words to give voice to their stories. Results suggest the critical importance of mathematics classrooms that provide opportunities for Black girls to work together in on problems in groups and social contexts, as well as the role of teacher-student relationships to develop both self-identity and mathematical identity. The mathematical identity developed by the girls who participated in this study was significantly improved by their experiences in a $7^{\text {th }}$ grade mathematics classroom that provided opportunities for fun and personalized mathematical explorations in social contexts, and that valued each student (and the teacher) as a member of the learning community. The impact of these experiences has remained with Jana, Tyana, Shaniyah, Erica, and Pamela. However, their experiences in high school, in their own words, have not developed their mathematical identity much further. Notwithstanding, all of the girls have retained the belief that they have both ability and the opportunity to succeed in the mathematics-related fields of science and nursing.

One limitation of this study is that only two girls were studied in depth. Data from three additional girls were limited - only one girl had been interviewed in $7^{\text {th }}$ grade, and the researcher was able to conduct only one high school interview with each of these girls. Secondly, this study used existing data from the larger $7^{\text {th }}$ grade study as well as high school data collected by the researcher, and did not examine the focus girls' grades or state test scores from any school year. Nor did this study seek to gather information about the girls' personal and family life. Rather, analyses of the data resources were used to uncover evidence from which case stories of the mathematical and racial identities of two Black girls were inferred, based on the experiences of the researcher.

This study is not generalizable to other Black girls in urban public school districts because of these limitations. Furthermore, the development of mathematical identity is complex and dependent upon variables such as the teacher, the curriculum, the overall school environment, and family life. And the development of racial identity is also complex - there are common experiences among all Blacks, adolescent females, and Black adolescent females. Therefore, the development of and relationships between selfidentity, racial identity, and mathematical identity for each individual is a unique story. Despite these limitations, the findings suggest how important the girls' mathematical experiences are to their identity development, and the value of future research on identity to mathematics education of Black girls in urban schools.

### 5.5 Personal Note

This dissertation came about because I wanted to know more about the school mathematics experiences, mathematical identity and racial identity of Jana and Tyana. I had been a mathematics teacher and coach in their school district, and a professional colleague and friend of Mr. P., their $7^{\text {th }}$ grade mathematics teacher. My daughter had attended middle school and graduated from the high school that Jana and the other girls attended. I developed my own mathematical and racial identity as an African-American girl growing up in a large urban community before moving to the small urban community where Jana and Tyana lived, and where I briefly attended the same high school before graduating from a nearby private suburban high school.

On January $20^{\text {th }} 2009$, as I watched a Black man inaugurated as President of the United States, I was proud of my identity as a Black African-American. I experienced a range of emotions, positive and negative, as I contemplated what this "critical event" might mean for all Americans. I was especially curious about the impact that an AfricanAmerican First Family in the White House would have on children, both Black and White, but especially young African-Americans and other children of color. Would it affect who they thought they were, who they wanted to be or who they thought they could be? Would it affect the way they thought of themselves when they were in mathematics class, and strengthen their resolve to engage in mathematics or school learning? Would it encourage them to pursue community organizing, law, politics, or a career in mathematics? What impact, if any, would be noticeable in the immediate or distant future?

As a result of drawing on Black feminist thought, critical race theory in education, and qualitative research methods, this study is not a generalization of all Black girls' mathematics classroom experiences or the development of racial and mathematics identity. Nor is it a comparison of similarities and differences with my personal experiences or those of my own daughter. Rather, my perspectives as an AfricanAmerican female, local education and cultural community member served to inform descriptions and inferences made after documenting the girls' experiences, thoughts, and beliefs about their mathematical and racial identity.

## REFERENCES

Allen, B. A. \& Boykin, A. W. (1992). African American children and the educational process: Alleviating cultural discontinuity through prescriptive pedagogy. In School Psychology Review, 21(4) (pp. 586-596).

Allen, B. A., Boykin, A. W. \& Hurley, E. A. (2005). Communal versus individual learning of a math-estimation task: African American children and the culture of learning contexts. In The Journal of Psychology: Interdisciplinary and Applied, Vol. 139, no. 6 (pp. 513-527).

Alston, A. S., Goldin, G. A., Jones, J. , McCulloch, A. , Rossman, C. \& Schmeelk, S., (2007). The Complexity of Affect in an Urban Mathematics Classroom. In T. Lamberg and L. R. Wiest (Eds.), Proceedings of the $29^{\text {th }}$ Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Stateline (Lake Tahoe), NV: University of Nevada, Reno (2007), pp. 326-333.

Anderson, E. (1990). Streetwise: Race, class, and change in an urban community. Chicago: University of Chicago Press.

Anderson, E. (1999) Code of the Street: Decency, Violence, and the Moral Life of the Inner City. New York: W. W. Norton.

Anderson, R. (2007). Being a mathematics learner: Four faces of identity. In The Mathematics Educator, Vol. 17, no. 1, (pp. 7-14).

Asante, M. K. (1987). The Africentric Idea. Philadelphia: Temple University Press.
Banaji, M. R., \& Prentice, D. A. (1994). The self in social contexts. In Annual Review of Psychology, 45 (pp. 297-332).

Bell, D. (1993). Faces at the bottom of the well: The permanence of racism. Basic Books.
Bennett, C.I. (1986). Comprehensive multicultural education: Theory and practice. Boston: Allyn and Bacon.

Boaler, J., \& Greeno, J. G. (2000). Identity, agency, and knowing in mathematics worlds. In J. Boaler (Ed.), Multiple Perspectives on Mathematics Teaching and Learning. Westport: Ablex Publishers.

Boykin, A. W. (1983). On academic task performance and Afro-American children. In J. R. Spencer (ed.), Achievement and Achievement Motives (pp. 324-371). Boston: Freeman.

Boykin, A. W. (1986). The triple quandary and the schooling of African American children. In U. Neisser (Ed.), The School Achievement of Minority Children: New Perspectives. London: Lawrence Erlbaum Associates.

Boykin, A. W. (1994). Harvesting culture and talent: African American children and educational reform. In R. Rossi (Ed.), Schools and Students At Risk (pp. 149164). New York: Teachers College Press.

Boykin, A. W., \& Allen, B. A. (1988). Rhythmic movement facilitation of learning in working class Afro-American children. In Journal of Genetic Psychology, 149, (pp. 335-348).

Boykin, A.W. \& Ellison, C.M. (1995). The multiple ecologies of black youth socialization: An afrographic analysis. In R.L. Taylor (Ed.), African-American youth: Their social and economic status in the United States. (pp. 93-128). Westport, CT: Praeger.

Brown, E. B. (1991). How my mother taught me to be a historian in spite of my academic training. In Double stitch:Black women write about mothers and daughters. P. Bell-Scott, B. Guy-Sheftall, J. J. Royster, J. Sims-Wood, M. Decosta-Willis \& L. Fultz (Eds.), Boston: Beacon Press (p. 74-75).

Brown, J. S., Collins, A. \& Duguid, P. (1989). Situated cognition and the culture of learning. Educational Researcher, 18(1), 32-41.

Brown, L.M. \& Gilligan, C. (1992). Meeting at the crossroads: Women's psychology and girls' development. Cambridge, MA: Harvard University Press.

Bryan, T. \& Bryan, J. (1991). Positive mood and math performance. In Journal of Learning Disabilities, 24 (pp. 490-494).

Cobb, P., Gresalfi, M., \& Hodge, L. L. (2009). An interpretive scheme for analyzing the identities that students develop in mathematics classrooms. In Journal for Research in Mathematics Education, 40(1).

Cobb, P. \& Yackel, E. (1998). A constructivist perspective on the culture of the mathematics classroom. In F. Seeger, J. Voight \& U. Waschescio (Eds.). The Culture of the Mathematics Classroom. London: Cambridge University Press.

Cokley, K. O. \& Helm, K. (2001). Testing the construct validity of scores on the multidimensional inventory of Black identity. In Measurement and Evaluation in Counseling and Development, 34 (pp. 80-95).

Cole, J. M. \& Boykin, A. W. (2008). Examining culturally structured learning environments with different types of music-linked movement opportunity. In Journal of Black Psychology, 34 (pp. 331-355).

Collins, P. A. (1991). Black feminist thought: Knowledge, consciousness and the politics of empowerment. New York: Routledge.

Cross, W. E., Jr. (1971). The Negro-to-Black Conversion Experience. Black World, 20(9) (pp. 13-27).

Cross, W. E., Jr. (1991). Shades of Black: Diversity in African-American Identity. Philadelphia: Temple University Press.

Cross, W. E., Jr. (1995). The psychology of nigrescence: Revising the Cross model. In J. G. Ponterotto, J. M. Casas, L. A. Suzuki, \& C. M. Alexander (Eds.), Handbook of Multicultural Counseling, Thousand Oaks, CA: Sage (pp. 93-122).

Dance, L. J. 2002. Tough Fronts: The Impact of Street Culture on Schooling. New York: Routledge.

DeBellis, V.A. (1996). Interactions between affect and cognition during mathematical problem solving: A two year case study of four elementary school children. Doctoral dissertation, The Graduate School of Education, Rutgers, The State University of New Jersey.

DeBellis, V. A. \& Goldin, G. A. (2006). Affect and meta-affect in mathematical problem-solving: A representational perspective. In Educational Studies in Mathematics, vol. 63, no. 2, p. 131-147.

DeCorte, E. \& Op’t Eynde, P. (2003). When girls value mathematics as highly as boys: An analysis of junior high students' mathematics-related beliefs. Paper presented to the symposium "The Relationship Between Students' Epistemological Beliefs, Cognition and Learning", at AERA, April 21-25, Chicago.

DeCuir, J. T., \& Dixson, A. D. (2004). "So when it comes out, they aren't surprised that it is there": Using critical race theory as a tool of analysis of race and racism in education. Educational Researcher 33(5)26-31.

Delpit, Lisa. (1995). Other people's children: Cultural conflict in the classroom. New York, NY: The New Press.

Denzin, N. K. (1989). Interpretive interactionism. Newbury Park, CA: Sage Publications.

Derry, S.J. (Ed.) (2007). Guidelines for video research in education: Recommendations from an expert panel. Report produced for the National Science Foundation.

Dixson, A. D. \& Rousseau, C. K. (2006). Critical race theory in education: All God's children got a song. New York, New York: Taylor and Francis Group.

Dossey, J. A., Mullis, I. V. S., Lindquist, M. M. \& Chambers, D. L. (1988). The mathematics report card. Are we measuring up? Trends and achievement based on the 1986 national assessment. Princeton, NJ: Educational Testing Service.

Durodoyle, B. \& Hildreth, B. (1995). Learning styles and the African American student. Education, 116

Dweck, C. S. (1986). Motivational processes affecting learning. American Psychologist, Vol. 41, (pp. 1040-1048).

Dweck, C. S. \& Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. Psychological Review, Vol. 95, (pp. 256-273).

Epstein, Y., Schorr, R. Y., Goldin, G. A., Warner, L., Arias, C., Sanchez, L., Dunn, M. \& Cain, T. R. (2007). Studying the affective/social dimension of an inner-city mathematics class. Proceedings of the $29^{\text {th }}$ Annual Conference of PME-NA. Tahoe, Nevada.

Essed, P. (1990). Everyday racism: Reports from women of two cultures. Amsterdam: Hunterhouse.

Essed, P. (1997). Diversity: Gender, color, culture. Amherst: University of Massachusetts Press.

Fennema, E. \& Peterson, P. L. (1984). Classroom processes and autonomous learning behavior in mathematics (Final Report, National Science Foundation, SEB8109077). Washington, DC: U.S. Government Printing Office.

Fordham, S. (1993). "Those loud black girls": (Black) women, silences, and gender "passing" in the academy. Anthropology and Education Quarterly, 24 (pp. 3-32).

Fordham, S. \& Ogbu, J. (1986). Black students’ school success: Coping with the burden of acting White. Urban Review, 18(3), (pp. 176-206).

Gee, J. P. (2001). Identity as an analytical lens for research in education. Review of Research in Education, 25 (pp. 99-125).

Gardner, H. (1983). Frames of mind: The theory of multiple intelligences. NY: Basic Books.

Gardner, H. (1999). Intelligence reframed: Multiple Intelligence for the $21^{\text {st }}$ century. NY: Basic Books.

Goldin, G. A. (1988). The development of a model for competence in mathematical problem solving based on systems of cognitive representation. In A. Borbas (Ed.), Proceedings of the Twelfth International Conference for the Psychology of Mathematics Education (International Group for the Psychology of Mathematics Education) Vol. 2 (pp. 358-365). Veszprem, Hungary: OOK Printing House.

Goldin, G. A. (2002). Affect, meta-affect, and mathematical belief structures. In Leder, G., Pehkonen, E., \& Törner, G. (Eds.), Beliefs: A Hidden Variable in Mathematics Education? Dordrecht: Kluwer (pp. 59-72).

Goldin, G. A., Epstein, Y. \& Schorr, R. Y. (2007). Affective pathways and structures in urban students' mathematics learning. Proceedings of the 9th International Conference of the Mathematics Education into the 21st Century Project. Charlotte, NC.

Goodman, J. L. (2005). Identity formation within a multicultural context: A field study of early adolescent African-American girls set in an inner-city community in north Philadelphia. Ph.D. dissertation, University of Pennsylvania. Retrieved March 1, 2009, from Dissertations \& Theses.: A\&I database. (Publication No. AAT3165684). http://repository.upenn.edu/dissertations/AAI316584

Gresalfi, M. S., Martin, T., Hand, V. \& Greeno, J. G. (2008). Constructing competence:
An analysis of student participation in the activity systems of mathematics classrooms. Educational Studies in Mathematics, 70,1, pp. 49-70.
hooks, b. 1993. Talking back: Thinking feminist, thinking black. Boston, MA: South End Press.

Hale, J. (1986). African-American children: Their roots, culture, and learning styles.
Baltimore: Johns Hopkins Press.
Hancock, E. (1989). The girl within. New York: Fawcett Columbine.
King, L. \& Dixon, V. J. (1976). African Philosophy: Assumptions and paradigms for research on Black persons. Los Angeles: Fanon Research and Development Centre.

Kozol, Jonathan. (1991). Savage inequalities: Children in America's schools. New York: Harper Perennial.

Kusimo, P. S. (1997). Sleeping beauty defined: African American girls in transition. National Science Foundation. Eric ED407207

Ladner, J. (1971). Tomorrow's tomorrow: The Black woman. Doubleday.

Ladson-Billings, G. (1995). Making mathematics meaningful in multicultural contexts. In W.G. Secada, E. Fennema \& L.B. Adajion (eds.), New directions for equity in mathematics education (pp 329-348). New York: Cambridge University Press.

Ladson-Billings, G. \& Tate, W. F. (1995). Toward a critical race theory of education. In Teachers College Record, Vol. 97, no. 1.

Lawrence-Lightfoot, S. (1983). The good high school: Portraits of character and culture.
Lawrence-Lightfoot, S. (1994). I've known rivers: Lives of loss and liberation. Reading, MA.: Addison-Wesley.

Lawrence-Lightfoot, S. \& Hoffman Davis, J. (1997). The art and science of portraiture. San Francisco: Jossey-Bass.

Lewis, J. L. \& Kim, E. (2008). A desire to learn: African American children's positive attitudes toward learning within school cultures of low expectations. In Teachers College Record, Vol. 110, no. 6 (pp. 1304-1329).

Lim, J. H. (2008). The road not taken: Two African-American girls' experiences with school mathematics. In Race, Ethnicity and Education, Vol. 11, no. 3 (pp. 303317).

Lubienski, S.T. (2007). Research, reform and equity in U.S. Mathematics Education. In Nasir, N. \& Cobb, P. (Eds.). Improving Access to Mathematics: Diversity and Equity in the Classroom. New York. Teachers College Press.

Ma, X., \& Cartwright, F. (2003). A longitudinal analysis of gender differences in affective outcomes in mathematics during middle and high school. School Effectiveness and School Improvement, Vol. 14 (pp. 413-440).

Madhere, S. (1989). Models of intelligence and the African American intellect. Journal of Negro Education, 58, 189-202.

Mandler, G. (1989). Affect and Learning: Causes and Consequences of Emotional Interactions, in D. McLeod \& V. Adams (ed), Affect and Mathematical Problem Solving: A new perspective, Springer-Verlag, London, (pp. 3-19).

Marryshow, D., Hurley, E. A., Allen, B. A., Tyler, K. M. \& Boykin, A. W. (2005). Impact of learning orientation on African American children's attitudes toward high-achieving peers. In American Journal of Psychology, Vol. 118, no. 4 (pp. 603-618).

Martin, D. B, (2000), Mathematics success and failure among African-American youth. Mahwah, NJ: Lawrence Erlbaum Associates.

Martin, D. B. (2003). Hidden assumptions and unaddressed questions in mathematics for all rhetoric. The Mathematics Educator. Vol. 13, no. 2 (pp. 7-21).

Martin, D. B. (2006a). Mathematics learning and participation as racialized forms of experience: African American parents speak on the struggle for mathematics literacy. Mathematical Thinking and Learning, Vol. 8, no. 3 (pp. 197-229).

Martin, D. B. (2006b). Mathematics Learning and Participation in African American Context: The Co- Construction of Identity in Two Intersecting Realms of Experience. In N. Nasir \& P. Cobb (Eds.), Diversity, equity, and access to mathematical ideas (pp.146-158). New York: Teachers College Press.

Martin, D. B. (2007). Beyond missionaries or cannibals: Who should teach mathematics to African American children? The High School Journal, Vol. 91, no. 1 (pp. 628).

Martin, D. B. (2009). Researching race in mathematics education. In Teachers College Record, Vol. 111, no. 2. (pp295-338).

Martino, A. \& Maher, C. A. (2002). How far can you go with block towers. In The Journal of Mathematical Behavior, Vol. 16, no. 2 (pp. 125-132).

McLeod, D. B. (1989). Beliefs, attitudes, and emotions: New views of affect in mathematics education. In D. B. McLeod, \& V. M. Adams (Eds.), Affect and mathematical problem solving: A new perspective (pp. 245-258). New York, NY: Springer-Verlag New York Inc.

McLeod, D. B. \& Adams, V. M. (Eds.). (1989). Affect and mathematical problem solving: A new perspective, (pp. 245-258). New York, NY: Springer-Verlag New York Inc.

McGee, E. \& Martin, D. B. (2011). From the hood to being hooded: A case study of a Black male PhD. In the Journal of African-American Males in Education, Vol. 2 (1).

McGraw, R., Lubienski, S. T., \& Strutchens, M. E. (2006). A closer look at gender in NAEP mathematics achievement and affect data: Intersections with achievement, race/ethnicity, and socioeconomic status. Journal of Research in Mathematics Education, 37(2), 129-150.

Middleton, J. \& Spanias, P. (1999). Motivation for achievement in mathematics: Findings, generalizations and criticisms of the research. In Journal for Research in Mathematics Education, Vol. 30 (1), (pp. 65-88).

Miller, K. (2007). Learning from video: What makes it compelling and what makes it hard. In R. Goldman, R. Pea, B. Barron, \& S.J. Derry (Eds.), Video research in the learning sciences (pp. 321-334). Mahwah, NJ: Erlbaum.

Moses, R. P. \& Cobb, C. E. (1999). Radical equations: Math literacy and civil rights. Boston: Beacon Press.

Moschkovich, J. (2002). A situated and sociocultural perspective on bilingual mathematics learners. Mathematical Thinking and Learning, 4 (2\&3), 189-212.

Murrell Jr., P. C. (1994). In search of responsive teaching for African American males: An investigation of students' experiences of middle school mathematics curriculum. In The Journal of Negro Education, Vol. 63, no. 4, Pedagogical and Contextual Issues Affecting African American Males in School and Society, (pp. 556-569)

Nasir, N. S., McLaughlin, M. W. \& Jones, A. (2009). What does it mean to be African American? Constructions of race and academic identity in an urban public high school. American Educational Research Journal, Vol. 46, no. 1 (pp. 73-114).

Nasir, N. S., Hand, V. \& Taylor, E. V. (2008). Culture and mathematics in school: Boundaries between "cultural" and "domain" knowledge in the mathematics classroom and beyond. Review of Research and Education, Vol. 32 (pp. 187-240).

National Council of Teachers of Mathematics. (1989). Curriculum and evaluation standards for school mathematics. Reston, VA: Author.

Noddings, N. (1989). Theoretical and practical concerns about small groups in mathematics. Elementary School Journal, 89, (pp. 607-623).

Nzuki, F. M. \& Masingila, J. O. (2007). Investigating African American students' identity and agency in a mathematics and graphing calculator environment at a low-SES school. Paper presented at the annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, University of Nevada, Reno, Nevada

Oyserman, D., Altschul, I. \& Bybee, D. (2006). Racial-ethnic identity in midadolescence: Content and change as predictors of academic achievement. In Child Development, Vol. 77, No. 5, (pp. 1155-1169).

Oyserman, D. \& Destin, M. (2010). Identity-based motivation: Implications for intervention. The Counseling Psychologist, Vol. 38, no. 7 (pp. 1001-1043). DOI: 10.1177/0011000010374775 http://tcp.sagepub.com/content/38/7/1001

Piaget, J., \& Szeminska, A. (1952). Child's conception of number. London: Routledge \& Kegan Paul.

Phillips Smith, E. Atkins, J. \& Connell, C. (2003). Family, school, and community factors and relationships to racial-ethnic attitudes and academic achievement. In American Journal of Community Psychology, Vol. 32 (1-2), (pp. 159-173).

Powell, A. B., Francisco, J. M. \& Maher, C. A. (2003). An analytical model for studying the development of learners' mathematical ideas and reasoning using videotape data. Journal of Mathematical Behavior, Vol. 22, no. 4, (pp. 405-435).

Perry, T., Steele, C. \& Hilliard, A. (2003). Young gifted and Black: Promoting high achievement among African-American students. Boston: Beacon Press.

Polce, M. E. (1987). Children and learning styles. In A. Thomas, \& J. Grimes (Eds.), Children's needs: Psychological perspectives, (pp. 325-334). Washington, D.C.: National Association of School Psychologists.

Reyes, L. H. (1984). Affective variables and mathematics education. The Elementary School Journal, Special Issue: Mathematics Education, Vol. 84, no. 5, (pp. 558581).

Roeser, R. W., Peck, S. C. \& Nasir, N. S. (2006). Self and identity processes in school motivation, learning, and achievement. In P. A. Alexander, P. A. and P. H. Winne (Eds.), Handbook of Educational Psychology (pp. 391-424). Lawrence Erlbaum Associates: Mahwah, NJ.

Scottham, K. M., Sellers, R. M. \& Nguyen, H. X. (2008). A measure of racial identity in African American adolescents: The development of the multidimensional inventory of Black identity-teen. In Cultural Diversity and Ethnic Minority Psychology, Vol. 14, no. 4 (pp. 297-306).

Secada, W. (1991). Diversity, equity, and cognitivist research. In E. Fennema, T. P. Carpenter \& S. J. Lamon (Eds.), Integrating research on teaching and learning mathematics (pp. 17-53). Albany: SUNY.

Sellers, R. M. (1993). A call to arms for researchers studying racial identity. In Journal of Black Psychology, Vol. 19, (pp. 327-332).

Sellers, R. M., Morgan, L. M. \& T. N. Brown. (2001). A multidimensional approach to racial identity: Implications for African American children. In Forging Links: African American Children Clinical Developmental Perspective, (Ed. Barnett, A.), (pp. 23-56). West Port, CT: Praeger Publishers.

Sellers, R. M., Smith, M. A., Shelton, J. N., Rowley, S. A. J. \& Chavous, T. M. (1998). Multidimensional model of racial identity: A reconceptualization of African American racial identity. In Personality and Social Psychology Review, Vol. 2, no. 1 (pp. 18-39).
Sfard, A. (2002). Telling identities: Conceptualizing diversity in terms of identity. Paper presented at the Fifth Congress of the International Society for Cultural Research and Activity Theory, Amsterdam, The Netherlands.

Sfard, A. \& Prusak, A. (2005). Telling identities: In search of an analytical tool for investigating learning as a culturally shaped activity. In Educational Researcher, Vol. 34, no. 4 (pp. 14-22).

Shade, B.J. (1982). Afro-American cognitive style: A variable in school success? Review of Educational Research, 52 (2), 219-244.

Shade, B.J. (1992). Is there an Afro-American cognitive style? An exploratory study. In A. Burlew, W. C. Banks, H. McAdoo, \& D. Azibo (eds.), African American Psychology (pp. 256-259). Newbury Park, CA: Sage.

Shay, K. (2008). Tracing middle school students' understanding of probability: A longitudinal study. Ph.D. dissertation, Rutgers, The State University of New Jersey.

Smalls, C., White, R, Chavous, T. \& Sellers, R. (2007). Racial Ideological Beliefs and
Racial Discrimination Experiences as Predictors of Academic Engagement Among African American Adolescents. Journal of Black Psychology. August 1, 2007 33(pp. 299-330)

Solorzano, D. \& Yosso, T. (2002). A Critical Race Counterstory of Race, Racism, and Affirmative Action. Equity and Excellence in Education, Vol. 35, no. 2 (pp. 155168).

Stake, R. E. (2000). Case studies. In N. K. Denzin \& Y. S. Lincoln (Ed.), Handbook of qualitative research, 2nd Edition (pp. 435-454). Thousand Oaks, CA: Sage Publications Ltd.

Steele, C. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. American Psychologist,Vol. 52, no. 6 (pp. 613-629).

Steele, C. \& Aronson, J. (1995). Stereotype threat and the intellectual test performance of African-Americans. Journal of Personality and Social Psychology, Vol. 69 (pp. 797-811).

Stevens, J. W. (1997). African-American female adolescent identity development: A three-dimensional approach. Child Welfare Vol. 76, no. 1 (pp. 145-172).

Stigler, J. W. \& Hiebert, J. (1999). The teaching gap. N.Y.: Free Press.Stryker, S. (1968). Identity salience and role performance. In Journal of Marriage and the Family, Vol. 4 (pp. 558-564).

Tajfel, H. (1981). Human groups and social categories. Cambridge: Cambridge University Press.

Tuck, K. \& Boykin, A. W. (1989). Verve effects: The relationship of task performance to stimulus preference and variability in low-income Black and White children,
A. Harrison (Ed.), The 1111 Conference on Empirical Research in Black Psychology (pp. 84-95). Washington, D.C.: NIMH Publications.

US Bureau of the Census (2000). Retreived March 1, 2009 from http://www.census.gov
Waddell, L. (2010). How do we learn: African American elementary students learning reform mathematics in urban classrooms. In Journal of Urban Mathematics Education, 3(2), 116-154.

Walsh, J. J. (2001). The multidimensional inventory of Black identity: A validation in a British sample. Journal of Black Psychology, Vol. 27, no. 2 (pp. 172-189).

Walter, J. G. \& Hart, J. (2009). Understanding the complexities of student motivations in mathematics learning. In Journal of Mathematical Behavior, Vol. 28, (pp. 162170).

Wenger, E. (1998). Communities of practice: Learning, meaning, and identity. Cambridge,UK: Cambridge University Press.

Willis, M. G. (1998). Learning styles of African American Children: A review of the literature and interventions. In Journal of Black Psychology, vol. 16 (1) (p.47-65).

Wolcott, H. (1997). Ethnographic research in education. In Complementary methods for research in education, (Jaeger, R. M., Ed.). American Education Research Association. (pp. 155-171).

Woodley, X. M. \& Williams, C. (1994). African American women's identity: A bibliography. WMST-L, an international electronic Women's Studies Forum. http://userpages.umbc.edu/~korenman/wmst/wmsttoc.html

Wright, B. L. (2011). Racial-Ethnic Identity, Academic Achievement, and African American Males: A Review of Literature. Journal of Negro Education,

Wright, B.L. (2011). I know who I am, do you?: Identity and academic achievement of successful African American male adolescents in an urban pilot high school in the United States, Urban Education, Vol. 46, pp. 611-638

Wright, D. (2009). First Lady Michelle Obama reflects on talking "like a White girl". The New York Times, March 19, NYTimes.com http://thecaucus.blogs.nytimes.com/2009/03/19/michelle-obama-advises-anacostia-students/

# APPENDIX A1 <br> PLEASE RETURN THESE MATERIALS IN THE SELF-ADDRESSED STAMPED ENVELOPE PROVIDED 



Dear Parent or Guardian,
My name is Jennifer V. Jones and I am a Rutgers University MetroMath doctoral student and researcher. I have lived in Plainfield for many years, and my daughter graduated from Maxson and Plainfield High School. As a Black woman I am interested in learning more about the mathematics classroom experiences of girls of color, and their development of self-identity and mathematics learner identity.

I would like to schedule several meetings with girls who were in Mr. $\mathrm{P} \square$ 's $7^{\text {th }}$ grade math class at Hubbard Middle School to gain valuable information about their school mathematics experiences since $7^{\text {th }}$ grade, and about their identities as girls and mathematics learners.

I have enclosed a PARENT CONSENT FORM for Student Participants that describes what will happen during each meeting. If you agree that your daughter can participate, please complete and sign the attached Permission to Participate, and return everything to me in the self-addressed stamped envelope. Participation is voluntary, and your daughter will receive $\$ 20$ each time she meets with me.

If you and your daughter do not think that it is appropriate for her to participate, please return everything to me in the self-addressed stamped envelope.

If you have any questions about the study, please don't hesitate to call me.

Thank you very much for your time.
Jennifer V. Jones, MetroMath Doctoral Fellow

# APPENDIX A2 <br> MetroMath: The Center for Mathematics in America's Cities <br> Rutgers University 

## SCRIPT FOR ORAL ASSENT

Student's Name $\qquad$ Date: $\qquad$
School: $\qquad$ Grade $\qquad$ Age $\qquad$
(R)esearcher: Hi, (student's name)

I'm Ms. Jones! Do you remember when you were in Mr. Pedrick's $7^{\text {th }}$ grade math class and I was one of the Rutgers researchers who came to observe and video-tape some of your classes with Dr. Alston [and to interview you afterwards]?

Student Response:
(R): I have some questions to ask you, but, before I begin, do you have any questions for me?

Give student a chance to ask questions - record as much as possible:
(R): When we came to Mr. Pedrick's class we were interested in what went on when you worked on math problems, sometimes with a partner or in a group. We would videotape the class, and then videotape interviews because your thoughts and ideas were very important to us. Well, now we're very interested to find out some more things about what has been going on in your math classes since then, and about you. Is this something that you would be willing to talk to me about?

Student Response:
(R): I am asking you and several other girls from Mr. Pedrick's class to allow me to videotape 3 more interview sessions with you. In the first session I will ask you to fill out a math survey; the same one you filled out in $7^{\text {th }}$ grade. Then, we will look at a short video clip from Mr. Pedrick's class, and I will ask you some questions about your math classes last year and this year. Is this something that you are willing to do?

Student Response:
$\mathbf{( R ) : ~ I n ~ t h e ~ s e c o n d ~ s e s s i o n ~ I ~ w i l l ~ a s k ~ y o u ~ t o ~ f i l l ~ o u t ~ a ~ s u r v e y ~ a b o u t ~ B l a c k ~ t e e n ~ i d e n t i t y . ~}$ Then, I will ask you some questions about the election of President Obama, his family, and school mathematics. Is this something that you are willing to do?

## Student Response:

(R): The third and last session will be a group interview. This time, I'd like to talk with you and the other girls together. This is so that you and the other girls can share your school math experiences, discuss your thoughts and ideas about Black identity and school mathematics, and ask me any questions that you may have [about the study]. Is this something that you are willing to do?

## Student Response:

(R): Each session will take about 1 hour, at a time and place that is convenient for you, sometime within the next few weeks. And you will receive $\$ 20$ each time. These interviews are only for educational research, and will be the confidential property of Rutgers University. Anytime the information is used, like when I write about our sessions, your identity will be protected. In other words, your real name will not be used. Is that clear to you?

## Student Response:

$\mathbf{( R ) : ~ T a k i n g ~ p a r t ~ i n ~ t h i s ~ s t u d y ~ w o n ' t ~ a f f e c t ~ y o u r ~ g r a d e s ~ o r ~ a n y ~ o t h e r ~ s c h o o l ~ a c t i v i t y ~ i n ~ a n y ~}$ way. You do not have to participate, and you also don't ever have to answer any questions that you don't want to answer. Is that clear to you, and are you willing to participate?

Student Response:
(R): If you or your parents have any questions you can always call Dr. Alston or Dr. Goldin or me. Do you have any questions now?

Student Response:
(R): Thank you very much for talking to me now, and we're looking forward to learning more from you, and about you! <br> \section*{APPENDIX B1a <br> \section*{APPENDIX B1a <br> JANA $7^{\text {th }}$ GRADE INTERVIEW CYCLE 1}

CD or DVD title: MMAF024
Description: Focus Student Interview Cycle 1
Date of Interview: 09/29/2006
Camera persons: S. Wang and R. Sigley Researcher: JVJones
Date of Verified Transcript: JVJones 02/09

| Time | Speaker <br> Move | Transcript | Affective Interaction Code | Mathematics Interaction Code | Social Interaction Code |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \hline 0: 00- \\ & 5: 00 \end{aligned}$ | 1. MJ | Hi J !!! |  |  |  |
|  | 2. J | Hi! |  |  |  |
|  | 3. MJ | I'm Ms. Jones and I'm very happy to be back here uh to have a chance to talk with you today umm and I want to talk to you a little bit about your math experiences umm and your feelings being in math class. You know we've been in your class videotaping earlier this week and I'm very curious about some of your work and uhh I'm glad you agreed to talk to me today. Your input is very important to us, uh and I want you to feel comfortable and safe and comfortable expressing whatever it is you want to express. So before we get started I want to ask you some general questions and if at any time you feel uncomfortable and you wanna stop you just let me know, okay? But I hope I won't make you feel uncomfortable. Is that okay with you? [Jana nods head] okay good. So we're videotaping and that's okay with you? [Jana nods head] Okay, so to get us started just tell me your name and your age. | comfortable |  |  |
|  | 4. J | My name is J <br> identity and I'm 12 years old (actual |  |  |  |
|  | 5. MJ | 12 years old? Okay so what grade are you in? |  |  |  |
|  | 6. J | I'm in the $7^{\text {th }}$ grade (actual identity) |  |  |  |
|  | 7. MJ | Okay, and can you tell us a little bit about you, one or two of your favorite things or anything you'd like to share with us? |  |  |  |
|  | 8. J | Yes, I like to talk a lot and I like writing [MJ doesn't hear, asks her to repeat it] and when I went to dance school but I stopped and when I |  |  |  |



|  |  | own and then you discuss it? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 17. J | I did this on my own and then I discussed it | proud (claims own work w/o help) | D (w/group) | $\boldsymbol{C}$ (discusses w/group?) |
| $\begin{aligned} & \hline 5: 00- \\ & 10: 00 \end{aligned}$ | 18. MJ | How do you feel about working in a group? |  |  |  |
|  | 19. J | I feel like I get more things done | productive |  |  |
|  | 20. MJ | You feel like your groupmates help you? [Jana: uh-huh] How do you feel when you ask questions? Of your groupmates... |  |  |  |
|  | 21. J | Sometimes I feel like they don't listen to me but when I ask questions then I feel smart sometimes because, then when I get the answer I know and I won't have to ask that question again. and when people ask $m e$, then I can answer them and that makes me feel smart | ignored (not being heard) <br> smart |  | $\begin{aligned} & \hline \boldsymbol{A} \text { (smart) } \\ & \boldsymbol{C n} \text { (ignored by } \\ & \text { group) } \\ & \boldsymbol{C} \text { (helpful to group) } \end{aligned}$ |
|  | 22. MJ | Okay, good, I have another clip that I want you to take a look at and then we'll talk a little bit about it.[view clip] |  |  |  |
| Interview Resumes |  |  |  |  |  |
|  | 23. MJ | Okay you remember when that happened? Can you think back and just describe what was going on there? |  |  |  |
|  | 24. J | Uhh My classmate in my group Nammi she did the graph and for the x axis she skipped lines but for the $y$ axis she didn't. And they were asking her why did she skip lines and she said so it could be more space. And I agreed and I said well it's the same information but it was just, the lines would be longer cuz she skipped lines and it doesn't make a difference. | supportive defensive? (b/c she is a group member?) | $X$ - and $Y$-axis, scaling | $\boldsymbol{C}$ (claims group membership w/in whole class, supports groupmate) |
|  | 25. MJ | So I noticed that you raised your hand to answer Mr. Pedrick's question when he asked you, do you umm feel comfortable raising your hand and answering [Jana nods head] in the class? And it makes you feel good when you do that [Jana nods head] How do you feel when you have a question during the whole class discussion do you feel comfortable raising your hand and asking a question? (in class discussion) | comfortable <br> good | $\boldsymbol{P}$ (in class discussion) | A (good at answering Qs) <br> $\boldsymbol{C}$ (learning with group?) |
|  | 26. J | Sometimes I don't [feel comfortable] because most of the people might know the answer and they might look at me like I'm dumb or something but... | uncomfortable <br> fearful? |  | $\boldsymbol{A}$ (fear of what others think of her, doesn't want to appear "dumb" (ambivalent; contradicting 5:14 statement above)) |
|  | 27. MJ | Does that sometimes make you not raise your hand and ask a question or answer a question <br> Jana responds quickly redirecting the focus to when she does raise hand |  |  |  |


|  |  | or answers a question |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 28. J | Or like sometimes when I do ask a question and nobody else like like thinks of it then it makes me feel better because they didn't observate (sic) that question | better (not dumb) |  | $\boldsymbol{E I}$ (pride in asking an original Q) |
|  | 29. MJ | Are there some days you feel more comfortable asking a question than on other days? Do you remember a day where you felt really comfortable ans-asking and answering questions or a day where you really didn't feel comfortable asking or answering a question? Can you describe one of those days? <br> Interviewer note: too many questions may have been overwhelming. Lesson learned: keep it simple, clear and direct! |  |  |  |
|  | 30. J | It was the first day of school this year and we was doing, in math class we was doing the handshake problem, like how many handshakes will occur if a certain number of people and most of the people, well most of the groups got their answer I wouldn't say wrong but didn't get the correct answer and the group that I was in uhh had the correct answer and I was answering the questions | empathy? <br> kindness? <br> proud | $\boldsymbol{R}$ (to task) <br> D (multiple <br> answers) | C (hesitates to call others wrong) or $\boldsymbol{H}$ (to maintain sense of community?) <br> A or $\boldsymbol{C}$ (pride in group) |
|  | 31. MJ | And who was in your group that day, on that first day of school? |  |  |  |
|  | 32. J | Umm Henry*, Kidra* and somebody else that's not in the class no more I forget their name. |  |  |  |
|  | 33. MJ | So the group you're in now you're in a group with umm 3 girls 2 other girls? |  |  |  |
|  | 34. J | (Jana nods head) Yeah 2 other girls |  |  |  |
|  | 35. MJ | Okay. How do you feel about that? |  |  |  |
|  | 36. J | It's OK. | comfortable |  |  |
|  | 37. MJ | But on the first day of school you were in a group that included at least one boy, did that make you feel any different? [Jana shakes head, no] No, okay good! I have another clip that I'd like for you to take a look at and talk a little bit about. [they look at clip] |  |  | $\boldsymbol{C}$ (no evidence that she feels differently working w/boys vs. girls) |
| Interv | Resum |  |  |  |  |
|  | 38. MJ | Okay do you remember that? [Jana nods head, yes] Can you tell us a just little bit about what was going on there? |  |  |  |
| $\begin{aligned} & \hline 11: 28 \\ & 17: 00 \end{aligned}$ | 39. J | Uhh I was feeling bad cause it's like she was like, actually she wasn't saying you're wrong J but it made me think that she was saying | bad | $T$ (using calculator to | $\boldsymbol{A}$ (bad) <br> Cn (groupmate |


|  |  | that you're wrong, why you doing this, why you doing that like she could take over everything and... <br> I was trying to like, she told me that I wouldn't get the answer but I still tried it out to see |  | find distance traveled in partial hour) | called her wrong, acted like "she could take over everything") |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 40. MJ | You wanted to try it out and work it out yourself? |  |  |  |
|  | 41. J | Cuz most of the times I don't go by what other people say so I see it myself | independent ("seeing" for herself) |  | $\boldsymbol{E}$ ("see it myself") |
|  | 42. MJ | So it makes you feel good to be able to try to figure things out on your own. [Jana nods head] Umm is there anything else that you can think of umm in terms of how you were feeling, how that made you feel, did you think about that later on, do you think it will have any impact on how you umm, it won't stop you from trying problems your own way and trying to figure them out? [Jana shakes her head, no] Tell me about what you're thinking. |  |  |  |
|  | 43. J | About the clip? |  |  |  |
|  | 44. MJ | Want to see it again? [Jana nods head] Okay. [they watch clip again] So you were using the calculator as a tool at that point to help you umm okay, do you use the calculator a lot as a tool? |  |  |  |
|  | 45. J | Yes, but sometimes I try not to cuz I want to like go on without using a calculator all the time just in case sometimes if I don't have later on in the job if I don't have a calculator and I need one, I can just use my brain, use my knowledge and what $I$ know. | designated identity (inferred - ability w/out calculator) | $T$ <br> (relationship between tool use, knowledge and knowing. | $\boldsymbol{A}$ (smart) |
|  | 46. MJ | Okay, so there's a different young lady at the table that wasn't there the first day, who was that at your group? |  |  |  |
|  | 47. J |  |  |  |  |
|  | 48. MJ | C ! OK, so she hadn't been at your group the first day but she was there the second day, right, umm, how did you feel about her joining your group? |  |  |  |
|  | 49. J | I felt okay cuz she like one of my good friends | good |  | C (declares friendship) |


|  | 50. MJ | Do you think she was right when she said um to Nammi umm you're making her feel bad? [Jana nods head] You think she was right? [Jana nods head] How did that make you feel when she said that? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 51. J | That she like one of my good friends, she been around me alot and she knows what I'm feeling. | comforted |  | Cor $\boldsymbol{H}$ (believes that her friend knows how she felt) I wonder which other girls were good friends? |
|  | 52. MJ | Umm, okay, thank you. Umm when you think back on any of the clips or you think back on those days, is there anything else that stands out in your mind about how you were feeling during those lessons this week? Can you remember anything specific that didn't come out in any of the clips? [Jana shakes head, no] Can I share something with you? [nods head, yes] <br> I wasn't there on the second day of filming, but umm Mr. Pedrick said that after class was over [Jana: Oh!] you, and I think $\mathbf{N} \square$ and D , [Jana starts to smile] what did you do? [Jana recalls immediately!] | delighted, pleased |  |  |

$\left.\begin{array}{|l|l|l|l|l|}\hline 53 . \text { J } & \begin{array}{l}\text { Well, we umm well N } \\ \text { didn't come to our group and he said that umm cause he was with other } \\ \text { groups and he said that some groups started of not very good and he said } \\ \text { that he was listening to every conversation every group's conversation } \\ \text { and he said that our group was doing pretty good so and he said that he } \\ \text { was working with the groups that he think mostly needed his help and } \\ \text { umm well we said that we still needed help, cause D } \\ \text { her hand to call him but I don't think he heard her so he said that he } \\ \text { really, he was gonna come but there wasn't enough time and he said } \\ \text { that we was one of the best groups and he thinks he thought that we } \\ \text { didn't need his help. } \\ \text { Jana is describing how her group wanted the teacher's attention... }\end{array} & \begin{array}{l}\text { empathetic (for } \\ \text { teacher who may } \\ \text { not have heard } \\ \text { calls or seen D's } \\ \text { hand) }\end{array} & \begin{array}{l}\boldsymbol{S}\end{array} & \begin{array}{l}\text { (not enough } \\ \text { time/class was } \\ \text { over) }\end{array} \\ \text { for other groups) }\end{array}\right\}$

| 58. MJ | That's okay, there may not be anything else that stands out in your mind. <br> I just have one thing I'd like you to do and before you do that umm I want <br> to say thank you for spending this time with me and again I hope you feel <br> comfortable enough, we'll be doing this again because we want to <br> continue to, umm talk to you about how you're feeling and how you're <br> doing math, in class, so this is the end of the interview I thank you for <br> your time and I'd like for you to look right into the camera and smile! |  |  |  |
| :--- | :--- | :--- | :--- | :--- |

All student names are pseudonyms or not visible.

## APPENDIX B1b

## JANA $7^{\text {th }}$ GRADE INTERVIEW CYCLE 2

CD or DVD title: MMAF034
Description: Focus Student Interview Cycle 2
Date of Interview: 12/01/2006
Camera person: S. Wang; Researcher: A. Alston
Transcriber: V. Lau; Date of Verified Transcript: 02/09

| Time | Speaker <br> Move | Transcript | Affective Interaction Code | Mathematics Interaction Code | Social Interaction Code |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \hline 0: 01- \\ & 5: 00 \end{aligned}$ | 1. I | Are we, are we going? Um, Ms. Jones was talking to you last time. |  |  |  |
|  | 2. J | Yeah. |  |  |  |
|  | 3. I | Do you remember her? |  |  |  |
|  | 4. J | Yes. |  |  |  |
|  | 5. I | And she was really bummed she couldn't come today, she had to work. And so she said she'll be back next time to talk to you again, but you know who I am. Doctor $\qquad$ from Rutgers. I don't know much about you. Can you tell the camera what your name is again? And how old you are? |  |  |  |
|  | 6. J | Well, my name is J , and I'm 12 years old |  |  |  |
|  | 7. I | And you've been going to, you've been living in... forever? |  |  |  |
|  | 8. J | Yes, since I've been born. |  |  |  |
|  | 9. I | And so, where'd you go to elementary school? |  |  |  |
|  | 10. J | I went to Evergreen elementary |  |  |  |
|  | 11. I | Evergreen, oh. And so, did you know Ms. $\qquad$ ? She's a really good friend of mine. She used to teach... Um, any brothers and sisters? What's your history? |  |  |  |
|  | 12. J | I have 5 brothers and 2 sisters. |  |  |  |
|  | 13. I | Oh my gosh, are you in the middle or are you older or younger? |  |  |  |
|  | 14. J | I'm the youngest. |  |  |  |
|  | 15. I | You're the youngest of all? |  |  |  |
|  | 16. J | (nod) Yes. |  |  |  |
|  | 17. I | So that means that, there are $5,6,7,8$ ? Is that right? 3 girls and 5 boys? |  |  |  |
|  | 18. J | Yes. |  |  |  |
|  | 19. I | Are they all still at home? Or some of them grown up or? |  |  |  |




|  | 78. J | No, mad because I wanted to do the picture of Ne-yo, but I couldn't. | Mad, angry (couldn't use her picture) |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 79. I | And so that made you feel, really mad? |  |  |  |
|  | 80. J | Uh-huh. |  |  |  |
|  | 81. I | Then what'd you do? |  |  |  |
|  | 82. J | Uh, I got a picture of my favorite cartoon character and then Mr. Pedrick said I could do Ne-yo's name. |  | Tries to find appropriate picture she likes for scaling activity |  |
|  | 83. I | Oh, so that sort of is what switched you. And so that whole first day, you were just sort of...threshing around? Or trying to figure that out? At the end of the first day you still didn't have the picture, didn't you? |  |  |  |
|  | 84. J | (nods) Mm -hmm. |  |  |  |
|  | 85. I | And you had traced it. |  |  |  |
|  | 86. J | (nods) Yeah. |  |  |  |
|  | 87. I | Um, what I'd like to ask you now is, about, another clip. This is a ... second day, but we did a lot of this the first day. |  |  |  |
| Intervie | ves |  |  |  |  |
|  |  | (school bell) |  |  |  |
|  | 88. I | And so tell me what was going on there. |  |  |  |
|  | 89. J | That's when my favorite cartoon character, that's when he told me that I could do Ne-yo's name, because I wanted to do Ne-yo. | Relieved that she could use $\mathrm{Ne}-\mathrm{Yo}$ in her scaledup drawing |  |  |
|  | 90. I | Do you hang out or work with K a lot? |  |  |  |
|  | 91. J | Sometimes. |  |  |  |
|  | 92. I | Is that, how does that make you feel? |  |  |  |
|  | 93. J | It don't, it don't matter. |  |  |  |
|  | 94. I | He's in your group. It was your group, it was you, K , and S ? |  |  |  |
|  | 95. J | S |  |  |  |
|  | 96. I | S ? S , she's new. Since beginning of the term, she wasn't here. |  |  |  |
|  | 97. J | She's not new to the school, but she switched... |  |  | Communalism (accepts new girl in math class and in group) |
|  | 98. I | Yeah. Do you enjoy working in groups like that, with |  |  |  |



|  |  | out. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 125. J | Yeah. |  |  |  |
|  | 126. I | Was that you? |  |  |  |
|  | 127. J | No, it was her. |  | Agrees with Shaniyah that task is challenging (figuring out scaled-up coordinates) |  |
|  | 128. I | And you sort of agreed. |  |  |  |
| 11:00 | 129. J | Mm-hmm. |  |  |  |
| 11:02 | 130. I | But that kind of, you were sort of wandering around and talking to different people, does that happen in class - you do that sometimes? |  |  |  |
| 11:10 | 131. J | ( oods) Yes. |  |  |  |
| 11:10 | 132. I | Do other people do it? |  |  |  |
| 11:13 | 133. J | Not really. |  |  |  |
| 11:17 | 134. I | Do you like that about math class? Being able to talk to other people? |  |  |  |
| 11:22 | 135. J | Yes. |  |  | Communalism (likes to interact freely with classmates while working) |
| 11:23 | 136. I | Why? |  |  |  |
| 11:24 | 137. J | Because, hmm, I don't know, I just like talking. |  |  |  |
| 11:35 | 138. I | So do you enjoy math class? Is it a good place? What's good and what's not good? |  |  |  |
| 11:40 | 139. J | It's good, but, yeah, it's good. |  |  |  |
| 11:45 | 140. I | What makes it good? |  |  |  |
| 11:47 | 141. J | Mm, I don't know, the work is easy, easier than other classes. |  |  |  |
| 11:54 | 142. I | Oh really? Other math classes or other classes? |  |  |  |
| 11:57 | 143. J | Other classes, like ELA, social studies. |  |  |  |
| 12:02 | 144. I | Why is it easier? |  |  |  |
| 12:05 | 145. J | Because, I don't know, it's just easier. |  |  |  |
| 12:13 | 146. I | Does it, what about the way, what do you do now? You wander around, you talk, you work on projects, you work together? |  |  |  |
| 12:24 | 147. J | Yeah, well I don't wander around a lot, I was just asking people questions, because at first I didn't get it well. Mr. Pedrick told me, so, well, he, I asked him if he could help me and he said hold on | Ignored (when told to "hold on") | Questioning (seeking help from other | Communalism (curiosity about other groups and |


|  |  | until he's done, so that's when I started to just wander around to people to see what they was doing. |  | students) | students' work) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 12:47 | 148. I | So you were waiting for his time, but you're also learning from That's pretty smart. And so does he move around the class like |  |  |  |
| 12:57 | 149. J | Yes. |  |  |  |
| 13:02 | 150. I | And you were kind of waiting. |  |  |  |
| 13:04 | 151. J | Mm-hmm. |  |  |  |
| 13:06 | 152. I | Um, ok, I'm going to show you, actually, let's see what you think about this one. |  |  |  |
| Interview Resumes |  |  |  |  |  |
| 13:17 |  | (video on) |  |  |  |
| $\begin{aligned} & \hline 13: 38 \\ & -17: 55 \end{aligned}$ | 153. I | Who's that? |  |  |  |
|  | 154. J | That's Carlos. |  |  |  |
|  | 155. I | And that's Tyquanna? (points to screen) |  |  |  |
|  | 156. J | Mm-hmm. |  |  |  |
|  | 157. I | Did you talk to her about what you were doing? |  |  |  |
|  | 158. J | Mm-hmm. |  |  |  |
|  | 159. I | Do you...? |  |  |  |
|  | 160. J | (nod) |  |  |  |
|  | 161. I | (stop video) Tell me, tell me what was going on. |  |  |  |
|  | 162. J | Um, I had this already in whole numbers, we was listing the quarter numbers on the paper. | confident | Had solutions | Communalism (owned group work) |
|  | 163. I | Ok, and show me, because I heard what he was saying but I couldn't quite follow, and so you were doing, show me, show me how that works with this. |  |  |  |
|  | 164. J | Okay, so, we started with the $x$-axis, and for the interval is $(1,1)$, and $(1,16)$ is going this way. |  |  |  |
| 18:07 | 165. I | Ok, where's the 1,16 on there? |  |  |  |
| 18:08 | 166. J | Over here. |  |  |  |
| 18:09 | 167. I | Oh, I see, so it's - |  |  |  |
| 18:10 | 168. J | $(1,16)$ |  |  |  |
| 18:12 | 169. I | I got it, and then? |  |  |  |
| 18:15 | 170. J | And then ( 5,16 ), and then (8,7). |  |  |  |
| 18:22 | 171. I | So did he [Mr. Pedrick] help you when he sat down and talked with you about that? |  |  |  |
| 18:26 | 172. J | Yes. |  |  |  |
| 18:29 | 173. I | And after that, what, you finished it? Is that what's going on? With all the points? |  |  |  |
| 18:35 | 174. J | Yes. |  |  |  |


| $18: 38$ | 175. I | And then what were you going to do? |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $18: 41$ | 176. J | I was going to trace it on the project- trans paper and then put <br> it on the projector so I could trace it. |  |  |  |
| $18: 50$ | 177. I | Instead of enlarging it from here. |  |  |  |
| $18: 53$ | 178. J | Mm-hmm. |  |  |  |
| $18: 54$ | 179. I | Mm, I see, and that's what you might do next time. Okay, I <br> have, you felt pretty good about this, didn't you? |  |  |  |
| $19: 01$ | 180. J | Mm-hmm. |  |  |  |
| $19: 02$ | 181. I | Why? |  |  |  |
| $19: 03$ | 182. J | Because, I don't know. |  |  |  |
| $19: 11$ | 183. I | It made you feel good when he helped you? Or when you <br> understood it, or what makes you feel good about that? |  |  |  |
| $19: 18$ | 184. J | When I understood. | Pride (confidence in <br> understanding) |  |  |
| $19: 20$ | 185. I | Okay, And so you do it. Okay, I have one more, um, clip that I <br> want you to look at, just because it was so interesting and I <br> don't know how you got tinto it, and it was very, very, uh, I <br> really enjoyed looking at <br> really and sifferent from these others. You're you - and it was <br> else, and so, I want you to, let's look at this part of it. |  |  |  |

Interview Resumes

| $\begin{aligned} & 19: 57- \\ & 24: 54 \end{aligned}$ |  | (video clip keeps playing) |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 186. I | What are you doing? |  |  |  |
|  | 187. J | I was tracing, um, the character, the character on the projector. |  |  |  |
|  | 188. I | How did you do that? |  |  |  |
|  | 189. J | Because I, if I could trace it, I mess up because if I do, I won't mess it up. |  |  |  |
|  | 190. I | And so you asked him if he could help you? |  |  |  |
|  | 191. J | (nod) |  |  |  |
|  | 192. I | You were pretty upset in the beginning. Do you remember? |  |  |  |
|  | 193. J | No. |  |  |  |
|  | 194. I | Let me show you. |  |  |  |
|  | 195. J | Oh. |  |  |  |
|  | 196. I | But, (mumbles) what do you think? |  |  |  |
|  | 197. J | Oh, because I didn't want to tell him, so he can hang his paper up, but she was taking too long and he got mad. |  |  |  |
|  | 198. I | And so they ... |  |  |  |
|  | 199. J | I asked him if I could trace his character, I was doing that and he |  |  |  |


|  |  | called me over and he said I could trace his. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 200. I | You like to work together with other people that way? |  |  |  |
|  | 201. J | (nod) |  |  |  |
|  | 202. I | Let's see how you feel about this. How did that make you feel? |  |  |  |
|  | 203. J | That people like the way I do work. I guess- I guess so. | Glad (others are pleased with her work) |  | Communalism (works well with classmates) |
|  | 204. I | It ended up pretty good. |  |  |  |
|  | 205. J | Mm-hmm. |  |  |  |
|  | 206. I | Are you and Kevin pretty good friends? |  |  |  |
|  | 207. J | Yes, sometimes. |  |  |  |
|  | 208. I | And so you see that it's just time for you to go, is that what you were tracing? (gets up) |  |  |  |
|  | 209. J | (gets up + goes to her desk and takes out a poster-size paper) Yes, I didn't finish. |  |  |  |
|  | 210. I | You almost did. That looks - was it hard? Or easy? |  |  |  |
|  | 211. J | It was easy. |  |  |  |
|  | 212. I | And so now is this what you're going to do with ...? |  |  |  |
|  | 213. J | (nods) Mm-hmm. |  |  |  |
|  | 214. I | And then, what do you have to find now? |  |  |  |
|  | 215. J | What do you mean? |  |  |  |
|  | 216. I | After this, is he now finished once he gets it traced? Or is there anything else ...? |  |  |  |
|  | 217. J | I guess it's finished, unless he wants a cover or something. |  |  |  |
|  | 218. I | (walks back over to where chairs are) So then what you'll do, is, is do the same thing, with these ones. |  |  |  |
|  | 219. J | Yeah. |  |  |  |
|  | 220. I | You have any questions you want to discuss about what we're doing with ...? |  |  |  |
|  | 221. J | (shakes head) No. |  |  |  |
|  | 222. I | I appreciate this so much, it's really great, and you're doing such, such good work. You like this kind of project better? Or about the same or other kind of math classes'? |  |  |  |
| $\begin{aligned} & \text { 25:08- } \\ & \text { 26:09 } \end{aligned}$ | 223. J | I like this project | Happy [at liking project study activities] | Working with others [enlarging/scaling -up/plotting coordinates] |  |
|  | 224. I | Why? |  |  |  |


|  | 225. J | Because it's fun, because it's fun, and we learn, well not learn, but <br> we don't work at the same time, and some people, some people <br> they're not learning, but they're doing work too because they want to <br> enlarge their picture by doubling the coordinates. |  |  |
| :--- | :--- | :--- | :--- | :--- |
|  | 226. I | Could you have done it like that? |  |  |
| 227. J | No, I didn't do it like that. |  |  |  |
| 228. I | But if you could, would you have? |  |  |  |
| $229 . ~ J$ | Yes. |  |  |  |
| 230. I | So if you doubled it, if you doubled it, what would happen? |  |  |  |
| $231 . J$ | The Ne-yo, all the letters would get larger, bigger. |  |  |  |
| $232 . J$ | And so you could do it that way? And the projector? If you wanted <br> to double it on the projector, could you figure out how to double it? <br> On the projector? |  |  |  |

## APPENDIX B1c <br> JANA $7^{\text {th }}$ GRADE INTERVIEW CYCLE 3

CD or DVD title: MMAF047
Description: Focus Student Interview Cycle 3
Date of Interview: 01/19/2007
Camera Person: S. Wang Researcher: JVJones, Alice Alston
Transcriber: H. Wilenchik, Date of Verified Transcript: 02/09

| Time | Speaker Move | Transcript | Affective Interaction Code | Mathematics Interaction Code | Social Interaction Code |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \hline 0: 00- \\ & 2: 18 \end{aligned}$ | 1. MJ | Um, (shuffles paper), I'm sorry you are going to have to bear with me for a minute because I have a list here. Okay, that would be this one, the final clips (more shuffling). Any day now. It's working. I think. You're not, you're not recording yet are you? Can you tell us, um, who you are? And how old you are? |  |  |  |
|  | 2. J | Um. |  |  |  |
|  | 3. MJ | Wait, okay. |  |  |  |
|  | 4. J | My name is Janae and I am 12. |  |  |  |
|  | 5. MJ | Okay, and I'm Miss Jones and we've talked a little bit after videotaping classes before. But it's been awhile so um, can you, can you remind me about, about you? Remember back in November I think it was, it was the first time that we met and sat down and talked. So it's been a couple of months since then. Anything new you want to tell me? |  |  |  |
|  | 6. J | No, not really. |  |  |  |
|  | 7. MJ | Not really? Oh, Okay. Well you said something interesting. Yes, I'm here to talk to you a little bit about this clay. Um, this week you had a couple of math classes where you were working with Play-Doh and um, talking about some math ideas. So like we've done before, I'd like to show you some video clips. Maybe to help you think about what went on and then ask you some questions. Is that okay? |  |  |  |
|  | 8. J | Yeah. |  |  |  |
|  | 9. MJ | Alrightee. Um, okay. We are going to go back to the first day and I would like you to take a look at this clip |  |  |  |



|  |  | called names cause I was mad. But now we just play about it and stuff. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 6:45 | 31. MJ | Oh, so what's changed? You used to feel mad about the names but now you don't? |  |  |  |
| 6:49 | 32. J | Mmhmm. |  |  |  |
| 6:50 | 33. MJ | What's changed? Talk a little bit more about that. |  |  |  |
| 6:53 | 34. J | Cuz, I don't know but, I don't know how to explain. But we just all came up with names for each other and we just call each other the names. |  |  |  |
| 7:04 | 35. MJ | So do you think everyone feels the same about the names? |  |  |  |
| 7:08 | 36. J | Most people. |  |  |  |
| 7:12 | 37. MJ | In general, they make you feel good? Do the names make you feel good? Or do the names make you feel not so good? |  |  |  |
| 7:20 | 38. J | Um...it's not really none of those. It's just, like, when somebody calls somebody a name we just laugh. Or if they call me a name, I'll laugh and we just have fun. |  |  | Describes ame calling as part of social interaction |
| 7:34 | 39. MJ | Do you do always laugh? |  |  |  |
| 7:36 | 40. J | Mmhmm. |  |  |  |
| 7:36 | 41. MJ | Oh you do, always laugh? |  |  |  |
| 7:38 | 42. J | Or unless I am in a bad mood and somebody messes with me and stuff. |  |  |  |
| 7:41 | 43. MJ | Oh, so if someone calls you a name, a nickname, and you are in a good mood, you are likely to laugh? |  |  |  |
| 7:50 | 44. J | Mmhmm. |  |  |  |
| 7:51 | 45. MJ | So if somebody calls you the same name and you are in a bad mood your response would be different, maybe? |  |  |  |
| 7:59 | 46. J | No I just, I wouldn't, I just wouldn't say anything. I would just be like don't call me, don't um, play with me right now because I'm not in a good mood. |  |  |  |
| 8:10 | 47. MJ | Oh, okay. Do you think, um, that any of your classmates don't like to be called the names? |  |  |  |
| 8:18 | 48. J | Um, well not the ones, the ones in this class they are okay. But some of the people in the other class, um, they don't like it. |  |  | Recognizes that some classmates don't like to be called names (may feel bad for them) |
| 8:30 | 49. MJ | Oh, what do you think you might do if you didn't like the, the nickname? What is your nickname by the way? |  |  |  |



## Interview Resumes

| $\begin{aligned} & \hline 11: 03- \\ & 11: 36 \end{aligned}$ | $\begin{aligned} & \text { (VIDEOC } \\ & \text { LIP) } \\ & \hline \end{aligned}$ |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 11:37 | 64. MJ | Oops, we did that. And you gave that wonderful definition, let me get to the next one. I'm sorry hun. |  |  |
| $\begin{aligned} & \hline 11: 44- \\ & 13: 00 \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { (VIDEOC } \\ & \text { LIP) } \end{aligned}$ | (lots of noise, PEDRICK trying to regain student's attention and focus) |  |  |
| Interview Resumes |  |  |  |  |
| 13:01 | 65. MJ | Hmm, can you describe, can you describe? |  |  |
| 13:06 | 66. J | Oh, I was mad because I got messy and the people at my, the boys at my table they wasn't getting messy. And I was also mad because when I was trying to make the clay and mix it up and stuff, it wouldn't like work. | Annoyed [at getting messy] |  |
| 13:20 | 67. MJ | Oh, so you got a little frustrated um when you were working, trying to make the clay? | Frustrated [with using "messy" clay] |  |
| 13:27 | 68. J | Mmhmm. |  |  |
| 13:28 | 69. MJ | Oh okay, um, had you been working okay before that? |  |  |
| 13:36 | 70. J | Wait, before what? |  |  |
| 13:38 | 71. MJ | Yeah, before you um, you put the clay down, you threw the clay down and you walked away from the group. But you had been working with the Play-Doh. You had made it |  |  |
| 13:46 | 72. J | Mmhmm. |  |  |
| 13:48 | 73. MJ | You were working. Was there something specific that happened? By someone, specific? |  |  |
| 13:53 | 74. J | MmmNmm (as in no) |  |  |
| 13:57 | 75. MJ | So pretty much the reason was that you didn't want to get dirty? |  |  |
| 14:01 | 76. J | Mmhmm. |  | [claims] frustration was due to "messy" clay and not others |
| 14:02 | 77. MJ | That was it? |  |  |
| 14:03 | 78. J | Because I didn't know we was making clay |  |  |
| 14:05 | 79. MJ | Oh, okay. Let's uh...(plays videocliop) |  |  |
| Interview Resumes |  |  |  |  |
| $\begin{aligned} & \hline 14: 14- \\ & 14: 23 \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { VIDEOC } \\ & \text { LIP } \end{aligned}$ |  |  |  |
| 14:17 | 80. MJ | By the way you got over there. How did that make you feel when you were sitting over there by yourself? |  |  |
| 14:27 | 81. J | It, it, I didn't really (inaudibvle) I was just mad so... |  | [claims] frustration was |


|  |  |  |  | due to "messy" clay and <br> not others |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| 14:35- <br> 15:00 | VIDEO <br> CLIP |  |  |  |  |



|  |  | drawings or, or a picture, what kinds of things did you think about that day when you were working with the Play-Doh? |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 17:20 | 93. J | Um....nothing really. |  |  |
| 17:35 | 94. MJ | Well, can you um, let me just so we have a record of it. Um, can you tell us, uh, make some drawings um, about what you know or what you learned about a sphere and a cylinder? |  |  |
| 17:52 | 95. J | Um, so I draw a circle or something? | [unsure of strategy to draw representation] |  |
| 17:55 | 96. MJ | You could, yeah, whatever, however you wanted to illustrate what went on. I am actually going to get another video clip (gets up from seat). That's over here (returns to seat). Do you remember anything that you can illustrate for us? |  |  |
| 18:33 | 97. J | Mmhmm. [camera zooms in on her illustration, 19:02] Oh, well, this was, this was, where we was um, measuring the clay and the cylinder to see if it would fit inside. | [described relationship of clay ball and cylinder] |  |
| 19:11 | 98. MJ | Mmhmm. |  |  |
| 19:12 | 99. J | Have the same volume. |  |  |
| 19:13 | 100.MJ | And why did you do that? What was the purpose of doing that? |  |  |
| 19:18 | 101.J | Uhh, Mr. Pedrick, he told us, to um, to get a cylinder and like ball the clay up (video clip briefly plays) He told us to ball the clay up and um, to see if it would fit inside the cylinder. So. | [thinking about relationship of ball and cylinder] |  |
| 19:35 | 102. MJ | Okay, and were you able to do that? |  |  |
| 19:39 | 103. J | Yes |  |  |
| 19:41 | 104. MJ | Okay, um, I have a clip from the second day and I want you to take a look at this. Look for you in the clip! |  |  |

Interview Resumes

| 20:47 | 105. MJ | Okay, can you tell us what was going on in that piece of the clip? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 20:50 | 106. J | Oh. Since I didn't want to work in the, my old group with Kenyatta and Kevin and Bryant. I asked Mr. P if I could work with Q and Tyana. |  |  |  |
| 21:01 | 107. MJ | Oh, okay. How were you feeling? What made you feel |  |  |  |


|  |  | that you didn't want to work with the others anymore? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 21:07 | 108. J | Cause, they wasn't really working and since it was a group project I didn't want to do it by myself. And so I just asked him, if I could like, go to another group. Because I seen that day they were working and it was only two of them so, I just went over there. | [annoyed, distracted?] |  | [wanted group mates to work as hard as she was] |
| 21:23 | 109. MJ | Oh, so that was what you were thinking when you changed groups. Um, remember, the day before, um, when you walked away from your group... |  |  |  |
| 21:23 | 110. J | Mmhm. |  |  |  |
| 21:24 | 111. MJ | Did that have anything to do with it? What were you thinking when on the second day when you decided to move from that group to the other one? |  |  |  |
| 21:41 | 112. J | Yeah. It was um, oh, can you repeat the question? |  |  |  |
| 21:46 | 113. MJ | Yeah, on the first day, remember the piece when you stomped away and you were a little bit upset so you moved away, stomped away, and sat in the chair and we talked about that a little bit. Now on the second day, we see that you actually moved from one group to another. Did what happen on the first day have any impact on the second day? |  |  |  |
| 22:10 | 114. J | Yes, um. |  |  |  |
| 22:12 | 115. MJ | Um, can you remember what? |  |  |  |
| 22:16 | 116. J | They wasn't really working as a group. They was just doing their own thing so, and I didn't have anything to do so I just went to the other group. | Disappointed | Wanted to work with others on the problem | Communication [wanted to work in |
| 22:27 | 117. MJ | So, and, can you describe how you were feeling when you moved? |  |  |  |
| 22:32 | 118. J | I felt better because at least I can get some work done. |  |  |  |
| 22:37 | 119. MJ | Okay, um, anything else you remember uh happening? Tell us what happened when you moved to the new group, what uh, how did you feel? |  |  |  |
| 22:47 | 120. J | I felt okay. |  |  |  |
| 22:48 | 121. MJ | I see you even took your name tag and everything and put it on your desk. That was good right? |  |  |  |
| 22:54 | 122. J | Mmhmm. |  |  |  |
| 22:55 | 123. MJ | Anything else that you were thinking when you were with your new group? |  |  |  |
| 22:59 | 124. J | Mmm. No. |  |  |  |





## APPENDIX B1d

## JANA $7^{\text {th }}$ GRADE INTERVIEW CYCLE 4

CD or DVD title: MMAF055
Description: Focus Student Interview Cycle 4 (prior to NJAsk7)
Date of Interview: 03/01/2007
Camera person: S. Wang, R. Sigley; Researcher: JVJones
Transcriber: P. Zimmerman; Date of Verified Transcript: 02/09

| Time | Speaker | Transcript | Affective Interaction | Mathematical Interaction | Social Interaction |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 0:00 | 1. MJ | Hi, Janae. |  |  |  |
| 0:02 | 2. J | Hi. |  |  |  |
| 0:03 | 3. MJ | Happy Monday. How are you today? |  |  |  |
| 0:06 | 4. J | Good. |  |  |  |
| 0:07 | 5. MJ | You know I wasn't in your class the last time um, they came to videotape. So I'm going to be asking you some questions and as much as you can remember. As much detail. I hope you share with me. OK? Um, can you remember what you were doing, what the activity was when the film crew came to video? |  |  |  |
| 0:27 | 6. J | Yes. |  |  |  |
| 0:28 | 7. MJ | Can you describe it for me? |  |  |  |
| 0:31 | 8. J | Um, we was finding coordinates and trying to make a shape and this is the original shape. |  | Scaling up by finding new coordinates |  |
| 0:40 | 9. MJ | This is the original shape that you drew from -- |  |  |  |
| 0:46 | 10. J | Oh. Mr. Pedrick's coordinates -- |  |  |  |
| 0:48 | 11. MJ | Oh, from Mr. Pedrick's coordinates? OK. |  |  |  |
| 0:51 | 12. J | And then, we had to like make the shape bigger using coordinates like we had to multiply the coordinates, X and Y to make a bigger shape and this is what we got. |  |  |  |
| 1:05 | 13. MJ | Oh, so this is the new shape? |  |  |  |
| 1:07 | 14. J | Um-hm. |  |  |  |
| 1:09 | 15. MJ | And explain again what's different about the shapes? |  |  |  |
| 1:12 | 16. J | It's bigger. |  |  |  |
| 1:13 | 17. MJ | It's bigger? OK, but it's the same shape only bigger? |  |  |  |
| 1:18 | 18. J | Yeah. |  |  |  |
| 1:18 | 19. MJ | OK, and you used the coordinates on there? So you were given the first set of coordinates and then you had to find the next set? Was that |  |  |  |


|  |  | easy? Did you like that? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1:29 | 20. J | Yeah. Yes. But Mr. Pedrick messed up with some of them. |  | Agrees w/classmates that Mr. Ps coordinates were incorrect |  |
| 1:34 | 21. MJ | What happened? |  |  |  |
| 1:34 | 22. J | His coordinates was wrong. |  |  |  |
| 1:37 | 23. MJ | How did you find that out? |  |  |  |
| 1:39 | 24. J | Well... because we already knew what the shape looks like because we did it earlier in the year so when we like put all the shapes together, he messed up on some coordinates and we well, Naomi and Patrice, they confronted him about it. And then they fixed it and typed it over. |  | Reasoned that Mr. Ps new coordinates did not match original shape |  |
| 1:59 | 25. MJ | Oh. So did you um, understand that there were mistakes in the coordinates? How did that make you feel? |  |  |  |
| 2:09 | 26. J | Smart. | Smart | Finding new coordinates, teacher's incorrect answers or mistakes (participating in math learning community), recognizing teacher's mistake | Communalism (working together) |
| 2:11 | 27. MJ | How so? |  |  |  |
| 2:12 | 28. J | Because ... I don't know. |  |  |  |
| 2:20 | 29. MJ | Do you feel that way a lot in Mr. Pedrick's class? |  |  |  |
| 2:22 | 30. J | Yes. |  |  |  |
| 2:23 | 31. MJ | Yeah? When are the times when you feel smart? |  |  |  |
| 2:27 | 32. J | When I answer a question and nobody knows or something. |  |  |  |
| 2:33 | 33. MJ | Was that a typical activity? |  |  |  |
| 2:37 | 34. J | This? |  |  |  |
| 2:37 | 35. MJ | Uh-huh. Have you done graphing before? |  |  |  |
| 2:41 | 36. J | Yes. |  |  |  |
| 2:43 | 37. MJ | What about the way you worked. Was it sort of like a typical day or was there anything unusual in the way Mr. Pedrick's class went that day? |  |  |  |
| 2:53 | 38. J | It wasn't nothing unusual. |  |  |  |


| 2:56 | 39. MJ | There wasn't anything unusual? It wasn't different? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 2:59 | 40. J | Um-um. |  |  |  |
| 3:00 | 41. MJ | No? How did you like that activity? |  |  |  |
| 3:05 | 42. J | It was OK. |  |  |  |
| 3:08 | 43. MJ | How would you compare it to other activities and the work you do in Mr. Pedrick's class? |  |  |  |
| 3:13 | 44. J | It's not as fun as that project we did when we drew the characters and stuff. |  |  |  |
| 3:22 | 45. MJ | Anything else? So there was another day when you drew characters? |  |  |  |
| 3:25 | 46. J | Um-hm. |  |  |  |
| 3:26 | 47. MJ | And plotted them using the grid? |  |  |  |
| 3:29 | 48. J | Yes. |  |  |  |
| 3:30 | 49. MJ | And how did that go? |  |  |  |
| 3:34 | 50. J | You want me to tell you like, how it started? |  |  |  |
| 3:39 | 51. MJ | Yeah. Why don't you? It's fun. |  |  |  |
| 3:41 | 52. J | OK. Um, Mr. Pedrick told us to pick a character. And then we had to trace it on the grid and then we had to plot the coordinates and that's when we traced it on the overhead and then we made it bigger by expanding the coordinates and stuff. |  | Explains task |  |
| 4:02 | 53. MJ | Oh, OK. So the idea is to take one drawing and make it bigger? |  |  |  |
| 4:07 | 54. J | Um-hm. |  |  |  |
| 4:12 | 55. MJ | There's a test, a math test coming up. |  |  |  |
| 4:15 | 56. J | Um-hm. |  |  |  |
| 4:16 | 57. MJ | Um, can you tell me about that test? |  |  |  |
| 4:20 | 58. J | Um |  |  |  |
| 4:22 | 59. MJ | What do you know about that test? |  |  |  |
| 4:30 | 60. J | I don't know what's going to be on the test yet. Because it's like a, it's a [NJAsk] so. |  |  |  |
| 4:39 | 61. MJ | That's the name of it? |  |  |  |
| 4:39 | 62. J | Um-hm. |  |  |  |
| 4:41 | 63. MJ | What has Mr. Pedrick told you about the test? |  |  |  |
| 4:46 | 64. J | Um, that it was going to be a little challenging for some of us. . |  |  |  |
| 4:52 | 65. MJ | How did that make you feel? |  |  |  |
| 4:54 | 66. J | Nervous. |  |  |  |
| 4:56 | 67. MJ | Nervous? |  |  |  |
| 4:57 | 68. J | Um-hm. |  |  |  |
| 4:57 | 69. MJ | Why did it make you feel nervous? |  |  |  |
| 5:00 | 70. J | Because ... I want to pass the test. | Nervous/anxious |  |  |
| 5:06 | 71. MJ | Yeah? You want to pass the test? Why? |  |  |  |


| $5: 11$ | 72. J | So I can go into the next grade. |  |  |
| :--- | :--- | :--- | :--- | :--- |
| $5: 13$ | 73. MJ | Oh. So do you think if you don't pass this test, you don't go to the <br> next grade? |  |  |
| $5: 18$ | $74 . \mathrm{J}$ | Well, no. But I want them to know that I'm smart and that I know a <br> lot and I learned a lot from this year. | Smart |  |
| $5: 28$ | 75. MJ | Have you been doing anything special or different to prepare for the <br> test? |  |  |
| $5: 34$ | 76. J | No, I study more each night. |  |  |
| $5: 36$ | 77. MJ | You study more each night? On your own or with friends? |  |  |
| $5: 40$ | 78. J | On my own. |  |  |
| $5: 41$ | 79. MJ | On your own? Have you been doing anything special in Mr. <br> Pedrick's class to prepare for the test? | independently |  |


| 7:29 | 96. J | Sort of. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 7:31 | 97. MJ | How do you think it might help you on the test? |  |  |  |
| 7:34 | 98. J | Because I, if we have a, a part where we have to do coordinates and stuff and ... |  |  |  |
| 7:46 | 99. MJ | Anything else? Was the activity, was this activity something that, something new that you were learning or a review of something? |  |  |  |
| 8:00 | 100.J | A review. |  |  |  |
| 8:01 | 101.MJ | A review? All of it was a review? |  |  |  |
| 8:04 | 102. J | Um-hm. |  |  |  |
| 8:09 | 103. MJ | Um, let's see. And you liked this activity? Do you remember anything about that day that stood out in your mind? |  |  |  |
| 8:26 | 104. J | Yeah. |  |  |  |
| 8:28 | 105. MJ | Tell me about it. |  |  |  |
| 8:29 | 106. J | Mr. Pedrick wouldn't help me. | Neglected |  |  |
| 8:31 | 107. MJ | What do you mean, he wouldn't help you? |  |  |  |
| 8:33 | 108. J | I was coming and asking him for help. He wasn't listening to me. | Ignored/neglected | Asks teacher questions |  |
| 8:39 | 109. MJ | He wasn't listening? |  |  |  |
| 8:40 | 110. J | Nope. |  |  |  |
| 8:42 | 111. MJ | Was he talking to other students? Or - describe what he was doing. |  |  |  |
| 8:47 | 112. J | Yeah, he was talking to other students. |  |  |  |
| 8:51 | 113. MJ | And how were you trying to get his attention? |  |  |  |
| 8:54 | 114. J | I was raising my hand and then for a long time, and then I started calling his name and stuff. Then I went over to where he was and I was trying to get his attention but I guess he was too busy. |  | [attempts] to ask teacher questions |  |
| 9:10 | 115. MJ | Does that happen a lot? |  |  |  |
| 9:12 | 116. J | Um-hm. |  |  |  |
| 9:12 | 117. MJ | It does? How does it make you feel? |  |  |  |
| 9:18 | 118. J | Um, forgotten. |  |  |  |
| 9:20 | 119. MJ | Forgotten? Anything else? |  |  |  |
| 9:27 | 120. J | Don't know. |  |  |  |
| 9:28 | 121. MJ | And what do you do when that happens and you feel forgotten? |  |  |  |
| 9:33 | 122. J | I just sit back at my desk and not do nothing. And try to understand. And ask one of my group members. |  |  |  |
| 9:44 | 123. MJ | Do you think that happens with other students? |  |  |  |
| 9:49 | 124. J | Not really. |  |  |  |
| 9:54 | 125. MJ | OK, you want to - take a look at this. [Plays video.] |  |  |  |
| Interview Resumes |  |  |  |  |  |
| 10:15 | 126. MJ | Oh, can you tell me what's going on there? |  |  |  |




| 18:12 | 177. MJ | So what was going on there? Mr. Pedrick finally came over. And you were working with Carla? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 18:18 | 178. J | Um yeah. Well no -- |  |  |  |
| 18:19 | 179. MJ | Well tell us what you were doing. |  |  |  |
| 18:20 | 180. J | I wasn't working with Carla. She told me to look at something on the computer. |  |  |  |
| 18:25 | 181. MJ | Oh she asked you to look at something on the computer? |  |  |  |
| 18:27 | 182. J | Um-hm. |  |  |  |
| 18:28 | 183. MJ | Was it, um, her work on the graph? |  |  |  |
| 18:32 | 184. J | It wasn't math related at all. |  |  |  |
| 18:34 | 185. MJ | Oh, it wasn't math related at all? |  |  |  |
| 18:36 | 186. J | She always does that. |  |  |  |
| 18:38 | 187. MJ | She always does that? |  |  |  |
| 18:39 | 188. J | Well, yeah. |  |  |  |
| 18:41 | 189. MJ | How does that make you feel when she asks you to look at math, at work that's not related to math at all, in math class? |  |  |  |
| 18:52 | 190. J | It don't make me feel no way but I feel like this is back to Mr. Pedrick, because he's allowing us to use the computer and she's not using it in a math way in one of his class. |  |  |  |
| 19:04 | 191. MJ | Oh, so do you get to use the computers a lot in Mr. Pedrick's class? |  |  |  |
| 19:08 | 192. J | Um-um. |  |  |  |
| 19:09 | 193. MJ | Not a lot? |  |  |  |
| 19:11 | 194. J | No. |  |  |  |
| 19:12 | 195. MJ | So how did you feel when she called you over and you realized it wasn't math related? |  |  |  |
| 19:22 | 196. J | No way. |  |  |  |
| 19:24 | 197. MJ | Do you think - how do you think she feels, she felt? Do you think she felt any, any particular way? |  |  |  |
| 19:32 | 198. J | No. |  |  |  |
| 19:36 | 199. MJ | So in terms of um, thinking about the test that's coming up, you said that Mr. Pedrick's activities are pretty much the same. It's not anything different. You're doing something a little bit different at home. Which is what? |  |  |  |
| 19:56 | 200. J | I study. |  |  |  |
| 19:57 | 201. MJ | You study a little more? And in Mr. Pedrick's class, you work with a lot of different people. And during the test, it's you working alone. Which do you prefer? |  |  |  |
| 20:15 | 202. J | Can you repeat the question? |  |  |  |
| 20:18 | 203. MJ | Yeah. When you're taking, when you're going to take this NJAsk7 |  |  |  |


|  |  | test, you're going to be working alone. And a lot of times in Mr. Pedrick's class, you're working with somebody else. Which one of those ways do you prefer? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 20:32 | 204. J | Working with somebody else. |  |  | communalism |
| 20:34 | 205. MJ | Yeah? So how do you feel about taking the test alone? How do you think it's going to make you feel? |  |  |  |
| 20:41 | 206. J | Nervous. | Nervous (less comfortable doing math alone) |  |  |
| 20:45 | 207. MJ | Are there things that you do in Mr. Pedrick's class to help prepare you for working alone? |  |  |  |
| 20:53 | 208. J | Um-hm. I try to work alone but when I need help, I just ask one of my group mates for help. |  | Strategy of working alone to help prepare for test | Relies on group/others for help |
| 21:00 | 209. MJ | That's something that you do a lot in class, you ask others for help? And what do you do when there isn't anyone to help or you're not supposed to ask anyone for help? What do you do? |  |  |  |
| 21:14 | 210. J | I just try my best. And guess the question. |  | Strategy of best efforts, then guessing |  |
| 21:20 | 211. MJ | Are there any other strategies that you might use when you can't ask anyone else? |  |  |  |
| 21:27 | 212. J | I don't know. |  |  |  |
| 21:31 | 213. MJ | Do you think you're prepared to take, to do well on the test? |  |  |  |
| 21:35 | 214. J | Um-hm. Yeah. | Confidence |  |  |
| 21:37 | 215. MJ | Well good. Do you think your classmates are prepared well to do good on the test? |  |  |  |
| 21:42 | 216. J | Some. Some of them. |  |  |  |
| 21:45 | 217. MJ | Has Mr. Pedrick helped you to prepare for the test? |  |  |  |
| 21:49 | 218. J | Um-hm. |  |  |  |
| 21:50 | 219. MJ | You feel he's helped a lot? |  |  |  |
| 21:51 | 220. J | Um-hm. He gave this practice test and so we could be ready. | Confidence (in ability to do well on test) | Strategy to practice test-like questions |  |
| 21:58 | 221. MJ | Anything else? |  |  |  |
| 22:03 | 222. J | Not that I could think of. |  |  |  |
| 22:04 | 223. MJ | So other than the practice test, and how do you use the practice test? You go over the questions together as a group in class? Just describe that a little bit. |  |  |  |


| 22:14 | 224. J | We work alone so because he wanted like getting us ready for the test and how the test was going to be set up and stuff. And how long it's going to be. How you have to behave. |  | Strategy to be familiar with test format | [reference to expected behavior] |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 22:27 | 225. MJ | Oh? And how you have to behave? So any special feelings? How does Mr. Pedrick help you, how does Mr. Pedrick make you feel about the test? |  |  |  |
| 22:39 | 226. J | He tried to get us ready and stuff. | Believes in teacher's intentions to prepare students for test |  |  |
| 22:45 | 227. MJ | OK. Anything else you want to tell us about that day or um, in terms of getting ready for the test? How you feel about the test? No? OK, well I really appreciate you talking to us again. Sometimes you know, interviews get a little wordy. But I have to say, I love your Baby Phat shirt. |  |  |  |

## APPENDIX B1e <br> JANA $7^{\text {th }}$ GRADE INTERVIEW CYCLE 5

CD or DVD title: MMAF071
Description: Focus Student Interview Cycle 5
Date of Interview: 06/05/2007
Camera person: S. Wang; Researcher: JVJones
Transcriber: Y.K. Lin; Date of Verified Transcript: 02/09

| Time | Speaker Move | Transcript | Affective Interaction Code | Mathematical Interaction Code | Social <br> Interaction Code |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 00:00 | 1. MJ | Good morning, J. |  |  |  |
| 00:02 | 2. J | Good morning. |  |  |  |
| 00:03 | 3. MJ | How are you? |  |  |  |
| 00:04 | 4. J | Fine. |  |  |  |
| 00:05 | 5. MJ | You wanna sit up a little closer? Cause we're gonna, umm, watch a few clips, as usual. Wow, it's been a long year, huh? |  |  |  |
| 00:11 | 6. J | Mm hmm. |  |  |  |
| 00:12 | 7. MJ | How do you feel about the year? |  |  |  |
| 00:13 | 8. J | It was fast. |  |  |  |
| 00:14 | 9. MJ | It was fast? Yea? What about in math class? |  |  |  |
| 00:19 | 10. J | It was fun, sometimes. | [believes] math is fun |  |  |
| 00:21 | 11. MJ | Yea? Anything stand out in your mind about math class? |  |  |  |
| 00:25 | 12. J | The project. |  | Math as "project" |  |
| 00:26 | 13. MJ | What project? |  |  |  |
| 00:27 | 14. J | The, umm, the one with the cartoons? Where we had to do the cartoons? |  | Math can be interesting/fun |  |
| 00:32 | 15. MJ | Ohh. You liked that, huh? |  |  |  |
| 00:34 | 16. J | Mm hmm . |  |  |  |
| 00:35 | 17. MJ | Yea. When we were here a couple of weeks ago, for the last, umm, two days of videotaping, do you remember what problem you were working on? When we were videotaping? |  |  |  |
| 00:47 | 18. J | No. |  |  |  |
| 00:49 | 19. MJ | No? Mm kay. Umm, we're gonna see a couple of video clips, and I'm |  |  |  |


|  |  | sure it's gonna refresh your memory. And then, we're going to talk about it a little bit. |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Interview Resumes |  |  |  |  |
| 01:02 | -- | [Video clip] |  |  |
| 01:36 | 20. MJ | Remember the problem yet? |  |  |
| 37 | 21. J | Yea. |  |  |
| 39 | 22. MJ | Okay, okay. Let me pause this. Do you remember what the problem was? |  |  |
| 42 | 23. J | I think, umm, we was doing - we was doing a project. Well, it wasn't a project, but we was doing a problem, and it was about pizza, and it had four toppings, and we had to, umm, and we had to see how many combinations we could make with those four toppings. | Problem-solving (combinations of 4 choices) |  |
| 02:01 | 24. MJ | Ohh ... okay. Did you have any ideas about that before you started working with your group? |  |  |
| 02:07 | 25. J | About the answer? |  |  |
| 02:08 | 26. MJ | Uh huh. |  |  |
| 02:09 | 27. J | Uh, yes. |  |  |
| 02:10 | 28. MJ | You did! What ideas did you have even before you started? |  |  |
| 02:15 | 29. J | You mean my strategies? |  |  |
| 02:16 | 30. MJ | Mm hmm . |  |  |
| 02:17 | 31. J | Oh. Umm, I was gonna - I was gonna start with one topping first and then do all of them and then start with the next topping until [inaudible]. | Strategy for combinations: start with 1 topping pizzas |  |
| 02:27 | 32. MJ | Okay. |  |  |
| Interview Resumes |  |  |  |  |
| 02:28 | -- | [Video clip] |  |  |
| 03:18 | 33. MJ | Ohh. Do you remember that? What was going on there? Mr. Pedrick sounded like he was talking to whole the class. What was he saying? |  |  |
| 03:27 | 34. J | He was saying cause I guess some groups was getting mad that he didn't get to them yet to help them, so he was just saying that he was gonna go to every group, and he was yelling at [inaudible] talking back or something. |  |  |
| 03:42 | 35. MJ | Now you were working in a group. Who was working in your group for this, uhh, problem? |  |  |
| 03:46 | 36. J | Maria, Tyquanna, Deja, and Patrick. |  |  |


| $03: 51$ | 37. MJ | And, is that your usual group? Do you usually work with that group of <br> students? |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $03: 56$ | 38. J | No, I usually work with [inaudible]. |  |  |  |
| $04: 01$ | 39. MJ | Ohh - so how come the groups were different? |  |  |  |
| $04: 04$ | 40. J | Cause of the exhibition. |  |  |  |


| 05:12 | 52. MJ | You think? How does that make you feel? |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 05:16 | 53. J | Bad. | Bad |  |
| 05:18 | 54. MJ | Aww. So even though this was a different group, it - it seems like he always gets to your group last? |  |  |
| 05:24 | 55. J | Mm hmm. |  |  |
| 05:27 | 56. MJ | Mm ... okay. Well ... |  |  |
| Interview Resumes |  |  |  |  |
| 05:31 | -- | [Video clip] |  |  |
| 05:37 | 57. MJ | Okay. Now, we've got some clips of the presentations, but before I get to the presentations, I think there's some other, umm, ... |  |  |
| Interview Resumes |  |  |  |  |
| 05:48 | -- | [Video clip] |  |  |
| 05:54 | 58. MJ | Ohh. This is your group, huh? |  |  |
| 05:55 | 59. J | Mm hmm. |  |  |
| 06:10 | 60. MJ | Ahh ... check it out. We see Mr. Pedrick came over to the group and pulled his chair up and sat down. So how does that make you feel? |  |  |
| 06:20 | 61. J | Better. But he still got there last! [Bell sounds] | Glad |  |
| 06:25 | 62. MJ | Okay, let's wait until the bell ... Okay, I'll ask you again. So Mr. <br> Pedrick is at your group. We're seeing he pulls up a chair and sits down. How does that make you feel? |  |  |
| 06:36 | 63. J | It makes me feel good, but - it made me feel better, but we was still last. I mean, he still got there last. |  | Aware that her group was last to receive teacher's attention |
| 06:44 | 64. MJ | Oh, okay. Do you remember, umm, the work that you had done so far with your group, when Mr. Pedrick came over at this point? |  |  |
| 06:51 | 65. J | Mm hmm. We was, umm, putting our information on a poster. |  |  |
| 06:55 | 66. MJ | Oh. You were working on a poster. Umm, did you have your own solution, or were you working together with your groupmates? |  |  |
| 07:03 | 67. J | We was working together. |  | Communalism |
| 07:06 | 68. MJ | Alright, let's see what else happens. |  |  |
| Interview Resumes |  |  |  |  |
| 07:07 | -- | [Video clip] |  |  |
| 07:52 | 69. MJ | Okay. I'm gonna stop. We're gonna continue, but you opened up a folder. Was that your individual work? Can you tell me what's going on there? |  |  |


| 08:00 | 70. J | Oh, that was just the papers that, umm, I don't know. I think that was Tyquanna's papers? Or something. |  | Expectation that each group member contributes their own work |
| :---: | :---: | :---: | :---: | :---: |
| 08:08 | 71. MJ | So each of you had your own paper? |  |  |
| 08:11 | 72. J | Yea. |  |  |
| 08:13 | 73. MJ | To solve the problem? |  |  |
| 08:14 | 74. J | [Nods] |  |  |
| 08:15 | 75. MJ | But you were working as a group? |  |  |
| 08:16 | 76. J | Mm hmm. |  |  |
| 08:17 | 77. MJ | Okay, and who just got up here? |  |  |
| 08:18 | 78. J | Deja. |  |  |
| 08:18 | 79. MJ | Deja? |  |  |
| Interview Resumes |  |  |  |  |
| 08:18 | -- | [Video clip] |  |  |
| 08:29 | 80. MJ | You know what - we're thinking about - I'm gonna ... |  |  |
| 08:52 | 81. MJ | Okay. Here, Deja gets up. |  |  |
| 08:58 | 82. MJ | Why did - here, let me stop that. Why did, umm, why did Deja get up? |  |  |
| 09:04 | 83. J | To tell him about, umm, her - her solution, and how and she got it and stuff, and her strategy. |  |  |
| 09:13 | 84. MJ | Okay. So she was talking to Mr. Pedrick about her solution? Was it a solution that all of you understood, or ... |  |  |
| 09:19 | 85. J | Yea, she explained it to us. Then we understood it. And he got over there, so she - since we was using her solution, umm, she was the one that explained it to him. | Listening to other's ideas; choosing group members strategy to present | Communalism |
| 09:30 | 86. MJ | Okay. Let's see. |  |  |
| Interview Resumes |  |  |  |  |
| 09:31 | -- | [Video clip] |  |  |
| 10:33 | 87. MJ | Okay, so can you tell me a little bit about - ooh, let me stop this about your strategy for solving? First explain what Deja was explaining. And you said your group agreed that her strategy - her answer- was right? |  |  |
| 10:49 | 88. J | Mm hmm. |  | Communalism |


| 10:50 | 89. MJ | Tell us about that, and then tell me about how you solved the problem. |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 10:55 | 90. J | I can't really explain hers, cause it's like, it's like, long, but I understood it, but I can't explain it back. | Can not explain group member's strategy |  |
| 11:02 | 91. MJ | Well, okay, explain your strategy. How did you go about solving this? |  |  |
| 11:08 | 92. J | I, umm, I was - since the toppings, I mean, the pizza toppings is on the paper, I was tallying them up every time I did a combination. | Keeping track/organizing ("tallying") |  |
| 11:19 | 93. MJ | When you say tallying them off, how ... |  |  |
| 11:22 | 94. J | I - I had the sheet, then I got a sheet of paper, and I did like, pepperoni and peppers and mushroom and ... |  |  |
| 11:34 | 95. MJ | Sausage was the other one. |  |  |
| 11:35 | 96. J | Yea. |  |  |
| 11:36 | 97. MJ | Pepperoni, sausage, peppers, and mushrooms. Those were the four choices for the toppings. |  |  |
| 11:41 | 98. J | Mm hmm. |  |  |
| 11:42 | 99. MJ | Mm hmm. |  |  |
| 11:43 | 100.J | So, I did a peppers and mushrooms, then I tallied it, cause that was a combination, and then peppers and pepperoni, and then I just found them all. | Tallied means counted |  |
| 11:54 | 101.MJ | Oh. Did you actually write out the combinations? |  |  |
| 11:57 | 102. J | No. Well, at first, I did, but then, I kept on starting over cause I messed up. |  |  |
| 12:03 | 103. MJ | What do you mean, you messed up? Why did you have to start over cause you messed up? What does that mean? |  |  |
| 12:08 | 104. J | Cause ... I don't know. I was - I think I was counting them wrong. | Mathematical Inquiry (starts [counting] over to correct mistake) |  |
| 12:13 | 105. MJ | What do you mean? |  |  |
| 12:15 | 106. J | Mm ... I don't know. |  |  |
| 12:22 | 107. MJ | I think of the end, when he was still sitting at your group, Mr. Pedrick asked you, umm, how do you know you have them all? Or how do you know you didn't repeat any? Can you tell me a little bit about what you were thinking about how to answer those questions? How do you know you have them all, and how do you know you didn't repeat it? |  |  |


| $12: 43$ | $108 . \mathrm{J}$ | If you write them down. | Records to find <br> combinations, to <br> keep track, to <br> avoid repeating |  |
| :--- | :--- | :--- | :--- | :--- |
| $12: 44$ | $109 . \mathrm{MJ}$ | Ohh, so that was a strategy. You want to see them written down. |  | Strategy of writing <br> down/recording <br> combinations |
| $12: 45$ | $110 . \mathrm{J}$ | Mm hmm. | Group <br> presentations are <br> part of math class <br> activity |  |
| $12: 48$ | 111. MJ | See if you had any - okay. Umm, after the groups worked together, <br> umm, they presented the solutions. That usually happens, right? |  |  |
| $12: 59$ | $112 . \mathrm{J}$ | [Nods] |  |  |
| $13: 00$ | $113 . \mathrm{MJ}$ | Let's take a look at some of the presentations. |  |  |


| Interview Resumes |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 13:01 | -- | [Video clip] |  |  |
| 13:46 | 114. MJ | I'm gonna stop it there. So, Tyquanna, who was in your group for that day, right, she asked a question when, umm, of these presenters. What was her question? |  |  |
| 13:57 | 115. J | [no answer] |  |  |
| 14:01 | 116. MJ | That's okay! Let's - let's go back. |  |  |
| 14:02 | 117. J | I was daydreaming. |  |  |
| 14:05 | 118. MJ | Just now? Oh, no you didn't! It's okay. Okay, let's - let's let's go back a bit. |  |  |
| 14:14 | -- | [previous video clip repeated] |  |  |
| 14:37 | 119. MJ | Go back just a little bit more, cause I wanna ... Okay - were you able to see that? ... I wanna see that poster ... Right there. And Tyquanna asked, ... |  |  |
| 14:59 | 120. J | How did you get 19? I think. | Inquiry [trying to explain how mistake was handled] |  |
| 15:01 | 121. MJ | Well, what happened? What are we looking at here? What why do you think she asked that question? |  |  |
| 15:08 | 122. J | Because - he - it's across - well, it's crossed out. |  |  |
| 15:14 | 123. MJ | What happened? What's crossed out? |  |  |
| 15:16 | 124. J | The 19. |  |  |


| 15:17 | 125. MJ | 19. And they wrote 16, right? |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 15:19 | 126. J | [Nods] | Inquiry [wondering about different solution] |  |
| 15:20 | 127. MJ | So Tyquanna, who was in your group, asked the question. What did you, uh, did you have the same question? |  |  |
| 15:28 | 128. J | Uh ... yea. |  | Group member asked question |
| 15:31 | 129. MJ | Do you remember, uh, what the response was? |  |  |
| 15:35 | 130. J | I think he said cause they had - they added cheese. Well, it was a - cheese was a basic topping, but yea, I think that's what he said. | Understanding/explaining different solutions |  |
| 15:45 | 131. MJ | Umm, is there anything in your strategy that, umm, might help - that might have given you the same problem? Because apparently they had 19 and then they went to 16 . Why do you think they might have had to eliminate 3 of those? Based on your experience. Cause you were writing down combinations, right? |  |  |
| 16:12 | 132. J | [Shrug] | NOTE: Does not appear able to identify, access or compare solution strategies |  |
| 16:17 | 133. MJ | Any idea? |  |  |
| 16:20 | 134. J | [Shakes head] Mm mm. |  |  |
| 16:21 | 135. MJ | Okay. I'm gonna go past where the bell rang |  |  |
| Interview Resumes |  |  |  |  |
| 16:24 | -- | [Video clip] |  |  |
| 16:56 | 136. MJ | Did you have your hand up? I see a lot of people have their well some people have their hands up. Maria, actually [inaudible] up. Did you have your hand up? |  |  |
| 17:05 | 137. J | Mm hmm. |  |  |
| 17:06 | 138. MJ | Do you remember why you had your hand up? Did you have a question about that presentation? |  |  |
| 17:10 | 139. J | I don't know. We all had our hands up cause he asked to, umm, go get the pizzas. |  | Volunteering to get pizza lunch! |
| 17:15 | 140. MJ | Ohh. [Laughs] Ohh. Ohh. It was time to go get the pizza! Okay. Okay. Umm ... uhh ... now, here's Tyquanna's presentation. This is your ... |  |  |


| 17.31 | -- | [Video clip] |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 18:23 | 141. MJ | Okay. That's a great shot. You've got your poster solution, and you're holding it, and your face is right there. So, who was explaining your - your group's work. |  |  | Communalism [presents with group] |
| 18:33 | 142. J | Deja. |  |  | Allows group member to present |
| 18:34 | 143. MJ | Deja? And could you explain what this representation means? |  |  |  |
| 18:42 | 144. J | [Shakes head] |  |  |  |
| 18:45 | 145. MJ | This is a - how many did as a group did you decide, uh, there were? How many combinations? |  |  |  |
| 18:51 | 146. J | How many combinations? |  |  |  |
| 18:52 | 147. MJ | Mm hmm. |  |  |  |
| 18:55 | 148. J | 16. |  |  |  |
| 18:56 | 149. MJ | 16. Hmm. |  |  |  |
| 18:57 | 150. J | Mm hmm. |  |  |  |
| 19:00 | 151. MJ | So you had written out all of the combinations, so this looks like what you presented up here. |  |  |  |
| 19:05 | 152. J | Mm hmm . |  |  |  |
| 19:06 | 153. MJ | The - written out the combinations? |  |  |  |
| 19:07 | 154. J | Mm hmm. |  |  | Deja was presenting "written out" combinations for her |
| 19:09 | 155. MJ | So when Deja was explaining for your group, the answer, how did that make you feel? |  |  |  |
| 19:18 | 156. J | It made me feel, like, okay, well, since I - I really understood it when we was at the group. It really didn't make me feel [inaudible] but, umm, now I really - I can't understand it no more, cause when she was explaining it, it was kind of different from when she was explaining it at the group. | Confused | Inquiry (trying to make sense of group member's change in solution explanation) | Harmony |
| 19:36 | 157. MJ | Mm hmm . So how many were in your group? There were four in your group. |  |  |  |
| 19:39 | 158. J | Five. |  |  |  |


| 19:40 | 159. MJ | Five in your group, right? So when it came time for the presentation, and Deja talked about her strategy, did you get a chance to talk about your strategy? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 19:52 | 160. J | Mm mm . |  |  |  |
| 19:54 | 161. MJ | How did that make you feel? |  |  |  |
| 19:57 | 162. J | Umm, it made me feel okay, 'cause I really wasn't done with my strategy yet, well, with my answer. | Safe Respected (didn't feel pressured by needing more time to complete her strategy) | Writing down combinations | Harmony (allows group member to present on behalf of all) |
| 20:07 | 163. MJ | So you think you could have worked more? |  |  |  |
| 20:08 | 164. J | Mm hmm. |  |  |  |
| 20:09 | 165. MJ | You would have been willing to work more, umm, 'cause you weren't sure that you'd finished? |  |  |  |
| 20:13 | 166. J | Mm hmm . |  | Persistence [willingness to finish/find own solution] |  |
| 20:16 | 167. MJ | When it's - when you're presenting with a group, how does it make you feel? |  |  |  |
| 20:24 | 168. J | It makes me feel okay, 'cause when I'm - if I was up there alone, I would've been nervous. | Good [when presenting with group] <br> Nervous [when presenting alone] |  | Communalism [group members share presentation risks and rewards] |
| 20:31 | 169. MJ | Say that again? |  |  |  |
| 20:32 | 170. J | If I was up there alone, I would've been nervous. |  |  |  |
| 20:34 | 171. MJ | Ohh. So do you think you would - do you prefer to present with a group? |  |  |  |
| 20:39 | 172. J | Mm hmm. |  |  |  |
| 20:41 | 173. MJ | Why? Tell - tell me a little bit about that. |  |  |  |
| 20:43 | 174. J | Because, I know that Mr. Pedrick's there, but if I'm working alone, and I need help with something, I can ask one of my group members if, umm, Mr. Pedrick can't make it. And if |  |  | Communalism and Harmony [group members |


|  |  | I'm thinking a way, maybe they have, umm, another strategy <br> or another opinion about the problem, and then they could tell <br> me, and then we could work it out. Something like that. |  | support and help <br> each other by <br> taking on <br> learning and <br> teaching roles |
| :--- | :--- | :--- | :--- | :--- |
| $21: 04$ | 175. MJ | Ohh. So you like working with the groupmates, huh? |  |  |
| $21: 07$ | $176 . \mathrm{J}$ | Mm hmm. |  |  |
| $21: 10$ | 177. MJ | Okay, umm, and you said it helps you understand a little bit <br> more, you can work it out, because Mr. Pedrick sometimes ... |  |  |
| $21: 15$ | $178 . \mathrm{J}$ | Mm hmm. |  |  |
| $21: 16$ | 179. MJ | $\ldots$ gets to your group last, huh? |  |  |
| $21: 18$ | $180 . \mathrm{J}$ | Mm hmm. |  |  |
| $21: 20$ | 181. MJ | Okay. So that's a good feeling? |  |  |
| $21: 23$ | $182 . \mathrm{J}$ | Yea. | To work with a group? When you have to work alone, how <br> does that make you feel? | Lonely [when <br> working alone] |
| $21: 24$ | 183. MJ | Lonely. |  |  |
| $21: 29$ | $184 . \mathrm{J}$ |  | Communalism <br> and Harmony <br> [preference to <br> work with others <br> inferred] |  |

Interview Resumes

| $21: 43$ | -- | [Video clip] |  |  |
| :--- | :--- | :--- | :--- | :--- |
| $22: 24$ | 186. MJ | Okay, who was that presenting for that group? |  |  |
| $22: 26$ | 187. J | Shakayah. |  |  |
| $22: 27$ | 188. MJ | Shakayah? Umm ... can you describe her strategy? You <br> may or may not be able; I'm just asking. How was her <br> strategy different from yours? |  |  |
| $22: 41$ | $189 . \mathrm{J}$ | [Thinks ... long pause...] |  |  |
| $22: 56$ | 190. MJ | Or, how was her strategy the same or different from <br> yours? Either one. |  | Inquiry (trying to make sense <br> of another student's solution <br> strategy) |
| $23: 02$ | $191 . \mathrm{J}$ | Well, it's a little similar, because she took the, umm, the <br> toppings and - and she, like, I don't - I can't explain. |  |  |


| 23:19 | 192. MJ | How does it make you feel when you - when you see other groups presenting their strategies? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 23:25 | 193. J | Umm ... |  |  |  |
| 23:27 | 194. MJ | Or solutions. |  |  |  |
| 23:30 | 195. J | It makes me feel [long pause] I don't know. I don't know how to put it. |  |  |  |
| 23:42 | 196. MJ | Does it sometimes help your thinking? |  |  |  |
| 23:46 | 197. J | Mm hmm . |  | Presenting solutions helps thinking |  |
| 23:48 | 198. MJ | And do you think that's a good thing? |  |  |  |
| 23:50 | 199. J | Yes. |  |  |  |
| 23:53 | 200. MJ | How do you think you would feel if you had to work on this problem by yourself? |  |  |  |
| 24:00 | 201. J | I would feel [loudspeaker announcement] - I would feel - I would feel ... |  |  |  |
| 24:12 | 202. MJ | We got - we gotta wait cause that [inaudible]. |  |  |  |
| 24:13 | 203. J | Oh. |  |  |  |
| 24:14 | 204. MJ | Okay. |  |  |  |
| 24:15 | 205. J | I would feel slow, but I would feel like, you know, like all the groups are getting done before me. Or maybe I would have felt like fast, sort of, because people, like, it was a lot of people in my group, and they was like talking a lot and - and they was talking a lot, and maybe that just got me off track or something. | Jana is unable to use a feeling or emotion to describe how she might feel if she had to work alone on this problem. However, I believe she is describing Fear, Uncertainty, or Worry she would feel if she worked on this problem alone. | Inquiry (continuing to work on a problem even when others have found a solution) | Jana is aware that working in a group can present challenges to her learning ("...and they was talking a lot, and maybe that just got me off track or something") |
| 24:41 | 206. MJ | Are there times in math class when you, uh, when you do work by yourself to solve a problem? |  |  |  |
| 24:47 | 207. J | Yes. |  |  |  |
| 24:48 | 208. MJ | Which do you prefer? |  |  |  |
| 24:50 | 209. J | With a group. |  |  | Communalism |


|  |  |  |  | and Harmony (inferred preference above, but stated here) |
| :---: | :---: | :---: | :---: | :---: |
| 24:51 | 210. MJ | With a group. |  |  |
| 24:52 | 211. J | Mm hmm. |  |  |
| 24:56 | 212. MJ | Umm. Okay. Anything else that you remember about this particular problem? 'Cause it - you worked on it for two days, right? |  |  |
| 25:05 | 213. J | Mm hmm . |  |  |
| 25:06 | 214. MJ | Just tell me a little bit about what happened the second day 'cause I wasn't there. I was only there the first one. |  |  |
| 25:12 | 215. J | Wait - you was there the sec ... |  |  |
| 25:14 | 216. MJ | I was there - no, I was there on the first day. |  |  |
| 25:17 | 217. J | Yea. The, umm, second day, we was like just finishing up our posters and presenting stuff. And then we ate the pizza. |  |  |
| 25:25 | 218. MJ | Oh. And then you ate the pizza. How many toppings were on the pizzas that you ate? |  |  |
| 25:30 | 219. J | Cheese. |  |  |
| 25:31 | 220. MJ | Just cheese? Get out. Man. You would have thought with - for the problem, all the work you did, you would have had some toppings on there, huh. |  |  |
| 25:40 | 221. J | [Nods head] |  |  |
| 25:41 | 222. MJ | That was okay. So, when, after everyone presented and before you ate the pizza, were you satisfied that - with the work that you and your classmates did on the problem? |  |  |
| 25:54 | 223. J | Mm hmm. |  |  |
| 25:56 | 224. MJ | Can you think of any problem during math class or during the year that was similar to this problem? Any other types of problems? |  |  |
| 26:09 | 225. J | With combinations? | Identifies the pizza problem as "combination" type |  |
| 26:10 | 226. MJ | Oh. It's about combinations? |  |  |
| 26:12 | 227. J | Mm. |  |  |


| 26:14 | 228. MJ | Yea, can you think of anything else that was another type of problem that was similar that you worked on in Mr. Pedrick's class? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 26:21 | 229. J | No. |  |  |  |
| 26:22 | 230. MJ | No? |  |  |  |
| 26:24 | 231. J | I don't think ... I think we did combinations before, but it was like, like a work project. Like, it wasn't a project, it was just like a work - homework and stuff that we did. It wasn't like a project. |  | [struggles to distinguish similar problem-solving tasks, projects and homework] |  |
| 26:37 | 232. MJ | How do you feel about these kinds of problems? |  |  |  |
| 26:44 | 233. J | Mm . Sometimes they're easy, sometimes they're challenging. | Describes "project"like problems as easy or challenging but does not identify feeling |  |  |
| 26:52 | 234. MJ | Ohh. Umm, do working on these kinds of problems in math class, umm, make you think about anything that you experience outside of school, outside of Mr. Pedrick's math class? |  |  |  |
| 27:09 | 235. J | Pizza. |  |  |  |
| 27:11 | 236. MJ | Pizza? So now every time you go order a pizza, you're gonna remember - you're gonna think about this problem, huh? |  |  |  |
| 27:17 | 237. J | Mm hmm. |  |  |  |
| 27:18 | 238. MJ | Think about the different combinations. Yea? |  |  |  |
| 27:19 | 239. J | Mm hmm. |  |  |  |
| 27:22 | 240. MJ | Any other real-life situation that it makes you think of when you think of figuring out how many combinations? |  |  |  |
| 27:31 | 241. J | Mm mm . |  |  |  |
| 27:32 | 242. MJ | No? So this was an interesting problem for during class, right. During school. School mathematics. But not so much outside? |  | Unable to make real-world connection to combinationtype problems other than pizza |  |
| 27:43 | 243. J | Mm hmm. |  |  |  |
| 27:44 | 244. MJ | Can you think of any problems or activities that you did in Mr. Pedrick's class that make you think about problems outside of school? |  |  |  |


| 27:56 | 245. J | Yea, but I can't remember. |  | Unable to recall any school problems and make connection to real-world problem |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 27:68 | 246. MJ | Yea? Okay, well, maybe the next time that we talk, we can - we can talk more about that. Okay? So what do you have planned for the summer? |  |  |  |
| 28:08 | 247. J | I gotta go to summer camp. |  |  |  |
| 28:09 | 248. MJ | You're going to summer camp? What are you going to do at summer camp? Fun summer camp? |  |  |  |
| 28:13 | 249. J | Mm. |  |  |  |
| 28:14 | 250. MJ | Like, camping summer camp? |  |  |  |
| 28:16 | 251. J | No. |  |  |  |
| 28:18 | 252. MJ | Like, day camp? |  |  |  |
| 28:19 | 253. J | [Nods] |  |  |  |
| 28:20 | 254. MJ | Ohh. Okay. What kinds of things do you anticipate doing? |  |  |  |
| 28:25 | 255. J | They - I went there before for three years. |  |  |  |
| 28:30 | 256. MJ | Oh! So what kind of things do you do? |  |  |  |
| 28:33 | 257. J | We read. |  |  |  |
| 28:35 | 258. MJ | You read? |  |  |  |
| 28:37 | 259. J | And write. But we going to church today. (??) Every Friday. |  |  |  |
| 28:41 | 260. MJ | Okay. Do you get a chance to work on math problems? |  |  |  |
| 28: 45 | 261. J | Sometimes. |  |  |  |
| 28:46 | 262. MJ | Sometimes? Yea? Wow. Okay. I'd like to hear about that in September. Well, thank you for talking to us. What do you think about the year in Mr. Pedrick's math class? Does anything stand out? In particular? |  |  |  |
| 29:04 | 263. J | We get - we get a lot of projects. | Satisfied (appears well-adjusted to CMP2 and teacher routines) | Problem-solving (appears well-adjusted to mathematics community practices, and equates multi-step, multisession, multi-strategy tasks with "projects") | Communalism (uses "we" when thinking about the year's math class) |
| 19:07 | 264. MJ | You get a lot of projects? |  |  |  |


| $19: 10$ | $265 . \mathrm{J}$ | Mm hmm. |  |  |
| :--- | :--- | :--- | :--- | :--- |
| $29: 12$ | 266. MJ | Yea. Okay. Well, thank you for talking to me, J. Okay. |  |  |

## \section*{APPENDIX B2a} <br> TYANA $7^{\text {th }}$ GRADE INTERVIEW CYCLE 1

CD or DVD title: MMAF024
Description: Focus Student Interview Cycle 1
Date of Interview: 09/29/2006
Camera persons: S. Wang and R. Sigley Researcher: JVJones
Date of Verified Transcript: 02/09

| Time | Speaker | Transcript | Affective <br> Interaction Code | Mathematics Interaction Code | Social Interaction Code |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 0:00 | 1. MJ | Hi, nice to see you again, I'm Ms. Jones and I'm very interested in speaking with you today about your math experiences in Mr. Pedrick's classroom. We've been in your classroom videotaping, you've seen us there and we've looked at the video tapes and we're curious about some of the things that have gone on during the class. I'm curious about some of the things you've done and other students have done. So we'd like to ask you, is that okay with you? |  |  |  |
|  | 2. T | Yes (nodding head) |  |  |  |
|  | 3. MJ | We want you to feel comfortable, we want you to feel safe so if any time you feel uncomfortable let us know and we can stop if you want but you know its going to be videotaped and recorded and we want to make sure that's okay with you before we go on, is that okay? Okay good. Uhh just to get started, umm tell me how old you are and your full name. |  |  |  |
| 1:00 | 4. T | I'm 12 years old and my name is Tyquanna Jasper (actual identity) |  |  |  |
| 1:07 | 5. MJ | Tell me a little bit about yourself |  |  |  |
| 1:09 | 6. T | I like to do math (actual identity) |  |  |  |
|  | 7. MJ | You do like to do math? That's great! |  |  |  |
|  | 8. T | I like to eat and I'm a good jumper. (actual identity) |  |  |  |
| 1:20 | 9. MJ | And you're a good jumper! Wow! That's a very nice way of describing yourself. Thanks for sharing that. Umm... So like I said, we're going to take a look at some video clips and then I'm going to ask you some questions about those, okay? So when we watch the tape I want you to really focus on you and |  |  |  |


|  |  | what was going on and try to remember what was happening at that day and at that moment and how you felt about the math problem that you were working on. Okay? (T nods head) So really look for yourself in the video, and then we'll talk a little bit more. Okay? (T nods head) So let me show you the first clip [Plays video] |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Interview Resumes |  |  |  |  |  |
|  | 10. MJ | Okay, does that refresh your memory a little bit? Do you remember that part in the class can you tell us what was going on here? |  |  |  |
| 2:46 | 11. T | Oh well, Bryant. Bryant had his graph that confused everybody in the class because he had, he had three graphs on one paper. He wasn't supposed to do it like that, but the point is everybody was wondering why, why did he put, why did he put all his dots on the same graph. He put all the dots on that same graph and it look confusing. | curious confused | Participating (takes the speaker floor from Nammi) Questioning (graphing "dots" to represent 3 sets of data) <br> Discussing (making sense of task and math) | H (feels confused like the rest of the group) EI ("I have a good question") |
| 3:08 | 12. MJ | Okay so that's what you remember about that, uh, specific clip? Okay, good. Okay. Well let me show you another clip. |  |  |  |


| Interview Resumes |
| :--- |
|  13. MJ Alright. Tell us what was going on there. You saw yourself in <br> that clip, obviously. What's going on there?    <br> $4: 05$ $14 . \mathrm{T}$ Bryant had his dots. I was confused and I didn't know what <br> dots were correct. I raised my hand to ask him but the dots <br> were there to explain. That's what I know about what <br> happened there.    <br> $4: 17$ $15 . \mathrm{MJ}$ Did you feel comfortable asking the question about Bryant's <br> graph when he was up in the front?    <br>  $16 . \mathrm{T}$ Yes (nodding head)    <br>  $17 . \mathrm{MJ}$ Do you ask questions a lot?    <br>  $18 . \mathrm{T}$ Yeah (nodding head)    |


|  | 19. MJ | Do you think your classmates are comfortable asking questions? Cause you were asking him a question directly, so do you ask each other questions a lot? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 20. T | Yeah, in math class, yeah. |  |  |  |
|  | 21. MJ | Okay, let me show you another clip. |  |  |  |
| Interview Resumes |  |  |  |  |  |
|  | 22. MJ | Okay, do you remember that? |  |  |  |
|  | 23. T | Yeah. |  |  |  |
|  | 24. MJ | Tell us what was going on there. |  |  |  |
| 5:40 | 25. T | Bryant had these lines on his graphs and I didn't understand them. I asked Mr. Pedrick. He was over there, and he told me to go over there and ask him. So I went over there and he explained to me that - let me see. [grabs a piece of paper] He explained to me that |  |  |  |
|  | 26. MJ | Yeah, this is Bryant's graph... |  |  |  |
|  | 27. T | He said that these lines right here match up with where the number's supposed to be right there. And he was telling me that it just like, it seemed like... He has the dots, the dotted line it go across straight, and show where number would be. | Confident | Explains another student's solution | Affirms student's explanation |
| 6:07 | 28. MJ | So, when, uh, you didn't feel uncomfortable about going to him and asking him about his graph? |  |  |  |
| 6:16 | 29. T | No, 'cause I wanted to understand | Comfortable | Questions, seeks to understand by questioning another student |  |
| 6:15 | 30. MJ | Okay. And, I think we have your graph here. And can you tell us a little bit about how your graph differs from his graph? |  |  |  |
| 6:26 | 31. T | Because my, well, my graph you could see, you could see all three lines A, B and C. But with his graph, it like, it like one big graph and he didn't, he didn't even measure out, like, which one is $A$, which one is $B$, which one is C. It look confusing. If you look at my graph, you can see the lines go up, that it's not, it's connected, but they all not connected together. | Confident to 1) explain own solution, 2) compare w/another student's, and express confusion w/different graph | Compares own solution w/another student's in detail |  |
| 6:48 | 32. MJ | Do you think that both graphs might somehow be correct? Both could be ways of representing the data? |  |  |  |


| $6: 55$ | $33 . T$ | They both correct. But it's that his correct and my correct. <br> It's just his is confusing my and he, he did too much <br> decoration. | Validates differing <br> solutions to maintain <br> positive affect <br> (inferred) | Accepts different <br> graphs as correct | C explains why <br> another student's <br> graph is confusing; <br> refrains from calling <br> incorrect ("to much <br> decoration") |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $7: 04$ | 34. MJ | Too much decoration. Okay. Let's take a look at another <br> clip. |  |  |  |


| 7:35 | 35. MJ | That's what you said there. After he explained his graph, how did you feel? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 7:41 | 36. T | I felt relief. I know what he mean now. | Relief | Perceived understanding of another student's work |  |
| 7:43 | 37. MJ | Good! Can you say a little more about that, umm, when you were asking him and he was explaining? And I heard you say, "Oh!" So you felt relief, tell us why you felt relief. |  |  |  |
| 7:58 | 38. T | Because at first, at first I was confused because everybody talking and I looked over and I was like well then what are they talking about. So I went over there and started talking to him. And then he was telling that he mean that, I was like, "Oh, now I get it, now I get it." And that's all they said as he was telling me. | confusion (w/classmate's graph) | Questioning and Discussing (seeks explanation of graph from classmate) | C wanted to know "what are they talking about" |
| 8:11 | 39. MJ | Now we talked a little about how your graph differs from Bryant's graph and you showed how you went over and asked Bryant about his graph umm I just want you to talk a little bit about your data about how you went about solving your problem with the table and your graph |  |  |  |
| 8:36 | 40. T | Umm the graph [smiles and takes hold of the paper] the data the data was easy cuz all we had to do was 50 and 50 and 50 was easy to multiply and then we find all of them like that and then right here its lined up so instead of having them add up I put 350(?) but I know I made a mistake right here because its more than 350 , its 360 I didn't know I made that mistake so I designed everything like that And in Bryant's graph he had | proud (smiles, holds paper) confident kindness (offers explanation for classmate's work) | Explaining (identifies mistake and selfcorrects ("I know I made a mistake right here") | C (gives support to classmate's math idea/work explaining classmate's graph |


|  |  | the same information its just that he I think he tried to do a bar graph but made some of the corners zig zag as you can see here these lines it looks like a bar graph too |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 9:26 | 41. MJ | Did you ask him about whether he was trying to have a bar graph and a coordinate graph, do you remember that? |  |  |  |
| 9:36 | 42. T | Yea, one of the points, when I raised my hand I be like, he was in front of the class when I asked him |  |  |  |
| 9:41 | 43. MJ | So how do you feel about the work that you did on this particular task, you have your table of data and your particular graph, how do you feel about that |  |  |  |
| 9:48 | 44. T | It feel bad because I know, now that I got my table done, it's easy to line everything up because you know what number go here what number go there | [feels] bad | Explaining ("it's easy to line everything up" | Affect |
| 10:01 | 45. MJ | So is there anything else in your mind that stands out that you remember specifically about how you were feeling during those two classes when we were videotaping or during the course of the week? |  |  |  |
| 10:13 | 46. T | When I first raised my hand I was like oh my god, oh my god, what if I get something wrong. So I just blocked all the cameras [out of my mind], then I just started answering the questions and everything then I finally stopped being nervous. | embarrassment and nervousness related to videotaping cameras |  |  |
| 10:29 | 47. MJ | Well you mentioned getting things wrong, how do you feel when you get things wrong? |  |  |  |
| 10:32 | 48. T | I be feeling like oh my god, I got this wrong, they're gonna crack on me. I feel bad when I get things wrong but people read it and it's the same thing that I got wrong so I realize I realize umm well its not always right to get it right to and if you get it wrong that's your mistake and you could do it and you know what you did wrong when they explain it | [feels] bad | Discussing and Explaining (learning from "you know what you did wrong when they explain it") | Affect (perceived feelings - if classmates "crack" it would make her feel bad) <br> C (classmates response to her mistakes can make her feel bad) Expressive Individualism (she owns "that's your mistake" to learn from it) |


| 10:58 | 49. MJ | So are you feeling better about when you do make a mistake or get things wrong are you uh getting more comfortable |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 50. T | Yea, because... |  |  |  |
|  | 51. MJ | Why are you getting more comfortable? Is it because of your teacher or is it because of your classmates, or just because of you, the way that you're feeling? |  |  |  |
| 11:18 | 52. T | Yea because of both because I answer and everybody be like I agree I agree I agree and the teacher you right you right I agree with you too and that make me just feel good | [feels] good |  | C (values group support) <br> Affect (group support makes her feel good) |
| 11:29 | 53. MJ | So you think your other classmates feel the same way |  |  |  |
|  | 54. T | I think so |  |  |  |
|  | 55. MJ | Okay, so is there anything else you want to tell me about how you feel about math in math class? |  |  |  |
| 11:47 | 56. T | My math or math class? |  |  |  |
|  | 57. MJ | Both. |  |  |  |
|  | 58. T | Math, I think is a good subject because one time in life you do have to do math no matter what you doing you have to do math in brain surgery, in a store if we don't learn if we don't learn math now we never gonna learn it and when you get older you're going to be lost in the world |  | Indicates that math is learned in school ("if we don't learn math now we never gonna learn it") |  |
| 12:09 | 59. MJ | In terms of learning math now, umm you feel pretty good in your math classes? [] [] okay good, well thanks for allowing me to ask you some questions and |  | Participating (asks and answers questions |  |
|  | 60. T | nods head, yes |  |  |  |
|  | 61. MJ | ...comfortable asking questions and answering questions |  |  |  |
|  | 62. T | nods head, yes |  |  |  |
|  | 63. MJ | um I look forward to continuing to work with you |  |  |  |

## APPENDIX B2b <br> TYANA $7^{\text {TH }}$ GRADE INTERVIEW CYCLE 2

CD or DVD title: MMAF035
Description: Focus Student Interview Cycle 2
Date of Interview: 12/01/2006
Camera person: R. Sigley Researcher: M. Dunn
Transcriber: Victor Lau, Date of Verified Transcript: 2/2/07

| Time | Speaker | Transcript | Affective Interaction Code | Mathematics Interaction Code | Social Interaction Code |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 0:02 | 1. MD | Hi, Tyana. |  |  |  |
| 0:02 | 2. T | Hi. |  |  |  |
| 0:03 | 3. MD | My name is Mrs. ... and I'll be interviewing you today. I'm really pleased to meet you. Um, as you know, we've been videotaping in the classroom- |  |  |  |
| 0:11 | 4. T | Yeah. |  |  |  |
| 0:11 | 5. MD | And, uh, I'm a little curious about some of the things I've seen you doing, uh, what you have to say is really important to us and we want to make sure that you feel comfortable and that you feel free to express your opinions openly. |  |  |  |
| 0:25 | 6. T | Mm-hmm. |  |  |  |
| 0:25 | 7. MD | Okay? Uh, first I want to start off with really easy, general questions. And then we're going to watch video clips and talk about them, okay? |  |  |  |
| 0:33 | 8. T | (nods) |  |  |  |
| 0:35 | 9. MD | Sounds okay to you? |  |  |  |
| 0:35 | 10. T | Mm-hmm. |  |  |  |
| 0:36 | 11. MD | Now we are videotaping today, that's okay? |  |  |  |
| 0:36 | 12. T | Yeah. |  |  |  |
| 0:36 | 13. MD | Yes? Okay. Alright, um, now I know they asked you these questions at your last interview, but I didn't get to hear them. So uh, uh, tell me what your name is. |  |  |  |
| 0:47 | 14. T | My name is Tyana. |  |  |  |
| 0:50 | 15. MD | Okay, how old are you, Tyana? |  |  |  |
| 0:52 | 16. T | Twelve. |  |  |  |


| $0: 53$ | $17 . \mathrm{MD}$ | Twelve, and what grade are you in? |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $0: 54$ | $18 . \mathrm{T}$ | I'm in the seventh. |  |  |
|  |  | (bell) |  |  |
| $1: 01$ | $19 . \mathrm{MD}$ | Why don't you tell me something about yourself? Now you told me <br> you're an expert jump-roper? Yeah? |  |  |
| $1: 03$ | $20 . \mathrm{T}$ | (nods) |  |  |
| $1: 06$ | $21 . \mathrm{MD}$ | You have anything you want to tell me about that? You want to tell <br> me something else? |  |  |
| $1: 08$ | $22 . \mathrm{T}$ | I can do lots of tricks. | Pride (in jump rope <br> tricks) |  |
| $1: 09$ | $23 . \mathrm{MD}$ | Yeah? Okay, tell me something. |  |  |
| $1: 13$ | $24 . \mathrm{T}$ | Like, criss-cross, hopping around, do the heal-toe. |  |  |
| $1: 20$ | $25 . \mathrm{MD}$ | Cool, do you guys still, um, say things? While you're jumping? |  |  |
| $1: 26$ | $26 . \mathrm{T}$ | We say, it's, it's called Sleeping booty, instead of beauty. |  |  |
| $1: 29$ | $27 . \mathrm{MD}$ | Yeah? Do you want to recite it or you don't? you don't have to do <br> something- |  |  |
| $1: 34$ | $28 . \mathrm{T}$ | It's like, like, let me think, I forgot it. |  |  |
| $1: 38$ | $29 . \mathrm{MD}$ | Okay, okay, I can't remember anymore, they used to say how many <br> kisses you get or something, anyway for younger kids. Okay, um, so, <br> let's get started with the videotapes. Okay? We're going to watch a <br> clip? And then we can talk. Okay? |  |  |
| $1: 53$ | $30 . ~ T$ | Okay. |  |  |
| $1: 54$ | $31 . ~ M D$ | Alright, let's see, now these are short, so if you want to see them a <br> second time that's okay, oh no, why did it get small again? It was <br> fine five minutes ago. |  |  |


| Interview Resumes |
| :--- |
|       <br> $3: 03$ $32 . ~ M D$ Okay, do you remember that?    <br> $3: 03$ $33 . ~ T$ Yeah.    <br> $3: 03$ $34 . ~ M D$ Yeah? Can you tell me about it? What was going on?    <br> $3: 08$ $35 . ~ T$ Um, we first came into class and then uh, I forgot my, uh, I forgot <br> my paper in my friend's locker, and I went to go get it, because I <br> wanted that one because of what I had I liked it, so I was getting <br> back, and he was like print another one so I got happy again. happy she could <br> use her own paper <br> [picture for math <br> activity]   <br> $3: 24$ $36 . ~ M D$ Ah, so you felt happy once he let you get another one? Okay, um, <br> how do you feel about the fact that he let you go up to the computer    |



| 5:34 | 47. MD | So you laughed a lot through that. |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 5:36 | 48. T | Yeah. Because, before, and like, like, like two weeks ago, ...so yesterday she was like, ... but I was like she's not really timing... so then Samiyah was like I know, I know, I know, I know, Samiyah was like yeah, she has to time me, before she gets back, because, it was, it was crazy. |  |  |
| 6:09 | 49. MD | Yeah? Yeah? Okay, um, so, so about the work you were doing there, uh, did you enjoy the work you were doing there? |  |  |
| 6:17 | 50. T | Oh yeah, yeah because, all I had to do was put dots and coordinates. | Describes plotting coordinates [as dots] |  |
| 6:25 | 51. MD | Okay, so, and you enjoyed doing that? |  |  |
| 6:27 | 52. T | Mm-hmm. |  |  |
| 6:27 | 53. MD | Yeah? Okay, and you thought it was easy, |  |  |
| 6:29 | 54. T | Yeah. |  |  |


| 6:31 | 55. MD | Okay, do you know, tell me about the coordinates. What were you going to do with the coordinates when you're finished? |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 6:35 | 56. T | I, Mr. Pedrick was saying that pick the dots any way you want, but then, but then he said it was going to be hard. Because he said, ...when I make the graph you've got to name the coordinates, so I was thinking it was mad hard, but then I stopped doing that and I put it on that. | explains/understands using coordinates to make graph |  |
| 6:53 | 57. MD | Oh, you did this instead. |  |  |
| 6:54 | 58. T | Yeah, I traced it right here. |  |  |
| 6:54 | 59. MD | Okay. |  |  |
| 6:58 | 60. T | And then I traced it right here right down to there. I measured all this and I had to draw on a big poster, because, because, all I had to do was, um, add it up. | explains how she traced to scale up picture (calls it "measured") |  |
| 7:07 | 61. MD | Okay, okay, um, so you switched your ...? From there to there? I think we got a clip of him talking to you about that. Let's see if we can get a quick look. I guess we'll look at it. Um, this time, this time I understand what I'm doing here. <br> [Plays video] |  |  |
| Interview Resumes |  |  |  |  |
| 7:54 | 62. MD | So at that point, did you understand what Mr. Pedrick wanted you to do? |  |  |
| 7:56 | 63. T | Yeah. |  |  |
| 7:58 | 64. MD | Yeah? |  |  |
| 8:00 | 65. T | He was saying, he was saying for two ...so he was saying put it up, put it up, I forgot what this is called again. |  |  |
| 8:10 | 66. MD | Transparency? |  |  |
| 8:10 | 67. T | Yeah, transparency, on the overhead. So, so, all we have to do is measure, and they first told me to put it on each of the pictures on the overhead, and trace it on that. | explains how to use overhead and trace projection |  |
| 8:21 | 68. MD | Ok, how was it like working with Naomi and Samiyah and Heather? Was that okay? |  |  |
| 8:28 | 69. T | Yeah, yeah, yeah, because they're like my three close friends. |  | Communalism (glad to be working with female friends) |


| $8: 33$ | 70. MD | Oh, are they? |  |  |
| :--- | :--- | :--- | :--- | :--- |
| $8: 33$ | $71 . \mathrm{T}$ | Yeah, they be in my group all the time, but you know Quadree tried <br> to get to, get to work with... |  |  |
| $8: 41$ | $72 . \mathrm{MD}$ | That's Kevin? |  |  |
| $8: 41$ | $73 . \mathrm{T}$ | Yeah. |  |  |
| $8: 41$ | $74 . \mathrm{MD}$ | Okay, but you already know Samiyah and Naomi pretty well. |  |  |
| $8: 47$ | $75 . \mathrm{T}$ | Mm-hmm. |  |  |
| $8: 49$ | 76. MD | Okay, that worked out well. Okay, alright, so, now, um, I want to go <br> to the next clip, okay? And talk, before we talk about this, because <br> Mr. Pedrick talks to you about it, um- <br> [Plays video] |  |  |

## Interview Resumes

|  |  | (watches clip) |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 9:21 | 77. T | We're looking at that? |  |  |
| 9:21 | 78. MD | Yeah, |  |  |
| 9:41 | 79. MD | Okay, that was short, do you need to see it again? Or do you remember it? |  |  |
| 9:43 | 80. T | I remember it. |  |  |
| 9:43 | 81. MD | Okay, so tell me about that, um, |  |  |
| 9:47 | 82. T | I put it on this, and he was like, this right here, |  |  |
| 9:55 | 83. MD | Uh-huh. |  |  |
| 9:55 | 84. T | This right here is six inches. |  |  |
| 9:55 | 85. MD | Right. |  |  |
| 9:55 | 86. T | So I was like, I was like, yeah, so what happened was, so, um, so that's when he was like, small paper, it's right here. this small paper right here, I was like I don't know, before I get the sum, |  |  |
| 10:04 | 87. MD | Okay. |  |  |
| 10:06 | 88. T | I've got to measure these right here, and then I added these all up, and see you had to write something about what you're changing. | tries to explain measuring to get |  |
| 10:20 | 89. MD | Okay, okay, now he asked you, what's that question he asked? He pointed to this and he asked a question. | new scale |  |
| 10:27 | 90. T | That was four inches. |  |  |
| 10:30 | 91. MD | This one was four? No, this was six, right? |  |  |
| 10:30 | 92. T | Yeah. |  |  |
| 10:33 | 93. MD | Alright, and, and then, what did he ask about it? |  |  |
| 10:38 | 94. T | He said, the inches were like, it's, it's, it's like on this, and I'm like I |  |  |



| 12:24 | 113. MD | You think, can that give you any idea, does that give you any idea of what the scale factor might be? |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 12:34 | 114. T | Six and a half by ...might be two. Because six, because six, divided by two equals three and one and a half and you're splitting one and a half, that's what I was thinking, in my opinion. |  |  |
| 12:47 | 115. MD | Okay. What about this little line here. I don't have a clip about it, but he was telling you to put an inch here and then did you do it here? |  |  |
| 12:55 | 116. T | Yeah, yeah, yeah, but, I drew it a little bit bigger because like on the screen, it was bigger. |  |  |
| 12:58 | 117. MD | Right. Right, right, so, what, just the rest of it, right? |  |  |
| 13:02 | 118. T | Yeah. |  |  |
| 13:02 | 119. MD | So, that one was an inch, and how long was this? |  |  |
| 13:05 | 120. T | It was four inches. |  |  |
| 13:05 | 121. MD | It was four inches. Does that give you any kind of idea of how much the scale factor might be? |  |  |
| 13:12 | 122. T | I don't know, because he came out of the blue and he was like ...what you mean? So I'm still waiting to see what the inch means. |  |  |
| 13:24 | 123. MD | Ah, okay, so you, are you looking forward to finishing - | tries to explain |  |
| 13:30 | 124. MD | So does it matter to you like he asked you this question about a six and a one and a half. And do you want, when he asked you, did you understand what he asked? I think I asked that already. | measuring to get new scale |  |
| 13:41 | 125. T | I, I don't even know. I, I think I know, this is my opinion, because he was saying, he was probably thinking that if this is six, then this is three, but the five, it wasn't, that wasn't what I had. |  |  |
| 13:55 | 126. MD | So, if this was six and this was three, would that tell you something about the scale factor? |  |  |
| 14:02 | 127. T | I, I would think it's going up by twos, because, that was six, this was three, and I'm thinking about the two , six divide by two, which is three. |  |  |
| 14:11 | 128. MD | Okay. So if this was three and this was six, you think, you think the scale factor was two? |  |  |
| 14:15 | 129. T | Mm-hmm. | tries to explain |  |
| 14:15 | 130. MD | Okay. Okay, but it wasn't, huh? It was one and a half. | measuring to get |  |
| 14:18 | 131. T | Yeah. | new scale and |  |
| 14:18 | 132. MD | Yeah. So then, but maybe you can pick another one, like this one, it's, um, hmm, try to find one that might be, hmm, this one's one | coordinates |  |



| Interview Resumes |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 15:51 | 141. T | You had to pick that? (not sure what she's saying) |  |  |  |
| 15:51 | 142. MD | Yeah. Well, yeah. I don't mean to embarrass you, I just picked that one because you seemed to be having a good time. You know, there are a lot of clips up there where you're very serious and working really hard, and there you're working but you're also having a good time. So, um, how did you feel about it all day long? You spent a lot of time at the projector, and you did a lot of work. Was that, how did you feel about that? |  |  |  |
| 16:12 | 143. T | I felt, I felt it was free time. | embarrassed [because she calls class time "free time] |  | Communalism (enjoys working with classmates) |
| 16:14 | 144. MD | It was free time? Yeah? How was it free time? |  |  |  |
| 16:17 | 145. T | Because usually, Mr. Pedrick would say you all can't use my projector without my permission, so he was, he was just like, open up the projector and I was like what? I'm thinking like something's wrong, something's wrong, but ... so I was happy I had the projector. | surprised [that she and classmates are using the teacher's equipment] | uses overhead projector as math tool |  |
| 16:38 | 146. MD | Oh, so you had a chance to work with the projector. I see. I see. Um, did you work alone through most of this when you were at the projector? |  |  |  |
| 16:48 | 147. T | Yeah. |  |  |  |
| 16:48 | 148. MD | Yeah? Did Mr. Pedrick come by you a few times too? |  |  |  |


| 16:50 | 149. T | Yeah, he came to ask questions. Even she came by to ask a question. |  | answers questions from teacher (and researcher) |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 16:53 | 150. MD | And ask questions? Yeah? Yeah? Any of the other students come and look at yours? |  |  |  |
| 16:59 | 151. T | Nammi and Shaniyah did. And they pointed out... you could do it that way, and I'd just be like oh, alright, but theirs is obviously better than mine. I think theirs was better than mine. |  | listens to others math ideas and what classmates say about her work | Communalism |
| 17:13 | 152. MD | What was their idea? |  |  |  |
| 17:14 | 153. T | They were saying that, how my, uh, how this right here, here, sometimes, ...it'd be two and a half. |  |  |  |
| 17:26 | 154. MD | Oh, okay, that sometimes it may be a little different. |  |  |  |
| 17:28 | 155. T | Yeah. Samiyah was telling me that you've got to pick the best one, |  |  |  |
| 17:36 | 156. MD | Best ruler? |  |  |  |
| 17:37 | 157. T | Best measure like, look at this, this is not two, it can't be two, so, |  | thinks about finding best math tool to use |  |
| 17:44 | 158. MD | Okay. Okay, yeah you have to be careful in making your measurements accurate, is that the idea? Alright. Um, how did you feel about, you know, doing most of these on your own, compared to when you did it in a group? Did you like it better or you like working alone sometimes than working with a group sometimes? How do you feel about that? |  |  |  |
| 18:02 | 159. T | Sometimes I like working alone. |  |  |  |
| 18:04 | 160. MD | Sometimes you do? |  |  |  |
| 18:04 | 161. T | Mm-hmm. |  |  |  |
| 18:04 | 162. MD | Why is that? |  |  |  |
| 18:07 | 163. T | Because I'm doing my own work. La, la. Doing my own work, having a good time, laughing and stuff. So, well, in a group, they go like, Tyana be quiet, be quiet while I work. I'm like, oh my God, I'm thinking like Oh my God, well I can work alone. | Disappointed [that classmates are bothered by her/think she talks too much] |  | Communalism sometimes classmates are bothered by Tyana's talkativeness |
| 18:26 | 164. MD | Ah. Okay, um, hmmm, alright, I'm trying to think of anything else. Is there anything else you can tell me about this? What do you plan |  |  |  |


|  |  | to do the next time you get together when you work on this project? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 18:41 | 165. T | I'm going to, what I'm going to do, I'm just going to add these up, and then find similarities and stuff. |  | uses math terms (similarity) |  |
| 18:47 | 166. MD | Alright, alright so let's, hmm, don't have a pencil, what you said, you said the big one was a hundred and... |  |  |  |
| 18:54 | 167. T | And three. |  |  |  |
| 18:54 | 168. MD | And three. Okay, So what if, I'm going to use this pencil. Do we have time? We've got a couple minutes. Okay, so, let's, let's, have you done any of the adding up there? |  |  |  |
| 19:06 | 169. T | (shakes head) Mm-mm. |  |  |  |
| 19:06 | 170. MD | Alright, so that's going to be 103. |  |  |  |
| 19:10 | 171. T | Mm-hmm. |  |  |  |
| 19:11 | 172. MD | Let's say, the little one was about 50,51 , something like that. Does that, what do you think the scale factor would be? |  |  |  |
| 19:25 | 173. T | I, I think, like, like I think it'd be like, like, I think it'd be like one half or one third or something like that. |  | tries to figure a problem out |  |
| 19:35 | 174. MD | From what, so one half meaning from, from, little to bigger. |  |  |  |
| 19:39 | 175. T | For 50, because, a hundred, half a hundred is fifty. |  |  |  |
| 19:44 | 176. MD | Okay. Okay. |  |  |  |
| 19:46 | 177. T | See, this would be a three, so the two's the factor. |  |  |  |
| 19:52 | 178. MD | Okay, yeah, and you know you probably made a little bit of an error in your measurement, because it's not nice and straight? |  |  |  |
| 19:56 | 179. T | Mm-hmm. |  |  |  |
| 19:56 | 180. MD | So that's why I'm kind of, playing with numbers a little bit. What if the number was 25 ? Not 50 but you know that's 103 . What if this was about 25 ? What do you think the scale factor would be? |  |  |  |
| 20:10 | 181. T | I don't know. | puzzled | Admits that she doesn't know but seems curious |  |
| 20:11 | 182. MD | Think about money. Like 25 cents and 100, |  |  |  |
| 20:14 | 183. T | Oh, by 4. |  |  |  |
| 20:14 | 184. MD | Okay. |  |  |  |
| 20:16 | 185. T | Because four quarters equals a dollar. I love money. |  |  |  |
| 20:18 | 186. MD | Yeah, I love money too. Okay, so then the scale factor would be 4, so now, let's take a look, so you added it all up, you think you could take just a piece of the picture and get the same idea? What if this |  |  |  |



| 22:09 | 213. T | Like, like show it to the whole class. | happy |  | Verve [likes to "perform" when sharing math ideas and solutions |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 22:11 | 214. MD | Yeah? |  |  |  |
| 22:11 | 215. T | I, I think I've got the best one. |  |  |  |
| 22:12 | 216. MD | You've got a good one. I really like it, and it'd be interesting to see what you come up with, um, when you're finally finished. You have to write something? Just writing? |  |  |  |
| 22:23 | 217. T | We probably have to do something about how fun it was, and something like that. |  |  |  |
| 22:29 | 218. MD | Uh, and you're looking forward to that? Do you like the writing? |  |  |  |
| 22:31 | 219. T | Mm-hmm. |  |  |  |
| 22:32 | 220. MD | You do? Good! That's real good. |  |  |  |
| 22:36 | 221. T | Because, because, we write about what we did, |  |  |  |
| 22:38 | 222. MD | Mm -hmm. |  |  |  |
| 22:38 | 223. T | It was like two pages long to me, because I, it's something like, yeah, we did that, it was crazy. |  | Writing about math |  |
| 22:44 | 224. MD | Okay, very good, okay, alright, well I don't want to make you late for class. So, I think we're done. I thank you very much, and we really learned a lot from talking to you today, okay? |  |  |  |
| 22:57 | 225. T | Mm-hmm. |  |  |  |

## \section*{APPENDIX B2c} <br> TYANA $7^{\text {th }}$ GRADE INTERVIEW CYCLE 3

CD or DVD title: MMAF Affect Study Cycle 3 Tyquanna interview
Description: Focus Student Interview Cycle 3
Date of Interview:
Researcher: JVJones, Alice Alston
Transcriber: Hana Wilenchik

| Time | Speaker <br> Move |  | Transcript | Affective <br> Interaction | Mathematical <br> Interaction |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $28: 59$ | $1 . \quad$ MJ | So I missed that... But I was able to see you all on videotape. <br> So I'm back and of course I was here the first day, um, of <br> taping. And um, we talked about it and we found some <br> interesting clips. So, like before, we are going to show you a <br> clip and ask you some questions about it, ask you how you <br> feeling, ask you if you could remember what you were <br> thinking. Okay? So just for the record for the video camera <br> can you just tell us who you are, and how old you are, and <br> how much you like me. No, I'm only kidding. Just do your <br> name. |  |  |  |
|  | $2 . \quad$ T | Hello. My name is I'm Tyquanna Jasper. I'm 12 years old. <br> [actual identity] |  |  |  |
| $29: 42$ | $3 . \quad$ MJ | Geez, were we running a race? Can you say it a little bit more <br> slowly? And you know I'm just teasing you because I know <br> you from 5 ${ }^{\text {th }}$ grade that's why! |  |  |  |
| $29: 54$ | 4. | T | Hello. My name is Tyquanna Jasper and I'm 12 years old. <br> [actual identity] |  |  |
| $29: 58$ | 5. | MJ | Okay, alright. So you were working with this uh, Play-Doh, <br> and sphere, spheres, and cylinder concepts... |  |  |
| $30: 08$ | 6. | T | Mmhmm. |  |  |
|  | 7. | MJ | Mor two days this week and saw some interesting things that <br> I would like to ask you about. So I am going to show you this <br> video clip and see if you can remember what was going on. <br> [Plays video] |  |  |

Interview Resumes

| $31: 21$ | $8 . \quad$ MJ | Okay, I am going to stop it there. So you <br> remember when Mr. Pedrick was opening up <br> the uh, uh... |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $31: 25$ | $9 . \quad$ T | Yeah. |  |  |  |
| $31: 24$ | $10 . \mathrm{MJ}$ | f..uh, the lessons. And uh, what do you <br> remember about that? |  |  |  |
| $31: 30$ | $11 . \mathrm{T}$ | (inaudible) so it all came together. So um, Mr. <br> Pedrick said, that, Mr. Pedrick that, that um we <br> gonna do 5.4 and then my favorite buddy was <br> like I thought, I thought we doing Play-Doh. <br> And he's like we are we are! (inaudible) We <br> gonna do the best and stuff like that (inaudible) <br> We sat and added the powder effect. | excited about math activity <br> and materials [Play-Doh] | anticipated math activity | Communalism <br> [working with "favorite <br> buddy"] |
| $31: 51$ | 12. MJ | Oh! Had you never played uh, you never made <br> play-Doh before? You never done anything like <br> that in Mr. Pedrick's class before? |  |  |  |
| $31: 58$ | $13 . \mathrm{T}$ | No this, this was the first time.  <br> $32: 00$ 14. MJFirst time? Okay. So, alright that was um, <br> opening up the class. Um, let's take a look at.... <br> [Plays video] |  |  |  |

Interview Resumes

| $33: 00$ | 15. MJ | I'm going to stop it there and go back to <br> another piece. But what, what was happening <br> there? Do you know? |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $33: 04$ | $16 . \mathrm{T}$ | Mmmmm (as in no). |  |  |  |
| $33: 05$ | 17. MJ | What was going on? (T shakes head no). <br> Nothing you...? Okay, let's take a look at... <br> [Plays video] |  |  |  |


| Interview Resumes |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $33: 54$ | 18. MJ | Can you tell us uh, what was going on there? <br> This um...because I was there that day, this was <br> the first day, and um, there was some <br> nicknames and... |  |  |  |
| $34: 05$ | $19 . \mathrm{T}$ | Yeah we got... |  |  |  |
| $34: 06$ | 20. MJ | Maybe there was some name calling. So tell me <br> what was nickname and tell me what was name |  |  |  |


|  |  | calling. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 34:06 | 21. T | (inaudible) You might not get it? But like... |  |  |  |
| 34:12 | 22. MJ | Why because I'm old? No. No. |  |  |  |
| 34:14 | 23. T | Because like, we first thought of names in science class, beginning of science. I'm called the shrimp. (Inaudible). So, like so, so, they they, they took it over though. It was for one day but then they were all raging and doing it for every class (inaudible) but only for like one period at a time. And they say like, everyday like, "You that, you that" and then go on and on. And they give teachers nicknames too. |  |  | describes use of name calling among classmates |
| 34:42 | 24. MJ | Oh really? So how does that make you feel? |  |  |  |
| 34:47 | 25. T | It's funny. Like, it's not like you gotta get bad about it because they ask you, they be like, "Would you, would you get mad if we called you this?" And, and, and if you say "Yeah" they don't like (inaudible). But if you playing along with the game. They, they, say it. | amused |  | Believes name calling is "play" |
| 35:02 | 26. MJ | Have you ever gotten mad at anything? Or have you every said "No you can't call me that?" |  |  |  |
| 35:06 | 27. T | Mmnmm (as in no). |  |  |  |
| 35:07 | 28. MJ | No? |  |  |  |
| 35:07 | 29. T | I only get mad uh. I only get mad (inaudible). I was taking a test. And, and they like, "Shrimp!" and I was like "Stop, stop. (inaudible) I'm taking a test!" And that's when they stopped. | angry/annoyed with name calling while taking a test | focused on math test [wanted to do well] |  |
| 35:18 | 30. MJ | Oh, so sometimes. How, how do the names make you feel? Like. Explain to me again, do the nicknames change. They can change? |  |  |  |
| 35:28 | 31. T | Like, like you have a, a spe, specific name. Like say that you act like whatever, it would be like that. But the name, like, we, we we be playin, we be playin. Like, like name that recognize your head or something. Like they call Carla <br> "Egg" because she got the egg head. And then, |  |  |  |

$\left.\begin{array}{|l|l|l|l|l|l|}\hline & & \begin{array}{l}\text { it's like, like, names like it's nothing to be, it's } \\ \text { nothing to be ashamed about it's just that. Like } \\ \text { you got a name. It's just that you got a name. } \\ \text { Like, like if it's a cracker name people you be } \\ \text { like. People don't get mad they add on ways. }\end{array} & & \\ \hline 35: 56 & 32 . \text { MJ } & \begin{array}{l}\text { Oh, okay. Well that's, that's good to hear } \\ \text { because um, I didn't know exactly what was } \\ \text { going on because some people use the term } \\ \text { nickname, because they are nicknames? }\end{array} & & \\ \hline 36: 06 & 33 . \text { T } & \text { Yeah. } & & \\ \hline 36: 07 & 34 . \text { MJ } & \begin{array}{l}\text { So, um, it's not that you are being called a } \\ \text { name? It's a nickname that you say? }\end{array} & & & \\ \hline 36: 14 & 35 . \text { T } & \begin{array}{l}\text { It's not, it's not, it's a nickname, but it's like, } \\ \text { it's like a cracker name. It's like, "You ugly". } \\ \text { Like, "Shutup Janae". Like, we be playin'. }\end{array} & & \begin{array}{l}\text { Verbal bantering with } \\ \text { each other is a teasing } \\ \text { game - not meant to }\end{array} \\ \text { hurt but making } \\ \text { someone feel bad does } \\ \text { happen (see 41.T } \\ \text { below) }\end{array}\right\}$

| $36: 51$ | 46. MJ | No? Okay, um, we have, I have another clip <br> that um, I wanted to ask you about. Uhh. |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $37: 11-$ <br> $37: 14$ | VIDEOCL <br> IP | (Plays a few seconds, wrong clip) |  |  |  |
| $37: 15$ | 47. MJ | Oh, oh no. Sorry. |  |  |  |



| 40:59 | 61. T | I think, that like, like, seeing that area and volume are the same because volume there were four-dimensional shapes the whole number and area there, there, for 2-dimenstion shapes. Two, two, dimensional shapes. (inaudible) And they different. They different because you are dealing with two different shapes and then but they the same, whole number. So my opinion, I think they is, but they not. Like, they got two (inaudible). |  | uses knowledge to try to explain area and volume |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 41:25 | 62. MJ | Could you, as you are describing the shapes, could you, maybe we want to get a record of this. Could you draw um, some 2-dimensional shapes that you can find the volume for? And explain how you would do that? |  |  |  |
| 41:38 | 63. T | Hmmm. Be like... (Camera zooms in to her drawing). Hold up. Like, like, a rectangle. |  |  |  |
| 41:59 | 64. MJ | Mmhmm. |  |  |  |
| 41:59 | 65. T | And then, and then, you measure the sizes. Measure that size, measure that size. And then, like, like, like, have one side over here, one side over here, one side over here. Like say this side 4 , this side 4 , this side 3 , this side, 3 . And then expalin, 4,4 times 4 is 16 and 3 times 3 is 9 . And you divide 9 by 16 . |  | uses drawing to help explain understanding and thinking |  |
| 42:19 | 66. MJ | Mmhmm. |  |  |  |
| 42:20 | 67. T | And for, this for the area. And for the volume. I'm still working on that. | confused | acknowledges that she is "still working" on understanding volume |  |
| 42:25 | 68. MJ | You still working on it, meaning, you still thinking about what it means for the volume? |  |  |  |
| 42:29 | 69. T | MMhmm. |  |  |  |
| 42:29 | 70. MJ | Okay. Can you. You said how you would, um, compute the area, can you just write that down. How you would find the area of the rectangle you drew? |  |  |  |


| 42:39 | 71. T | 3 times 16.3 times 9 . Think. (counting using her fingers). Wait, let me think. (Continues to count with fingers). Hold on, think. Hold on. |  | tries to figure out answer and explain |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 43:20 | 72. MJ | Okay, what, if you don't want to go ahead with the computation You can just write how you would figure it out. So... |  |  |  |
| 43:27 | 73. T | I'll add... |  |  |  |
| 43:28 | 74. MJ | You wrote, you wrote 16 there. |  |  |  |
| 43:30 | 75. T | Yeah. |  |  |  |
| 43:31 | 76. MJ | 16 represents what? 16 what? |  |  |  |
| 43:33 | 77. T | 16,16 , represents 4 times 4. |  |  |  |
| 43:38 | 78. MJ | Okay, um, so you multiplied 4 times 4 and those are two sides of the rectangle. |  |  |  |
| 43:43 | 79. T | Yeah, 4 times 4 gives you 16. Oh, oh no. Wait, that ain't right. I'm confused. You got 3 times 3 equals 9 . And then you times 6 by 9 to get the area. That's how, that's how I do it. | confused | Persistent in trying to understand and explain with drawing |  |
| 44:00 | 80. MJ | And that's how you shown there. |  |  |  |
| 44:02 | 81. T | Yeah, four... |  |  |  |
| 44:02 | 82. MJ | I just want to make sure that if, if, I want to explain your drawing to somebody else I know what you said, even though it's on the tape. Okay, so would you label any of those numbers? You have 16 here, 16 what? |  |  |  |
| 44:16 | 83. T | Is, 1 (muttering). This could be, what's this called? Like, like, the sizes. I don't know how to label it. If I could answer it, then Mr. Pedrick. If I could answer it or whatever, (inaudible). And he, he, explain it to us on the board. |  | Tries to figure out but relies on teacher to help her [with explanation on the board] |  |
| 44:32 | 84. MJ | Okay, so you are talking about area in this one. And so, if you were to explain volume, what's different about volume, from area, or is there is any difference? |  |  |  |
| 44:45 | 85. T | It's different because volume is a (inaudible) like, like. He said, he said in class, like. Like a |  |  |  |


|  |  | hexagon, one of them, we talk about size. But, but we do it, we do it, we still working on it. (inaudible) |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 45:02 | 86. MJ | Okay so it sounds like sometimes you really don't have the words for it. |  |  |  |
| 45:06 | 87. T | Yeah. |  | [acknowledges] lack of math vocabulary to help explain what she knows or thinks she knows |  |
| 45:06 | 88. MJ | Like you are thinking something, and you don't really know what to say. Eh, sometimes that happens. Um, I would like to... unless Dr. Alston has something, any additional questions on this? She might want to ask. |  |  |  |
| 45:24 | 89. AA | Let me see the picture. Can I see the picture you drew? So this was, this was $3 \ldots$ |  |  |  |
| 45:32 | 90. T | Yeah. |  |  |  |
| 45:33 | 91. AA | And this was? |  |  |  |
| 45:34 | 92. T | Four. |  |  |  |
| 45:35 | 93. AA | Uh huh, And the area was 4. |  |  |  |
| 45:37 | 94. T | I didn't find the area. |  |  |  |
| 45:39 | 95. AA | Yeah, but. But... |  |  |  |
| 45:40 | 96. T | I just, I just explain to her. I, I have to draw it. |  | Relies on drawing/picture to help explain thinking |  |
| 45:43 | 97. AA | Can you tell me what the number for the area would be? |  |  |  |
| 45:45 | 98. T | 4 times 4 is 16. |  |  |  |
| 45:47 | 99. AA | Usually, it's 3 times 4 times 16. |  |  |  |
| 45:50 | 100.T | 4 times 4 is 16 , I think. |  |  |  |
| 45:52 | 101.AA | Plus 3 times 4. |  |  |  |
| 45:55 | 102. T | No I did it like, like, the sizes. Like. Eight times the sizes. |  |  |  |
| 46:00 | 103. AA | But it's still not 16 . How in the world did you get 16 from those numbers? |  |  |  |
| 46:04 | 104. T | 4 times 4.4 times 4 is 16.3 times 3 is 9 . And |  |  |  |


|  |  | you drop off the area. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 46:10 | 105. AA | Oh. That's very... |  |  |  |
| 46:12 | 106. T | Or, or, you could do it like, four times 3. |  |  |  |
| 46:14 | 107. AA | That's what. I'm, I'm, I'm, I'm. Um, it could have been four times 3 which was what I thought were talking about earlier. But, I still don't understand what you are counting. What do you talk about when you talk about area? |  |  |  |
| 46:25 | 108. T | Like, you talk about area, like, like, you trying to find the size of the shapes. Like, say, say you got graph paper right? |  | Refers to graph paper as tool in explanation |  |
| 46:32 | 109. AA | Uh huh. |  |  |  |
| 46:33 | 110. T | And you got, you got, 4 going down. |  |  |  |
| 46:32 | 111. AA | Yep. |  |  |  |
| 46:34 | 112. T | 3 across. And (inaudible) |  |  |  |
| 46:36 | 113. AA | What do you mean 4 what going down into 3? |  |  |  |
| 46:38 | 114. T | Like, like, you have graph paper. |  |  |  |
| 46: | 115. AA | I wish we had some. But you can, you can pretend. |  |  |  |
| 46:45 | 116. T | You got graph paper. |  |  |  |
| 46:47 | 117. AA | Mhmm. |  |  |  |
| 46:50 | 118. T | You got 1, 2...3, 4, |  |  |  |
| 46:52 | 119. AA | Ohhh. |  |  |  |
| 46:52 | 120. T | 3, 4. 5... |  |  |  |
| 46:54 | 121. AA | 5 , that's 5 . |  |  |  |
| 46:55 | 122. T | Yeah, you got 5 going down. |  |  |  |
| 46:56 | 123. AA | Mmhmm. |  |  |  |
| 46:57 | 124. T | And you got... |  |  |  |
| 47:00 | 125. AA | Mmmhmm. |  |  |  |
| 47:03 | 126. T | 1, 2, 3, 4, 5, 6, 7. |  |  |  |
| 47:03 | 127. T | And you then you got 5 going down, 7 going across. And, and, that would be 35 . And, and, and that would be area. | confident | Understands area as product of length and width of 2-D object |  |
| 47:08 | 128. AA | Oh. Oh. Show me the rest of them I want to see that 35 . Because I think, I think that's what Ms. |  |  |  |



| 48:36 | 155. T | Hmmm? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 48:36 | 156. AA | If you got the answer, would that be the area... |  |  |  |
| 48:39 | 157. T | Yeah. |  |  |  |
| 48:39 | 158. AA | [area] of the floor? |  |  |  |
| 48:42 | 159. AA | That really helps me. Well now, suppose it were, not. Can you only find the area of the rectangle? |  |  |  |
| 48:51 | 160. T | Mmnnmm (as in no). You can find areas of a lot of things. But, it will take time. |  |  |  |
| 48:54 | 161. AA | What other kinds of things can you find? |  |  |  |
| 48:56 | 162. T | Like hexagons, stuff like that. But we still working on that. Sometimes... |  |  |  |
| 49:00 | 163. AA | You are still working on that? |  |  |  |
| 49: | 164. T | Sometimes, sometimes, but sometimes I be, I be getting confused on that. | [acknowledges] confusion |  |  |
| 49:03 | 165. AA | Yeah. And so you were saying something about dimensions? How many dimensions are the, there in these things you were making? |  |  |  |
| 49:10 | 166. T | Like, like you got two dimensions. Like two, two dimensions like triangles, squares. Like, like, like the small shapes. But the... |  |  |  |
| 49:17 | 167. AA | The flat... |  |  |  |
| 49:19 | 168. T | Yeah, but the big shapes like, like a lot of sizes. That's 3-dimensional. |  |  |  |
| 49:22 | 169. AA | What do you mean? |  |  |  |
| 49:23 | 170. T | Like |  |  |  |
| 49:23 | 171. AA | Give me, give me a shape that has three dimensions. |  |  |  |
| 49:27 | 172. T | Let's see. Ah, an oxagon. |  | Tries to use math language |  |
| 49:31 | 173. AA | An octagon? |  |  |  |
| 49:32 | 174. T | I think, I think that's a 3-dimensional. |  |  |  |
| 49:34 | 175. AA | Or an octagon? |  |  |  |
| 49:35 | 176. T | I, I...octagon (inaudible) |  |  |  |
| 49:36 | 177. AA | How many sides does an octagon have? |  |  |  |


| 49:38 | 178. T | I think eight. | unsure [of answer] |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 49:40 | 179. MJ | Mmhmm. |  |  |  |
| 49:42 | 180. T | I don't know about that. |  |  |  |
| 49:44 | 181. MJ | Eight is one of my favorite numbers. I always remember OCTagon, 8 . |  |  |  |
| 49:47 | 182. T | Let me see what (inaudible). I can't draw. |  |  |  |
| 49:49 | 183. AA | They don't have to be all the same. They can just... |  |  |  |
| 49:51 | 184. MJ | Yeah, you can sort of... |  |  |  |
| 49:53 | 185. T | I want |  |  |  |
| 49:53 | 186. MJ | Yeah, it's more like a sketch. |  |  |  |
| 49:54 | 187. T | Ughhh (as in annoyance). | Frustrated | Tries to make drawing/picture to help explanation |  |
| 49:56 | 188. MJ | It has... |  |  |  |
| 49:56 | 189. T | 1, 2, 3, 4, 5, 6, 7, 8. |  |  |  |
| 50:00 | 190. AA | Yeah, and then make them straight. |  |  |  |
| 50:01 | 191. T | Yeah. |  |  |  |
| 50:02 | 192. AA | That's a good way to make an octagon. Because then if you go like that (drawing a line on her paper that attaches T's lines). You see what I'm saying? |  |  |  |
| 50:5 | 193. T | Go over here, go over here, go over here. And you go... |  |  |  |
| 50:12 | 194. AA | Yeah, and the straight is either (inaudible). Okay. But that has 3-dimensions? Isn't that still flat? |  |  |  |
| 50:22 | 195. T | Oh yeah. So it'll probably be like, a pictagon wouldn't it? |  | Tries to use math vocabulary [mixes up pictograph and octagon?] |  |
| 50:32 | 196. T | I forgot. |  |  |  |
| 50:34 | 197. MJ | Five. |  |  |  |
| 50:34 | 198. T | Five. |  |  |  |
| 50:35 | 199. AA | If you go like that. Like a house. |  |  |  |
| 50:41 | 200. MJ | A stop, a stop sign. Hexagon. But aren't they still all falt? |  |  |  |


| 50:43 | 201. AA | I think, it's not an octagon. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 50:48 | 202. T | Yeah. |  |  |  |
| 50:49 | 203. AA | (inaudible) |  |  |  |
| 50:51 | 204. T | I'mma look around. |  |  |  |
| 50:53 | 205. AA | Do you see anything around here that has 3dimensions? |  |  |  |
| 50:55 | 206. T | A box. |  |  |  |
| 50:58 | 207. AA | Why? |  |  |  |
| 51:01 | 208. T | Because a box not flat. |  | Real-life example and explanation of understanding 3-D object |  |
| 51:04 | 209. AA | That really helps me. So it's hard to draw a box isn't it? Because you have to draw it like you imagine it. (T draws box) So that's your, you imagination of a box. |  |  |  |
| 51:26 | 210. T | I mean that's a box that's 3-dimensional. |  |  |  |
| 51:27 | 211. MJ | So can you find the area of a box? That box? Or the box you drew? |  |  |  |
| 51:32 | 212. T | I don't think so. It'd, it'd probably be hard. (inaudible) It'd probably take time, like the whole day. Well not the whole day but like an extra (inaudible) | unsure of ability | reluctant to try to use picture to find answer |  |
| 51:42 | 213. MJ | So do you think you can find the volume of a box? |  |  |  |
| 51:46 | 214. T | Yeah, I think so, you could. |  |  |  |
| 51:51 | 215. MJ | Does this rectangle have volume? |  |  |  |
| 51:53 | 216. T | Mmm. I, I, I, don't know that. But as I was growing up they used to use these as areas. Like, as the area of stuff. Like that... |  |  |  |
| 52:02 | 217. MJ | Mmhmm. Mmhmm. So umm, I think it's interesting that you drew a circle and split it up into eight and then used those to help you get the sides. Um, so can find the area of a circle? |  |  |  |
| 52:18 | 218. T | No. Cause how, how, how do you find the area. I think a circle is 360 , right? | unsure of answer | Refers to what she knows about circles [360 degrees] |  |



|  |  | about when you say I want to find the volume of that box? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 53:46 | 234. T | I think, I think, like volume of a box, like you measure, like you get a ruler, you measure the sizes. |  | Refers to ruler as tool to measure length |  |
| 53:51 | 235. AA | Yeah, but what are you talking about? I mean, what is it that you, you are counting? You told... |  |  |  |
| 53:56 | 236. T | You're measuring. |  |  |  |
| 53:57 | 237. AA | You told me that when you found the area you are measuring the number of squares in it. |  |  |  |
| 54:00 | 238. T | Mmhmm. |  |  |  |
| 54:01 | 239. AA | When you find the volume, what are you measuring, or what are you counting? |  |  |  |
| 54:06 | 240. T | I mean, that's a hard question. I never, I never thought of that. | unsure [of what researcher's question] | is unable to refer to 3-D unit measure for volume |  |
| 54:09 | 241. AA | You really never did? Well. What, when, when, when we had a box like this, what's different from the box, the 3-dimensional thing and the flat thing? What's the difference? |  |  |  |
| 54:26 | 242. T | Because the flat, the flat, the flat, it stays flat when the box sit down. |  |  |  |
| 54:31 | 243. AA | What's the difference though? I mean, you got an inside don't you? |  |  |  |
| 54:34 | 244. T | Yeah, and it, and it, you the inside. |  |  |  |
| $\begin{aligned} & 54: 37- \\ & 54: 40 \end{aligned}$ | $\begin{aligned} & \text { (VIDEOCL } \\ & I P) \\ & \hline \end{aligned}$ | (PEDRICK says a few words) |  |  |  |
| 54:40 | 245. MJ | Sorry. |  |  |  |
| 54:41 | 246. AA | Okay, we'll talk about that tomorrow. |  |  |  |
| 54:46 | 247. T | What time is it? |  |  |  |
| 54:50 | 248. AA | You have another, what do you get out at 12:35? |  |  |  |
| 54:53 | 249. T | Yeah. 12, 12:34. |  |  |  |
| $\begin{aligned} & \hline 55: 01- \\ & 55: 07 \end{aligned}$ | $\begin{aligned} & \text { (VIDEOCL } \\ & I P) \\ & \hline \end{aligned}$ | (Clip plays for a few seconds). |  |  |  |


| $55: 07$ | 250. MJ | Sorry about that. That's not the right one. <br> Fourth from the bottom. Let's see if it is this <br> one. |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $55: 18$ | (VIDEOC <br> LIP) | (Clip plays for a few seconds |  |  |  |
| $55: 27$ | 251. T | We saw this one already. |  |  |  |
| $55: 28$ | 252. MJ | This one we saw this already? |  |  |  |
| $55: 30$ | $253 . \mathrm{T}$ | You said fourth from the bottom? |  |  |  |
| $55: 33$ | 254. MJ | This is the third from the bottom. |  |  |  |
| $55: 39$ | $255 . \mathrm{T}$ | Oh. |  |  |  |
| $55: 43$ | 256. MJ | Okay I think we did talk about this. Because <br> Naomi said that she thought volume and area <br> are the same thing. And that's how we started <br> talking about this. But you... <br> [Plays video] |  |  |  |

Interview Resumes

| Interview Resumes | 257. MJ | Okay, so that is sort of what we were talking <br> about. Um, so, do you think Dyquanna <br> understood your explanation? |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $57: 35$ | $258 . \mathrm{T}$ | Mmhmm. |  |  |  |
| $57: 36$ | 259. MJ | Do you agree with her explanation, the way, <br> she |  | Communalism <br> [acknowledges <br> classmate's <br> explanation] |  |
| $57: 39$ | $260 . \mathrm{T}$ | Yeah. |  |  |  |
| $57: 40$ | 261. MJ | I. was saying. Do you think it helped your <br> thinking during in class? When you were <br> talking about um, volume and area. Did it help <br> your thinking um, to listen to Naomi, to listen <br> to... |  |  |  |
| $58: 01$ | $262 . \mathrm{T}$ | Oh yeah because, they were like, like, they <br> were saying stuff, getting like. (inaudible). <br> They were saying the same different. <br> (inaudible). I got it right. |  | Communalism [says <br> she understands <br> classmate's <br> explanation] |  |
| $58: 11$ | 263. MJ | And how did that make you feel? |  |  |  |


| 58:13 | 264. T | Like I knew something. | Proud/smart [feels like she knows something] |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 58:14 | 265. MJ | So during the discussion of um, volume and um, area. You felt good? |  |  |  |
| 58:20 | 266. T | Mmhmm. |  |  |  |
| 58:21 | 267. MJ | Were there any types when you felt puzzled or didn't quite understood what was going on? |  |  |  |
| 58:27 | 268. T | One time, one time we were doing this problem and then he called on me and I was like, I think, I think I got it wrong. |  |  |  |
| 58:34 | 269. MJ | Oh, a problem doing one of these? |  |  |  |
| 58:36 | 270. T | I think one of those. But it was like back. And I got it wrong. We all got it wrong. They all be like in the beginning of the school year. (Inaudible) they give me a problem and I got it wrong. But, as I got it wrong, someone, someone else got it right so I wrote it down, that problem equals that. So next time, if it's the same problem, I can get it right and explain it. | Confident [in ability to learn from mistakes] | Believes that mistakes (her own and others) are part of learning math |  |
| 58:58 | 271. MJ | I think we talked about that the first time that we sat down and, and talked. |  |  |  |
| 59:02 | 272. T | Oh we did? |  |  |  |
| 59:03 | 273. MJ | Yeah. Have, have your feelings changed, since then? |  |  |  |
| 59:10 | 274. T | Not really. Like, um. Like, like, if I don't know the problem now, if I don't get the problem, I raise my hand, I raise my hand, I raise my hand now and say "I don't get it". If I do get it, I raise my hand for the answer. |  | engages in math inquiry and asks questions when she doesn't know or understand |  |
| 59:26 | 275. MJ | Mmhmm. Okay, um, I actually, um, in that same thought um, in how you feel, and how you work, anything. Working with your other students, with your other classmates, in your group specifically. You were working with um, your group with Naomi, and... |  |  |  |
| 59:48 | 276. T | Naomi... |  |  | Communalism [works |


| $59: 49$ | 277. MJ | Um. |  |  |
| :--- | :--- | :--- | :--- | :--- |
| $59: 50$ | 278. T | Naomi, Patrice |  |  |
| $59: 52$ | 279. MJ | Um, Patrice. |  |  |
| $59: 52$ | 280. T | And Maria. Not Maria, Dyquanna. |  |  |
| $59: 52$ | 281. MJ | Dyquanna, Dyquanna, right, right. Okay, so I with other <br> students] <br> have a little piece from that one, that if you <br> don't mind. |  |  |
| $1: 00: 04$ | 282. AA | I am going to get back upstairs for about five <br> minutes. And we are not going to do <br> (inaudible). |  |  |


| Plays Video Clip |  |  |
| :--- | :--- | :--- |
| $1: 00: 52$ | 286. MJ | Okay, that is the wrong one. I need day two. <br> Um, Can you cut...? |

NOTE: VIDEOTAPING IS STOPPED FOR 1:06 MINUTES AND RESUMES WITH VIDEO CLIP BEGINNING 1:01:58


|  |  | put it into the thing and then cut it, and then you measured, we measured it and something like that. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1:02:58 | $\begin{aligned} & \hline 293 . \\ & \text { MJ } \end{aligned}$ | Oh okay, so you all, you ladies were working pretty good together, you were sharing, there was no um, problem with that? |  |  |  |
| 1:03:06 | $\begin{aligned} & 294 . \\ & \mathrm{T} \end{aligned}$ | And we had the best clay in the class! | Pride [in making materials for math activity] | Communalism (pride in group |  |
| 1:03:08 | $\begin{aligned} & \hline 295 . \\ & \text { MJ } \end{aligned}$ | Oh (laughs) okay. Let me show you another piece of the same. This was a little bit later, um, very soon after. |  |  |  |
| 1:03:26 |  | (CLASS BELL BEEPS) |  |  |  |
| 1:03:30 | $\begin{aligned} & \hline 296 . \\ & \text { MJ } \end{aligned}$ | It'll be okay, it'll be okay. Just, I, I want you to take a look at this. |  |  |  |
| 1:03:34 | $\begin{aligned} & 297 . \\ & \mathrm{T} \\ & \hline \end{aligned}$ | No, I got lunch. I was mad. |  |  |  |
| 1:03:38 | $\begin{aligned} & \hline 298 . \\ & \text { MJ } \\ & \hline \end{aligned}$ | What happened there? |  |  |  |
| 1:03:39 | $\begin{aligned} & 299 . \\ & \mathrm{T} \\ & \hline \end{aligned}$ | I was mad. Because I was trying to make a sphere and they, and they took it from me? |  |  |  |
| 1:03:44 | $\begin{aligned} & \hline 300 . \\ & \text { MJ } \end{aligned}$ | What did they take from you? |  |  |  |
| 1:03:45 | $\begin{aligned} & \hline 301 . \\ & \mathrm{T} \end{aligned}$ | The clay. And and they, they said, they said I wasn't doing it right. And I was. | annoyed [because group members said she was wrong] |  |  |
| 1:03:49 | $\begin{aligned} & \hline 302 . \\ & \text { MJ } \\ & \hline \end{aligned}$ | And just to describe what you did, you made a sphere that fit right into the cylinder. |  |  |  |
| 1:03:54 | $\begin{aligned} & \hline 303 . \\ & \mathrm{T} \end{aligned}$ | Yeah. |  |  |  |
| 1:03:55 | $\begin{aligned} & 304 . \\ & \text { MJ } \end{aligned}$ | And then what happened? |  |  |  |
| 1:03:56 | $\begin{aligned} & \hline 305 . \\ & \mathrm{T} \end{aligned}$ | And they, they took it from me! |  |  |  |
| 1:03:57 | $\begin{aligned} & 306 . \\ & \text { MJ } \end{aligned}$ | They took it? Why'd they take it? |  |  |  |
| 1:03:59 | $\begin{aligned} & 307 . \\ & \mathrm{T} \\ & \hline \end{aligned}$ | I don't know, they said I wasn't doing it right. But I thought I was doing it right. | confused and annoyed [because |  |  |


|  |  |  | she thought she was right] |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1:04:02 | $\begin{aligned} & \hline 308 . \\ & \text { MJ } \end{aligned}$ | And how did that make you feel? |  |  |  |
| 1:04:04 | $\begin{aligned} & 309 . \\ & \mathrm{T} \end{aligned}$ | Sad. | Sad | Maintained group cohesion even after group made her feel bad by taking clay and telling her she "wasn't doing it right". |  |
| 1:04:09 | $\begin{aligned} & 310 . \\ & \text { MJ } \end{aligned}$ | And just sad? Anything else? |  |  |  |
| 1:04:12 | $\begin{aligned} & 311 . \\ & \mathrm{T} \\ & \hline \end{aligned}$ | I wanted to snatch it back but I didn't. |  |  |  |
| 1:04:16 | $\begin{aligned} & \hline 312 . \\ & \text { MJ } \end{aligned}$ | Um, anything else you remember about what was going on there? Because uh like you said, all you ladies had clay. |  |  |  |
| 1:04:24 | $\begin{aligned} & \hline 313 . \\ & \mathrm{T} \\ & \hline \end{aligned}$ | We, we, we (inaudible) to make a sphere. |  |  |  |
| 1:04:26 | $\begin{aligned} & 314 . \\ & \text { MJ } \end{aligned}$ | Hmhmm. Okay. Um, anything about the two days that you remember that you want to mention or say specifically, or stood out in your mind? Because remember the first day you were making the clay (bell rings, inaudible). Anything mathematical that you learned or thought about? |  |  |  |
| 1:04:49 | $\begin{aligned} & 315 . \\ & \mathrm{T} \end{aligned}$ | Yeah, I learned, I learned, I learned how to work with others. |  |  |  |
| 1:04:52 | $\begin{aligned} & \hline 316 . \\ & \text { MJ } \\ & \hline \end{aligned}$ | To do what? |  |  |  |
| 1:04:52 | $\begin{aligned} & 317 . \\ & \mathrm{T} \\ & \hline \end{aligned}$ | To, my, to, to work, to work with another person. I usually work by myself, but now. |  |  |  |
| 1:04:56 | $\begin{aligned} & 318 . \\ & \text { MJ } \end{aligned}$ | Even in Mr. Pedrick's class? |  |  |  |
| 1:04:58 | $\begin{aligned} & \hline 319 . \\ & \mathrm{T} \\ & \hline \end{aligned}$ | Yeah, I used to work by myself. But now, but now.... |  |  |  |
|  |  | (END OF INTERVIEW) |  |  |  |

## \section*{APPENDIX B2d} <br> TYANA $7^{\text {th }}$ GRADE INTERVIEW CYCLE 4

CD or DVD title: MMAF055
Description: Focus Student Interview Cycle 4 (prior to NJAsk7)
Date of Interview: 03/01/2007
Camera person: S. Wang, R. Sigley; Researcher: JVJones
Transcriber: P. Zimmerman; Date of Verified Transcript: 02/09

| Time | Speaker | Transcript | Affective <br> Interaction Code | Mathematical Interaction Code | Social Interaction Code |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 0:07 | MJ | We're ready. |  |  |  |
| 0:11 | 1. MJ | Good morning. |  |  |  |
| 0:12 | 2. T | It's good to see you again, Tyquanna. And you know, I wasn't here the last time that they videotaped. So we're going to be looking at these clips for the first time at the same time, OK? So um, I'd like to show you a clip and if you could look at it and try to remember as much as you can and then describe what's going on. OK? [Plays video.] |  |  |  |
| 2:04 | 3. MJ | So, does that help refresh your memory? |  |  |  |
| 2:06 | 4. T | Yeah. |  |  |  |
| 2:07 | 5. MJ | Tell me about what was going on there. |  |  |  |
| 2:10 | 6. T | <KwaDri?>, <inaudible> and I couldn't find <inaudible> wrong so I was like, 2 times 4 is not 6 . So then <inaudible> and then Mr. Pedrick came over. He thought I was copying and I wasn't copying. I was doing this work. And then he <inaudible> she copy, she copy, she copy. | Annoyed, confident [in her own math work] | focused on completing math task |  |
| 2:33 | 7. MJ | But you weren't copying? Right, OK. I want you to, if you could because I was just sort of amused at what was going on, too, because I hadn't see it before. And you seem to be amused. But could I just ask one favor? Could I ask you to take the gum out? You don't mind, do you? All right, thanks. |  |  |  |
| 2:54 | 8. T | You know that <inaudible> go to like this. |  |  |  |
| 2:57 | 9. MJ | So tell me about the work. What's going on here? I see, I see coordinates and then I see graph paper. So what's -- |  |  |  |
| 3:03 | 10. T | Yes, this <inaudible> we had to fill in the numbers like we had | confident [in what | explains her work |  |


|  |  | to do like negative 4 times 2 equals negative 8 . We had to do like for each one, the <inaudible> rule. Adding the - we had to graph it, you had to use the coordinates that we did right here and make a mug. | she did] |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 3:22 | 11. MJ | And make a what? |  |  |  |
| 3:23 | 12. T | A mug. |  |  |  |
| 3:24 | 13. MJ | A mug? A mug like a coffee mug? |  |  |  |
| 3:28 | 14. T | No, like a <inaudible> mug. |  |  |  |
| 3:30 | 15. MJ | Like a who mug? |  |  |  |
| 3:32 | 16. T | We have names - just call them mug... |  |  |  |
| 3:36 | 17. MJ | Oh. So I mean it looks like a picture. It looks like an unfinished picture. What is it going to look like? This is a finished picture? |  |  |  |
| 3:43 | 18. T | No. See, Mr. Pedrick, like this, like this, I do one of these |  |  |  |
| 3:52 | 19. MJ | You have a, yeah, that's, were you working with a group? |  |  |  |
| 3:53 | 20. T | Yeah. This. This is <inaudible>. This is, this is the wrong one, too. You got this one, this one. It's the wrong sheet because we had - he messed up so we had to do it all over again. |  |  |  |
| 4:15 | 21. MJ | Who messed up? |  |  |  |
| 4:16 | 22. T | Pedrick. So -- |  |  |  |
| 4:18 | 23. MJ | Oh, how did he mess up? With the coordinates you mean? |  |  |  |
| 4:20 | 34. T | Yeah, we had to add stuff in and then he made another coordinate so he printed out a whole new sheet. He printed out a whole new sheet to do this. This is the wrong one. | pleased, proud | [recognized that Mr. P. had made mistake plotting coordinates] | Communalism [interacts as valued member of math learning community] |
| 4:30 | 25. MJ | OK, so if you were given these coordinates and then you had to figure out what these were? |  |  |  |
| 4:35 | 26. T | Yeah but for this one we did but the other one with Pedrick, Mr. Pedrick and my friend <inaudible> they did it on the computer. All they printed out, all we had to do was graph on a grid. |  |  |  |
| 4:48 | 27. MJ | OK so you took your coordinates from here and came out with this picture? |  |  |  |
| 4:51 | 28. T | Yeah. |  |  |  |
| 4:52 | 29. MJ | So what was going on with the paper you were copying from? Or just looking at. I won't say copying because you said you weren't copying. |  |  |  |


| 5:02 | 30. T | <Kwadri>, I was like Kwadri, let me see your paper. <inaudible> see any mistakes. We had a group you get one. I was like Kwadri had a mistake but <inaudible> didn't get all the way up here, he was already down there. So I was like Kwadri, that's wrong. <inaudible> and everything Mr. Pedrick came over here. You're copying. And I kept telling him, I wasn't copying. He's the only one copying. He said I was copying when I wasn't copying. I go over his answers. | annoyed/disappointed | Trying to explain to a group member/ understand another student's work |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 5:29 | 31. MJ | So the pictures look different? That's how you knew? |  |  |  |
| 5:31 | 32. T | Yeah. |  |  |  |
| 5:32 | 33. MJ | It was different? |  |  |  |
| 5:32 | 34. T | Like here, like this side he, his way up, his way out here somewhere. But everybody gets in the middle like that. But he's way over here. |  |  |  |
| 5:42 | 35. MJ | So what did you find that was different? Did you find that a particular set of coordinates that were different? |  |  |  |
| 5:46 | 36. T | Yeah, like a number like, he multiplied two times. Like he did, so he got 4 times 2 . He got 4 times 2 it was, equals 8 . He did another time, 2 times 8 is 16 . He was doing like that. But no can do like that. He got all wrong and I told him he was wrong. |  | Challenging a student's strategy |  |
| 6:04 | 37. MJ | Oh. So how did that make you feel? |  |  |  |
| 6:07 | 38. T | Smart. |  |  |  |
| 6:09 | 39. MJ | Smart? How so? |  |  |  |
| 6:10 | 40. T | Because I told him and <inaudible> right. |  | Correcting another student |  |
| 6:14 | 41. MJ | How do you think he felt? |  |  |  |
| 6:15 | 42. T | Crazy. |  |  |  |
| 6:20 | 43. MJ | This, I have one more clip from that day that we were going to look at and see what you think. Actually let's finish up this clip. [Plays video.] |  |  |  |
| 6:40 | 44. MJ | OK so -- [video clip continues for :09] |  |  |  |
| 6:49 | 45. MJ | So how did it make you feel when Mr. Pedrick thought you were copying? |  |  |  |
| 6:53 | 46. T | Like he probably thought that I copied because on that day I was tired. So he <inaudible> copied so I could get my work done. But I did my work, I did not copy. | Tired, annoyed |  |  |


| 7:04 | 47. MJ | Does that happen often when you come into class maybe tired or with an attitude? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 7:10 | 48. T | I put my head down. I'll do my work but after I do my work while he's talking, I put my head down. I'll probably go to sleep. Then I wake up and I fall into the lunch part. | Tired, annoyed |  |  |
| 7:19 | 49. MJ | So you like to work in the class, even though sometimes you're tired or have an attitude? OK. Let's see what else went on. This is that same day. [Plays video.] |  |  |  |
| 8:04 | 50. MJ | So what was going on there? |  |  |  |
| 8:07 | 51. T | Because I did all of them, I did all of them, but I put them in the wrong place. I was getting frustrated so I give up, I give up. I kept, I put <inaudible> all four in the wrong place. I had too many 4s. I had <inaudible> Kwadri <inaudible> look. I said oh, I give up, I give up. And Mr. Pedrick came over. He was like, <inaudible> answer like that. And I had to do it all over again |  | Acknowledging mistake Self-correcting |  |
| 8:30 | 52. MJ | At one point you said you give up, but that really wasn't - do you feel like that a lot, like giving up? |  |  |  |
| 8:37 | 53. T | Yeah but I, you have to do but I still keep working. |  | Perseverance |  |
| 8:41 | 54. MJ | You still keep working? Um, tell me about how you felt that day. Was it a typical day? |  |  |  |
| 8:49 | 55. T | I mean it was like <inaudible>. |  |  |  |
| 8:51 | 56. MJ | It's like a what? |  |  |  |
| 8:52 | 57. T | <inaudible>. I came in with an attitude, but I showed them my attitude. Because when I have an attitude, I keep it <inaudible> and then Kwadri <inaudible> aggravated. I give up, I give up, I give up. But then he <inaudible> again. | Aggravated | Encouraged another student |  |
| 9:12 | 58. MJ | So it was typical in the way you feel in math class? |  |  |  |
| 9:15 | 59. T | Yeah, sometimes. |  |  |  |
| 9:17 | 60. MJ | You said sometimes. What was different about it? |  |  |  |
| 9:24 | $61 . \mathrm{T}$ | It's just that like he was over there telling me something. <inaudible> over there. I was getting frustrated. I was like, I was like y'all leave me alone. But that's <inaudible> kept talking but I blocked them out. | Frustrated | Trying to understand multiple strategies |  |
| 9:39 | 62. MJ | So sometimes you feel frustrated when different people are telling you different things? |  |  |  |
| 9:42 | 63. T | Yeah. |  |  |  |


| 9:46 | 64. MJ | How did your work that day, what you were doing, compare to your regular class? Is it, was there anything unusual at all? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 9:54 | 65. T | No because last, because we did most of them last time. But we did it on the a <inaudible> piece of paper. We did five of them and we had to pick our best one, put them up. Like this right here? This right, it's the same thing we did the day before. But we're doing four of them of the same thing. |  |  |  |
| 10:12 | 66. MJ | Can you say a little bit more when you say, but this time you did four of them? |  |  |  |
| 10:17 | 67. T | I think you're doing four, not like four but I think maybe some opposite this way that way because he say he say it will be more when it's graphed. So I'll try to figure out what he mean. |  | Trying to understand graph |  |
| 10:29 | 68. MJ | So do you think you know what he means now? Do you usually have a graph that goes all over? |  |  |  |
| 10:36 | 69. T | No. Usually |  |  |  |
| 10:37 | 70. MJ | What's different about this graph? These coordinates? |  |  |  |
| 10:41 | 71. T | No. This is the same. There's this, like usually we have like one big graph. We would have equal parts like that. |  |  |  |
| 10:51 | 72. MJ | When you say equal parts, what do you mean? |  |  |  |
| 10:52 | 73. T | We have <inaudible> we just have one graph. One whole graph instead of having <inaudible>. Usually we have there's a line right here, a line right here. We have a line between. |  |  |  |
| 11:07 | 74. MJ | Oh, I see. So I think what you're saying is usually you have this part of the graph -- |  |  |  |
| 11:12 | 75. T | Yeah. |  |  |  |
| 11:12 | 76. MJ | -- where it's all positive numbers? |  |  |  |
| 11:15 | 77. T | Yeah. |  |  |  |
| 11:16 | 78. MJ | And so these coordinates were different because why? |  |  |  |
| 11:20 | 79. T | Because those are negative numbers. |  |  |  |
| 11:22 | 80. MJ | Oh, and that was the first time you worked with coordinates with negative numbers, when you were graphing? |  |  |  |
| 11:27 | 81. T | Um-um. It was like a second time. |  |  |  |
| 11:31 | 82. MJ | How do you feel about graphs that have negative numbers on them? |  |  |  |
| 11:36 | 83. T | I thought it was, I thought it was fine, like because I'm learning new stuff. | Pleased, curious [to learn] |  |  |


| 11:44 | 84. MJ | Oh, so some of it was new, working with the negative coordinates? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 11:47 | 85. T | Yeah at first. But not the last. First I was confused. He explained it. I said oh. Then I got it. | Confused, relieved | Trying to understand |  |
| 11:54 | 86. MJ | And now you feel differently? You feel better about it? |  |  |  |
| 11:57 | 87. T | Yeah. |  |  |  |
| 11:59 | 88. MJ | You know there's, can I ask you some questions about the test coming up? There's a test in, what, next week? |  |  |  |
| 12:04 | 89. T | Yeah. |  |  |  |
| 12:05 | 90. MJ | Or the week after? No next week. |  |  |  |
| 12:06 | 91. T | Next week. |  |  |  |
| 12:08 | 92. MJ | How do you feel about that? |  |  |  |
| 12:11 | 93. T | Huh...I feel... I don't know how I feel. |  |  |  |
| 12:15 | 94. MJ | What do you know about the test? Can you tell me what you know about the test? |  |  |  |
| 12:204 | 95. T | It's called the NJ Ask. But <inaudible> NJ Ask but <inaudible> called GEPA. A four-part test. Like it's ELA, it's ELA, math, and sometimes it's social studies and science into it. But it's two days of math, two days of <inaudible> it's four days. And then I think because last year, last year we had like we come at 2:30 when <inaudible> and when you come in, everybody goes home. The <inaudible> testing don't let them go home this year. Everybody in the whole school testing the same. Same day. |  |  |  |
| 12:49 | 96. MJ | So this test is different from other tests that you've taken during the year? |  |  |  |
| 12:52 | 97. T | Yeah. Because this is a big test. |  |  |  |
| 12:55 | 98. MJ | The big test? What do you mean? |  |  |  |
| 12:57 | 99. T | Like, like this is the test for the year just to show what you learned and what you need more to learn for next year. |  |  |  |
| 13:07 | 100. MJ | Oh, OK. Um, what has Mr. Pedrick told you about the test? Anything? |  |  |  |
| 13:13 | 101. T | He, I don't think he's worried about it but like us be nervous because like our teachers they <inaudible> you got to learn this. Mr. Pedrick, he's teaches what he was teaching. |  |  | Appreciates that Mr. P. has confidence in her |
| 13:24 | 102. MJ | Oh, so that was different than what your other teachers... |  |  |  |


| 13:27 | 103. T | Yeah. Because my teachers, they'd be like, test coming up so we got to go over this, go over that. Mr. Pedrick say, if we know, if we look and pay attention while he was talking and stuff, doing work, we should have no problem. But if you weren't paying attention, you might have a problem. |  | Recognizes that engagement in math class helps her to learn and prepare for test |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 13:41 | 104. MJ | How does that make you feel? |  |  |  |
| 13:42 | 105. T | I felt <inaudible> but then again, like I'm looking at what he's talking about. I hear what he's saying like later on in the day, like when he was saying <inaudible> I understand. | confident | engages during math class, thinks about math learning outside of math class |  |
| 13:56 | 106. MJ | So you don't think Mr. Pedrick's classes have changed any? It's pretty much what you would normally do? Or is it different? |  |  |  |
| 14:05 | 107. T | No, I don't think it's different. I think it's the same. |  |  |  |
| 14:12 | 108. MJ | Do you do anything special to prepare for the test? Are you doing anything special? |  |  |  |
| 14:16 | 109. T | Study. I study -- |  |  |  |
| 14:19 | 110. MJ | Are you studying differently? |  |  |  |
| 14:20 | 111. T | Yeah. We <inaudible> skip to but now <inaudible> the test's coming up so I just she's like go study for that test. Thirty minutes studying. I take 30 minutes a day for the test. <inaudible> like I take like all my old work that I had before and I add them up and I was like, I erased my answers and do it over. To see <inaudible>. I know <inaudible> stuff. |  | uses additional study time to prepare for test |  |
| 14:53 | 112. MJ | Um, in Mr. Pedrick's class, you work a lot with other, with your classmates. Group works and sometimes with one other partner, sometimes in a group. How does that make you feel? Which way do you prefer to work? By yourself or in a group? |  |  |  |
| 15:07 | 113. T | I like working in a group but it's the same particular person <inaudible> messes up I'm like <inaudible> he said my group, he add <inaudible>so I asked Mr. Pedrick he switched my other friend with him. Because I couldn't take it. Like I <inaudible> because he just aggravating like, like all he do is copy off of people. <inaudible> he get mad. |  |  | Communalism [likes working in groups, with friends] |
| 15:35 | 114. MJ | But you're used to working in a group in Mr. Pedrick's right? |  |  |  |
| 15:37 | 115. T | Yeah. |  |  |  |


| 15:38 | 116. MJ | Now you know on the day of the test, you're going to have to be working alone. Do you prefer to work alone? How do you feel about working - having to work alone during the test? |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 15:48 | 117. T | I work alone because I don't have my group copying my work, then they're going to get grade for my work. |  | recognizes importance of individual ability on tests |  |
| 15:57 | 118. MJ | Oh, that's interesting you should put it that way. Because remember back in one of these clips, Mr. Pedrick accused you of copying. But... |  |  |  |
| 16:05 | 119. T | Yeah. |  |  |  |
| 16:06 | 120. MJ | But what was different about that? Was there anything different about you? |  |  |  |
| 16:10 | 121. T | It was a problem because he never saw me copy before. Like he never saw me copy <inaudible> paper. He thought I was copying because <inaudible> every time I work I usually have my own, like he made me sit over there, I have my own way of doing work. And I'll be done and joking around. Like he never, ever saw me like trying to cheat off somebody. But he was shocked. | disappointed [because Mr. P. thought she was copying], confident in ability to do her own work |  |  |
| 16:33 | 122. MJ | OK. Um, is there anything else about that day that you can remember that stands out in your mind? No? You think you're prepared for the test? How do you feel about the test? |  |  |  |
| 16:49 | 123. T | It's awful nervous but then again I don't because I know | nervous but confident [because she believes in her ability and Mr. P. believes in her ability] |  |  |
| 16:52 | 124. MJ | Do you feel any more nervous about this test than you do like in any other test that Mr. Pedrick gives you or... |  |  |  |
| 16:58 | 125. T | No. No this test, it <inaudible> he'd be, he'd give us tests. Like three pages long. Like his test would be harder than the NJ Ask test. |  |  |  |
| 17:10 | 126. MJ | Oh, so you think he's preparing you well for the test? And other than that? Do you think you're prepared for the test? |  |  |  |
| 17:21 | 127. T | Yeah. |  |  |  |

## APPENDIX B3 ERICA $7^{\text {th }}$ GRADE INTERVIEW

## CD or DVD title: MMAF057

Description: Non-focus Student Interview
Date of Interview: 04/25/2007
Camera person: S. Wang
Transcriber: Yeuwhai Kathy Lin (Note to reader: Acknowledgements made by one speaker (like "mm hmm") during the other speaker's dialogue are not documented in this transcript.)

| Time | Speaker Move | Transcript |
| :---: | :---: | :---: |
| 00:01 | 1. Alice | Uh, because as I was saying, what we're trying to study is your math experience in uh, in Hubbard this year. Umm, and do you remember when we videotaped the different classes? |
| 00:16 | 2. Petrice | Mm hmm. Yea. |
| 00:18 | 3. Alice | Umm, I'm curious about some of what you done, and I'm glad that you came to - to talk to us. Uh, and I'm going to start by asking you just a few questions and then we might watch a couple of video clips from during the year and and talk about them. Uh, is that okay? |
| 00:35 | 4. Petrice | Mm hmm. |
| 00:37 | 5. Alice | Okay, then I'll ask you a few more questions when we see it. And you see that we're videotaping today. Is that okay? |
| 00:44 | 6. Petrice | Yes. |
| 00:45 | 7. Alice | Great. Uh, just to get started, please tell us your name. |
| 00:51 | 8. Petrice | Petrice. |
| 00:52 | 9. Alice | Petrice ...? |
| 00:54 | 10 Petrice | Green. |
| 00:55 | 11. Alice | Petrice Green. And you're in seventh grade this year. Umm, how old are you, Petrice? |
| 01:01 | 12. Petrice | Thirteen. |
| 01:02 | 13. Alice | You're 13. When is your birthday? |
| 01:03 | 14. Petrice | October 14. |
| 01:05 | 15. Alice | Yea, so you've really been 13 for a long time. Umm, so tell me a little bit about |


|  |  | yourself. Have you lived in Plainfield always? |
| :---: | :---: | :---: |
| 01:12 | 16. Petrice | Mm mm . Came from Jamaica. |
| 01:14 | 17. Alice | Came from Jamaica? Yea. Uh, when? |
| 01:18 | 18. Petrice | When I was two. |
| 01:20 | 19. Alice | When you were two? |
| 01:22 | 20. Petrice | Yea. But I visit my dad, sometimes. |
| 01:24 | 21. Alice | Do you? Uh, and he's still in Jamaica? |
| 01:26 | 22. Petrice | Mm, he died. |
| 01:28 | 23. Alice | Oh, I'm sorry. |
| 01:29 | 24. Petrice | It's okay. |
| 01:30 | 25. Alice | Recently? |
| 01:32 | 26. Petrice | On my birthday, October $14^{\text {th }}$. |
| 01:33 | 27. Alice | Oh my God! |
| 01:34 | 28. Petrice | It's okay. |
| 01:35 | 29. Alice | Your birthday's October $14^{\text {th }}$. My husband's birthday is October $14^{\text {th }}$ and so that's a special day in our lives. Uh, do you still have relatives in Jamaica? |
| 01:43 | 30. Petrice | Um, my grandma and my aunts. That's it. |
| 01:48 | 31. Alice | And you and your mother are here? You live with your mother here? |
| 01:53 | 32. Petrice | Mm hmm. |
| 01:54 | 33. Alice | You have brothers and sisters? |
| 01:56 | 34. Petrice | Umm, my brother is 21 , he go to King University, and my sister is about to go to umm LIM. |
| 02:00 | 35. Alice | Oh that's great! And so you're the youngest? |
| 02:02 | 36. Petrice | Yea. |
| 02:03 | 37. Alice | Yea. And so your brother's at King? |
| 02:05 | 38. Petrice | Mm hmm. |
| 02:08 | 39. Alice | And your sister's where? |
| 02:09 | 40. Petrice | She's going to LIM. She's graduating. |
| 02:10 | 41. Alice | What's LIM? |
| 02:11 | 42. Petrice | Umm, Laboratory Institute of Merchandising. |
| 02:12 | 43. Alice | Where? |
| 02:14 | 44. Petrice | In Newark. |
| 02:15 | 45. Alice | In Newark? Yea, that's great. And so you have - you have big shoes to follow - to - to - to do that kind of thing with them. And so will you go back to Jamaica this summer, or ...? |
| 02:30 | 46. Petrice | No, we going on vacation. We're going to umm, the Dominican Republic. |


| 02:35 | 47. Alice | Oh really? Do you have family down there too, or ...? |
| :---: | :---: | :---: |
| 02:38 | 48. Petrice | No, I'm just going on a cruise. |
| 02:40 | 49. Alice | That'll be fun. That'll be great. |
| 02:42 | 50. Petrice | Not really. |
| 02:44 | 51. Alice | You don't want to do that? |
| 02:45 | 52. Petrice | No. |
| 02:46 | 53. Alice | Why? How come? |
| 02:47 | 54. Petrice | Cause the ship sunk. |
| 02:48 | 55. Alice | The ship what? |
| 02:49 | 56. Petrice | The ship sunk. On the news. The ship sunk. |
| 02:54 | 57. Alice | Not your ship - the ship you were gonna go on? |
| 02:55 | 58. Petrice | No, but - I can't swim. |
| 03:00 | 59. Alice | Well, did you - did you see on the news where those two people fell off? |
| 03:03 | 60. Petrice | [Nods] |
| 03:04 | 61. Alice | That was not sinking, but they fell off into the water and they got them out from some cruise, so they were saying - they were saying they gotta be more careful. |
| 03:08 | 62. Petrice | I can't swim. |
| 03:13 | 63. Alice | Oh. You'll have a good time. You'll be fine. [inaudible] |
| 03:14 | 64. Petrice | Yea. |
| 03:15 | 65. Alice | And have you been to the Dominican - have you been to any of the other islands? |
| 03:20 | 66. Petrice | No. |
| 03:21 | 67. Alice | Just Jamaica. Yea. Umm, so tell me a little bit about - you're the youngest. What - what are you interested in? What do you do? |
| 03:31 | 68. Petrice | Animals. |
| 03:32 | 69. Alice | Really! You have pets? |
| 03:34 | 70. Petrice | Mm hmm. I have - I have four birds, and I have a Chihuahua named Sandy. |
| 03:41 | 71. Alice | That's so fun. And you take care of them? |
| 03:43 | 72. Petrice | Mm hmm. |
| 03:45 | 73. Alice | And in school, do you - are you in any sports, or music, or whatever? |
| 03:49 | 74. Petrice | I was in track for two years. I was in track, outdoor and cross country. |
| 03:56 | 75. Alice | Mm hmm. But not this year? |
| 03:58 | 76. Petrice | Mm mm. Well, yea this year, but they're doing outdoor relay. I don't want to do it. It's too hard. |
| 04:05 | 77. Alice | Too hard? So what do you enjoy, cross country? |


| $04: 07$ | 78. Petrice | Yea, cross country. It was fun. |
| :--- | :--- | :--- |
| $04: 10$ | 79. Alice | Mm hmm. And so, uh, you've been in the schools in Plainfield, always. |
| $04: 18$ | 80. Petrice | Since third grade. |
| $04: 19$ | 81. Alice | Since third grade. That's when you came - where in third grade - from <br> Jamaica? |
| $04: 22$ | 82. Petrice | Mm mm. |
| $04: 23$ | 83. Alice | That's what I thought. |
| $04: 24$ | 84. Petrice | I wasn't living in Plainfield when I came from Jamaica. |
| $04: 27$ | 85. Alice | Where did you go to? |
| $04: 28$ | 86. Petrice | I don't know. I don't know [inaudible] |
| $04: 29$ | 87. Alice | You don't remember where the - where you went to first grade? |
| $04: 32$ | 88. Petrice | I think it was New Brunswick, but I wasn't in Plainfield. Came to Plainfield in <br> third grade, and I went to Washington school. |
| $04: 37$ | 89. Alice | Went to Washington? And came to Hubbard in sixth grade? |
| $04: 40$ | 90. Petrice | Mm hmm. |
| $04: 42$ | 91. Alice | Yea. Umm, what's your favorite class in school? |
| $04: 50$ | 92. Petrice | Mm ... |
| $04: 54$ | 93. Alice | Do you like school? |
| $04: 55$ | 94. Petrice | Yea, it's okay. |
| $04: 57$ | 95. Alice | It's okay? |
| $04: 59$ | 96. Petrice | Sometimes. |
| $05: 00$ | 97. Alice | Sometimes. What makes it okay, and what makes it not? |
| $05: 03$ | 98. Petrice | The kids make it okay. |
| $05: 05$ | 99. Alice | Your friends? |
| $05: 06$ | 100.Petrice | My friends, yea. And I just don't - some teachers make it not. Some teachers. <br> Not Mr. Pedrick, though. |
| $05: 15$ | 101.Alice | Really? |
| $05: 16$ | 102. Petrice | Sometimes annoying, but he okay. |
| $05: 20$ | 103. Alice | Annoying, but okay? |
| $05: 22$ | 104. Petrice | [Nods] |
| $05: 23$ | 105. Alice | Uh, and what - what makes a good teacher? |
| $05: 26$ | 106. Petrice | Mm, somebody that help you and understands and don't say you're wrong, I <br> guess. |
| $05: 34$ | 107. Alice | Mm hmm. Mm hmm. What do you do after school? Take - take care of your <br> birds and things? |
| $05: 42$ | 108. Petrice | After school, I go to after school program. |


| 05:44 | 109.Alice | To where? |
| :---: | :---: | :---: |
| 05:45 | 110.Petrice | After school program. |
| 05:46 | 111.Alice | Here? |
| 05:47 | 112.Petrice | Mm hmm. |
| 05:48 | 113.Alice | Yea. And what kind of things do you do? |
| 05:51 | 114.Petrice | Umm, we do - they help us with our homework first, then like we play board games or we can go outside [inaudible]. Then we go to like special classes, like real classes like ELA or math, or then - or we go on the computer. |
| 06:03 | 115.Alice | And do you enjoy doing that? |
| 06:06 | 116.Petrice | Yea. |
| 06:07 | 117.Alice | Okay. Yea. Do that mostly because your mother's working, or because it's good - good to be with your friends, or ... |
| 06:12 | 118.Petrice | No, it's mostly because my house is [inaudible] when I go home, so I go to after school program. |
| 06:19 | 119.Alice | And you can do your homework there, too, which is probably really good. Uh, do you remember when we've been here videotaping? Uh, we've been here, uh, I was trying to remember, maybe three, four times. Umm, umm, do you remember anything about any of the math that we were doing during those times? |
| 06:38 | 120.Petrice | I don't remember. We was trying to make clay. |
| 06:43 | 121.Alice | You remember the clay one. I think we all remember that. What was that about? |
| 06:46 | 122.Petrice | And I think we had - I think you was there, but I don't think you all was interviewing when we was making the wumps (??). |
| 06:53 | 123.Alice | The wumps. That was the most recent one. |
| 06:56 | 124.Petrice | Mm hmm . |
| 06:57 | 125.Alice | Actually, I even have a little video to look at of that one. |
| 07:00 | 126.Petrice | Okay. |
| 07:01 | 127.Alice | For when you did the wump just recently. I think you've done them a couple of times, but what - what were the wumps? |
| 07:08 | 128.Petrice | We was umm, using the uh, umm, we was using like two to six. We was trying to make it on a grid using coordinates to make it on the grid to see like how did it change, did it flip or rotate. Stuff like that. |
| 07:20 | 129.Alice | What do you mean? |
| 07:22 | 130.Petrice | Like, okay, first he would give us like a wump and it would be like in the middle. Then he like give us another set of coordinates and like, the wump |


|  |  | would like move up, so he would ask, "Did it flip or rotate or turn?" He would ask like "How did it get there?" and "How much coordinates did it take over to get there?" |
| :---: | :---: | :---: |
| 07:40 | 131.Alice | $\mathrm{Mm} \mathrm{hmm}, \mathrm{mm} \mathrm{hmm}, \mathrm{mm} \mathrm{hmm}$. And so you're working on that. I do remember - that was the last time. |
| 07:46 | 132.Petrice | Mm hmm. |
| 07:47 | 133.Alice | ... we were here, I think. Can you remember any of the other times we've been here, or any other things that were important that you've done in math? |
| 07:52 | 134.Petrice | I probably didn't - I don't remember. I only remember clay, the wumps, and I think you all was here when we was making the cartoon characters. |
| 08:01 | 135.Alice | That's pretty good. What was the cartoon - how come that was math? |
| 08:06 | 136.Petrice | Hmm? |
| 08:07 | 137.Alice | How - how - why was that - what made that math? |
| 08:09 | 138.Petrice | What made that math? Because we had to umm, we had to like enlarge it. Like, say we take it from the computer. We had to like enlarge it and then we had to find the exact coordinates and write it down on paper so like, if we gave it to a fourth grader, they be able to find or make the picture. |
| 08:28 | 139.Alice | So was - isn't that sort of like the wumps too? |
| 08:31 | 140.Petrice | Yea. |
| 08:32 | 141.Alice | Yea. Umm, what are you doing in math now? |
| 08:35 | 142.Petrice | What are we doing now? |
| 08:38 | 143.Alice | Mm hmm . |
| 08:39 | 144.Petrice | I don't know. I wasn't here yesterday or the day before that, so I don't know if they got a new book. |
| 08:45 | 145.Alice | You haven't been back since vacation. |
| 08:46 | 146.Petrice | Yea. So I don't know ... |
| 08:48 | 147.Alice | Have they gotten a new book, or ...? |
| 08:50 | 148.Petrice | I don't know. |
| 08:51 | 149.Alice | When - can you remember what you were doing before Spring Break? |
| 08:55 | 150.Petrice | Oh yea, I was here Monday. I think we was doing umm, we was doing a ro - I forgot what it's called! Ratio? Yea, I think that's what we was doing. We was trying to find like - we was doing percents and area stuff. I think it's shapes. It was one of these books. I don't know. I wasn't here. |
| 09:21 | 151.Alice | One of the Connected Math books. |
| 09:22 | 152.Petrice | Yea, I wasn't here. |
| 09:23 | 153.Alice | Yea, yea, yea. We'll figure it out cause we'll be back in a few weeks and - and |


|  |  | look at you again. Umm, for the ones you were just talking about - the wumps one - umm, umm, did you like doing those? |
| :---: | :---: | :---: |
| 09:36 | 154.Petrice | Yea, I wasn't there for the first one, but I was there for the second and third. |
| 09:41 | 155.Alice | Of when we came? |
| 09:42 | 156.Petrice | Yea, I wasn't there when they like made the wumps, cause it was like near October. I wasn't here. |
| 09:46 | 157.Alice | But - because you had to go back to Jamaica, I bet. Umm, but when we came in and you were doing the cartoon figures, umm, was that an interesting activity? |
| 09:59 | 158.Petrice | Yea, it was, cause we got to pick our own cartoon character, so it was okay. |
| 10:05 | 159.Alice | Yea, uhh, and that - that made it interesting for you? |
| 10:11 | 160.Petrice | Yea. |
| 10:13 | 161.Alice | And do you think other people in the class thought so too? |
| 10:15 | 162.Petrice | Yea, cause they was trying to find their own cartoon charter was better, or yea, it was fun. |
| 10:21 | 163.Alice | Still some of them up on the wall. Yea. Umm, what was yours? Do you remember? |
| 10:27 | 164.Petrice | Stewie. |
| 10:28 | 165.Alice | What? |
| 10:29 | 166.Petrice | Stewie. |
| 10:30 | 167.Alice | Stewie. Who's Stewie? Stewie a cartoon? |
| 10:34 | 168.Petrice | From Family Guy. |
| 10:35 | 169.Alice | Yea. Yea. Umm, and what did - did you learn anything? Maybe look at this. I'm gonna look at a couple of - of - of - of clips. Can - can - you wanna move? ... Let's see if I can get it up ... Let's see what you remember about it ... Okay ... These are just really short, and they're just to help us remember. I wanna sort of talk about what - what you remember about what was going on. |
| 11:47 | -- | [Video clip begins] |
| 12:25 | 170.Alice | [Video clip ends] I'll stop it. Do you remember anything about what was going on there? |
| 12:26 | 171.Petrice | Mm hmm. |
| 12:28 | 172.Alice | Tell me. |
| 12:29 | 173.Petrice | I was trying to figure out which cartoon character to do. |
| 12:31 | 174.Alice | Uh huh. |
| 12:32 | 175.Petrice | So I made - I was trying to figure out, cause - I was trying to figure out the easiest one and the diamond, I couldn't find out the coordinates. |


| 12:39 | 176.Alice | Oh, and that's what aggravated you? Is that what you were saying? |
| :---: | :---: | :---: |
| 12:44 | 177.Petrice | Yea. |
| 12:47 | 178.Alice | Is that what you were saying? I would - show me. Show me what you mean. |
| 12:50 | 179.Petrice | Okay, like, cause ... |
| 12:51 | 180.Alice | You have to push this pen on, I think. |
| 12:52 | 181.Petrice | I was trying to make a diamond, right? But it keep on cutting into half, so I didn't - I couldn't find the coordinates for it. See that? [inaudible] See that design went in. $1,2,3,4,5,6 \ldots$ Okay ... Alright, cause I couldn't understand like, I couldn't understand this is 6.6 but like, right here. These. |
| 13:49 | 182.Alice | Oh the ones that weren't ... |
| 13:51 | 183.Petrice | Weren't on a line. I couldn't really figure out. |
| 13:55 | 184.Alice | Yea, so you got frustrated. That was - that was when you said that. |
| 13:57 | 185.Petrice | Mm hmm. |
| 13:58 | 186.Alice | Cause you felt what - that you needed to have them all up and down, or ... |
| 14:02 | 187.Petrice | I was trying to like - I couldn't understand like since it's cut in half, what would it be. And like I don't think like kids would know like to go ... But like, that's what I was trying to figure out. |
| 14:18 | 188.Alice | Oh, I see. That was helpful. Cause when I was looking at it I couldn't - I knew you got frustrated and you - and you wadded up your paper and umm, when you - when you work like that, do - do you - the other kids help you some, or what goes on in a group? Do you work with your group? |
| 14:32 | 189.Petrice | Yea, they help me sometime, when I don't understand, they help. But yea we have new groups now. |
| 14:38 | 190.Alice | Mm hmm . |
| 14:41 | 191.Petrice | But I only got one person in my group. |
| 14:42 | 192.Alice | Who's your group partner then? |
| 14:44 | 193.Petrice | Maria. |
| 14:45 | 194.Alice | Oh. Yea uh, In one of the ones we're gonna look at, you and Maria are working together. |
| 14:50 | 195.Petrice | Umm, I think it was the wumps? |
| 14:52 | 196.Alice | The last wumps? Yea, yea. Uh, anyhow then this - I have one more for us to look at from that one, and it is umm ... it was - look at - look at what's the name of that clip. Let's see what it is. The first one was "Making the Diamond." |
| 15:25 | 197.Petrice | Is that Tyquanna? |
| 15:27 | 198.Alice | Uh, no, this one is frustrate - well yes, maybe Tyquanna might have been in it |


|  |  | too, but it was - it was you that was frustrated. |
| :---: | :---: | :---: |
| 15:40 | -- | [Video clip begins] |
| 17:03 | 199.Alice | Is that your little guy? |
| 17:04 | 200.Petrice | Yea. |
| 17:15 | 201.Alice | [Video clip ends] Yea, what was going on then? |
| 17:17 | 202.Petrice | I was getting frustrated, cause I couldn't figure out which one to do. And he said if we enlarge it, probably it was better and it was. |
| 17:25 | 203.Alice | What did you mean enlarge it? How did you do that? |
| 17:27 | 204.Petrice | Okay, we had to - we had to umm draw it out - |
| 17:29 | 205.Alice | You had been so frustrated - you'd been frustrated trying to do this. Is that what you're saying? |
| 17:34 | 206.Petrice | No, like Stewie - we had to - I had to draw it out on a see through paper. We had to project it and then we had to like draw it on a bigger paper and find out how small - how bigger it got from the smaller paper to how did it get like that. I think he was helping me with the measurements. |
| 17:53 | 207.Alice | Later on? |
| 17:54 | 208.Petrice | Mm hmm. |
| 17:55 | 209.Alice | Yea, yea, oh I remember that. When? |
| 17:58 | 210.Petrice | When we was like, if we measure his feet on the smaller one on the computer, then we measure his feet to compare to that one, like how much bigger is it? He was helping me with that one. |
| 18:08 | 211.Alice | And that was the scale factor. |
| 18:09 | 212.Petrice | Yea. |
| 18:10 | 213.Alice | When you figured out how many times? Yea. I do remember that. But you're saying that - uh, is this - this - do you do this kind of math a lot? |
| 18:19 | 214.Petrice | Hmm? |
| 18:20 | 215.Alice | Is this umm, what we were just looking at, is that a relatively typical math class for you with - with uh, Mr. Pedrick? |
| 18:30 | 216.Petrice | Like making pictures and stuff? |
| 18:34 | 217.Alice | Well, you know, moving around, talking, and all that kind of ... |
| 18:38 | 218.Petrice | Mm , no. It's not regular regular. [inaudible] we don't move around, but I guess - it wasn't regular, no. |
| 18:45 | 219.Alice | It was sort of more a project? |
| 18:46 | 220.Petrice | Yea, it was more of a project and helping each other. |
| 18:50 | 221.Alice | Mm hmm . Mm hmm. Umm, but you work - do you work with groups most of the time, or ...? |


| 18:56 | 222.Petrice | Yea, we all have groups. Assigned groups. |
| :---: | :---: | :---: |
| 18:59 | 223.Alice | And you shift - you say you shift around. |
| 19:01 | 224.Petrice | Yea. |
| 19:02 | 225.Alice | And right now, uh, you're working with Maria? |
| 19:07 | 226.Petrice | Maria and umm, I think Hector. |
| 19:09 | 227.Alice | Mm hmm. Umm, when you get frustrated like you were there, uh, do you feel that way often in math? |
| 19:20 | 228.Petrice | No. I like math. |
| 19:24 | 229.Alice | Do you? Why? |
| 19:26 | 230.Petrice | Cause it's important. Every job you get, you have to know math. Or else you ain't gonna get a job. |
| 19:33 | 231.Alice | Yea. Umm, do you think you do well in math? |
| 19:37 | 232.Petrice | Yea, I got a A. |
| 19:38 | 233.Alice | Did you? That's great. Uh, what - for the - for the whole year, or for the uh last marking ...? |
| 19:45 | 234.Petrice | Last marking period, I got a A. And I had a B before that. |
| 19:49 | 235.Alice | Oh. So you think you can get an A for the whole year. |
| 19:51 | 236.Petrice | Yea. |
| 19:52 | 237.Alice | Yea, yea. Uh, what about math do you like, besides it's good for everything you gotta do. |
| 19:59 | 238.Petrice | What about. |
| 20:00 | 239.Alice | What about doing math do you like? |
| 20:03 | 240.Petrice | I don't know. I just like it. |
| 20:07 | 241.Alice | You just said you did. |
| 20:09 | 242.Petrice | I don't love it, but I like it cause I need it. |
| 20:11 | 243.Alice | Yea, yea. |
| 20:12 | 244.Petrice | So I try to do my best with it, cause I know if don't know math, then I can't get no where. |
| 20:16 | 245.Alice | $\mathrm{Mm} \mathrm{hmm} . \mathrm{Mm} \mathrm{hmm}$. But overall, for that - that particular project, you liked it pretty well? |
| 20:25 | 246.Petrice | Yea, it was fun, it was fun. It was easy, but it was fun. |
| 20:28 | 247.Alice | What was easy? What made it easy? You looked frustrated in those two things that - |
| 20:32 | 248.Petrice | It was easy after he told me - after he was helping and I had to project it. It was easy after that. |
| 20:39 | 249.Alice | Yea, and so he - he sort of gave you a - |


| 20:43 | 250.Petrice | Yea, it was easy after I found who I was doing. |
| :---: | :---: | :---: |
| 20:44 | 251.Alice | And figured out a way to get started? Yea. I'm gonna show you one other one, and - uh, what was it like working in a group, umm, with - who was it? It was Bryant [inaudible]? Who was in that first group? The group we were just looking at? |
| 21:05 | 252.Petrice | It was Bryant sitting next to me and Glennis (??) in front of me. |
| 21:09 | 253.Alice | And who? |
| 21:10 | 254.Petrice | Glennis. |
| 21:11 | 255.Alice | And Glennis? |
| 21:12 | 256.Petrice | Was in front of me. |
| 21:13 | 257.Alice | Was in front of you, and then that was all? I heard somebody |
| 21:15 | 258.Petrice | I don't remember. |
| 21:17 | 259.Alice | I can't remember either. But was that an okay group to work with? |
| 21:21 | 260.Petrice | It was okay. Oh, Hector, I think. |
| 21:24 | 261.Alice | Mm hmm. |
| 21:25 | 262.Petrice | It was okay, cause they was helping me. |
| 21:27 | 263.Alice | Was some of that - was it - oh, Bryant had SpongeBob? |
| 21:29 | 264.Petrice | Yea. |
| 21:32 | 265.Alice | He's a pretty good artist. |
| 21:34 | 266.Petrice | Yea, I can't draw for nothing. |
| 21:35 | 267.Alice | Hmm? |
| 21:36 | 268.Petrice | I can't draw. |
| 21:38 | 269.Alice | No, I get - When I'm here, I love looking at the cartoons he does. Does he ever show them to you? |
| 21:43 | 270.Petrice | Mm hmm. He makes people's names for them sometimes. |
| 21:48 | 271.Alice | Yea, uh, okay, and this one, I wanna see if you remember what was going on here, and let's talk about it for a few minutes. It is ... I think ... |
| 22:19 | 272.Petrice | Oh yea. I remember that one. That was funnest. |
| 22:22 | 273.Alice | Hmm? |
| 22:24 | 274.Petrice | That was fun. |
| 22:25 | 275.Alice | You think? |
| 22:26 | 276.Petrice | The wumps. Cause Mr. Pedrick made a [inaudible] mistakes. |
| 22:32 | -- | [Video clip begins] |
| 22:35 | 277.Petrice | He don't listen! |
| 22:39 | 278.Alice | [Video clip ends] This is so hard. |
| 22:43 | -- | [Video clip begins] |


| 22:59 | 279.Alice | [inaudible] Why don't we shift around here. Shift around it. |
| :---: | :---: | :---: |
| 24:00 | 280.Alice | [Video clip ends] Okay, let's get it again. (??) [Video clip begins] |
| 24:14 | 281.Petrice | [Laughs] You can stop it now! You can stop! [Video clip ends] |
| 24:17 | 282.Alice | So what do you remember? |
| 24:20 | 283.Petrice | Me calling, he didn't wanna come. (??) |
| 24:22 | 284.Alice | What do you remember about that whole thing? |
| 24:23 | 285.Petrice | He messed up! |
| 24:25 | 286.Alice | He messed up. |
| 24:27 | 287.Petrice | He messed up on the nose and the mouth. |
| 24:29 | 288.Alice | Does it ... |
| 24:31 | 289.Petrice | Cause when he messed up the first one, he messed up all of them. |
| 24:34 | 290.Alice | Because after that ... |
| 24:35 | 291.Petrice | After that I think you have to like times it by 2 then add 5, like you have to keep on doing it, but he messed up on the first one, so all of them was messed up, so we had to do it all over. |
| 24:44 | 292.Alice | Yea. Yea. Well, do teachers ever mess up? |
| 24:49 | 293.Petrice | Yea, yea, sometimes. |
| 24:52 | 294.Alice | He was pretty honest. |
| 24:53 | 295.Petrice | Yea. |
| 24:56 | 296.Alice | Yea. Do you ever mess up in math? Huh? |
| 25:00 | 297.Petrice | A lot of times, yea. |
| 25:04 | 298.Alice | How do you feel when - how'd you feel then when you caught him messing up? |
| 25:08 | 299.Petrice | Hmm? |
| 25:09 | 300.Alice | How did you feel? |
| 25:10 | 301.Petrice | I felt happy. |
| 25:11 | 302.Alice | Why? |
| 25:12 | 303.Petrice | Cause. I was happy he messed up. |
| 25:14 | 304.Alice | And Maria too, it looked like. |
| 25:15 | 305.Petrice | Yea. |
| 25:16 | 306.Alice | Yea, yea. |
| 25:18 | 307.Petrice | I was happy that I found out that he messed up, but I was happy that he messed up cause ... |
| 25:22 | 308.Alice | You were happy that you dis - |
| 25:24 | 309.Petrice | Discovered it, yea. |
| 25:26 | 310.Alice | Yea. And you were happy that he messed up? |


| 25:27 | 311.Petrice | Yea. |
| :---: | :---: | :---: |
| 25:28 | 312.Alice | How come? |
| 25:30 | 313.Petrice | Because. He don't like admitting it, but he did. He had to. |
| 25:34 | 314.Alice | Yea. To the whole class. Yea, yea, yea. And so you were working with a different group over there? |
| 25:43 | 315.Petrice | No, umm, this is Maria and Janae, but uh, she left and went over the group with Samaiah and umm, Vashon and Naomi. |
| 25:51 | 316.Alice | But she was with you all for a while. |
| 25:53 | 317.Petrice | Yea. |
| 25:54 | 318.Alice | Yea. Uh, and that's how you got with Maria and [inaudible] - sort of stayed there. |
| 25:57 | 319.Petrice | Yea. |
| 25:58 | 320.Alice | And is that a good partnership? Work well? |
| 26:01 | 321.Petrice | Mm hmm. Yea. |
| 26:03 | 322.Alice | And Hector did you say? Hector? |
| 26:04 | 323.Petrice | He came there today. |
| 26:05 | 324.Alice | Yea. |
| 26:06 | 325.Petrice | Yea, he came over there today. |
| 26:08 | 326.Alice | Yea, yea. What makes a good group? |
| 26:10 | 327.Petrice | If the person - if the person like knows about math and you talk to them a lot, they're your friend. |
| 26:20 | 328.Alice | So it's good to be with your friends? |
| 26:21 | 329.Petrice | Yea. |
| 26:22 | 330.Alice | And - and it's good, uh, what - do you all get up and present your ideas to the class a lot? |
| 26:30 | 331.Petrice | Mm yea, I think this was when like we each had like - we each had to do like a project. Like say A, B, C. He'll give us either B or C then we present it to the class and then like class will score us, not him. |
| 26:46 | 332.Alice | Oh, like with a rubric. |
| 26:48 | 333.Petrice | Yea, with a rubric. |
| 26:50 | 334.Alice | Mm hmm . Do you like that - doing that? |
| 26:52 | 335.Petrice | Yea, it was fun cause I got to score other people. |
| 26:54 | 336.Alice | You like that too? |
| 26:55 | 337.Petrice | Yea, cause it felt like a teacher. |
| 26:57 | 338.Alice | Yea. Well do you ever have discussions with other people when you present, or like do you - do you talk - ask questions of each other when you're |


|  |  | presenting? |
| :---: | :---: | :---: |
| 27:07 | 339.Petrice | When we're presenting? |
| 27:08 | 340.Alice | Mm hmm . |
| 27:09 | 341.Petrice | Like us? Do we ask questions? |
| 27:11 | 342.Alice | Mm hmm. |
| 27:12 | 343.Petrice | No, we just tell what we did and how we came up with the answer. |
| 27:16 | 344.Alice | And nobody else asks you any questions. |
| 27:18 | 345.Petrice | Yea, they ask us questions like how do we come up with the answer, and why is it this, and we just tell them what we did. |
| 27:24 | 346.Alice | Yea, yea. And you sort of like doing that. Uh, how do you feel when other students don't agree with your answer? Does that ever happen? |
| 27:32 | 347.Petrice | Yea, but that's their opinion, so I can't tell them they're wrong or they're right. But that's their opinion. I was right, though. |
| 27:42 | 348.Alice | You were? |
| 27:43 | 349.Petrice | Yea. We was right, cause it was a group project. |
| 27:47 | 350.Alice | What was the project? This was a different one [inaudible]. |
| 27:49 | 351.Petrice | Mm mm. Like ... |
| 27:51 | 352.Alice | It was this when you - when you got the womp? Is this - was that this? |
| 27:54 | 353.Petrice | No, the project's like when we had to umm, get the A, B, or C. We had like a lot of them. But that's umm, I was in the group when I was - I was in a group with Naomi and Hector and - I forgot the other girl's name - and Nala. |
| 28:10 | 354.Alice | Nala? |
| 28:11 | 355.Petrice | She's kinda quiet, yea. |
| 28:12 | 356.Alice | Mm hmm. |
| 28:13 | 357.Petrice | So that was a different project. |
| 28:14 | 358.Alice | Mm hmm. And when you say A, B, C, you just have to different parts? |
| 28:19 | 359.Petrice | Like A1, A ... yea, we had to do all the separate parts. |
| 28:21 | 360.Alice | Do you remember what the math was? What it was about? |
| 28:25 | 361.Petrice | Umm, no. |
| 28:28 | 362.Alice | Just a bunch of problems? |
| 28:31 | 363.Petrice | It was a bunch of problems. It was like - okay, it was shapes, yea, because it was - okay, I remember this one - when there was like this guy went to the movies and we was trying to figure out which one was the best popcorn holder - either silicone, a box, ... |
| 28:49 | 364.Alice | Oh, those [inaudible]. Yea. |
| 28:50 | 365.Petrice | Yea, it was a silicone, I think it was a box or a rectangle. And we had to find |


|  |  | out - they would give us the length and the width. We had to find out the diameter and the - we had to just find out which one would hold more and so that's what we had to do with one of those. That's the only one I remember. |
| :---: | :---: | :---: |
| 29:05 | 366.Alice | Mm hmm . Yea. What makes a problem a good problem that you can remember? |
| 29:11 | 367.Petrice | If it's fun. |
| 29:13 | 368.Alice | If it's fun. |
| 29:14 | 369.Petrice | And you enjoy doing it. |
| 29:15 | 370.Alice | Yea. Yea, and so that one did, and the one we were looking ... |
| 29:18 | 371.Petrice | Yea, cause I knew what I was doing. |
| 29:21 | 372.Alice | Yea. And so that also makes it a good problem? Is if you know what you're doing? |
| 29:24 | 373.Petrice | Yea. You know what you're doing. |
| 29:25 | 374.Alice | Yea. And - and if it was interesting and fun to do. And so that project - that's another project, uh, that you did do. Um, and so and you're saying that's not a typical day in math? What's a typical day in math class like? |
| 29:40 | 375.Petrice | A typical day in math class would be get a book that explain what you doing, he'll read to us, and then we just do our problems! Like A1, A2, B2. Just do our problems. He'll come around to each group to help them. |
| 29:57 | 376.Alice | Mm hmm . And you work with your group members? |
| 29:58 | 377.Petrice | Mm hmm. |
| 29:59 | 378.Alice | Yea. And - and you take turns sharing? |
| 30:01 | 379.Petrice | Yea, cause we all have to have the same answers. |
| 30:04 | 380.Alice | In your group. |
| 30:05 | 381.Petrice | Mm hmm. |
| 30:06 | 382.Alice | Yea. So you have to agree. Uh, if you could change to have a perfect math class, or if you have had a perfect math class, umm, what would it be like? How would you describe what could be a perfect math class? |
| 30:24 | 383.Petrice | A perfect - I don't - a perfect math class? |
| 30:27 | 384.Alice | I mean, what would make it really good? |
| 30:29 | 385.Petrice | Pretty good .. umm, the problems that we do, like, if they was interesting like the clay problem or the pizza problem, when he brought in pizza. That was interesting cause there's food. |
| 30:42 | 386.Alice | So you like things that are real? |
| 30:44 | 387.Petrice | Yea. Like you get to physically do instead of with your head. Problems like that. |


| $30: 48$ | 388.Alice | Mm hmm. How about the way the kids are? |
| :--- | :--- | :--- |
| $30: 52$ | 389.Petrice | The kids? |


|  |  | gonna make a book about you all, what do you think - what would be the important ideas? |
| :---: | :---: | :---: |
| 33:10 | 413.Petrice | Of the book? How we work together, and Mr. Pedrick of course, ... |
| 33:15 | 414.Alice | And what? |
| 33:18 | 415.Petrice | Mr. Pedrick, and the problems that we did. |
| 33:20 | 416.Alice | What about Mr. Pedrick? |
| 33:22 | 417.Petrice | How is he a good teacher. |
| 33:23 | 418.Alice | How is he a good teacher? |
| 33:25 | 419.Petrice | Cause. He - he understand us sometimes. And he won't tell you that you're wrong. That one - cause kids don't like hearing that they're wrong. But he won't tell you that you're wrong. He just tell you how to fix the problem. But he's a good teacher. |
| 33:39 | 420.Alice | And so that's what it takes to make a good teacher? |
| 33:41 | 421.Petrice | Mm hmm. |
| 33:43 | 422.Alice | Is somebody who doesn't tell you you're wrong? |
| 33:45 | 423.Petrice | Well, not tell you - well, he say that it's not right, but he won't be like, "Oh that's wrong," that like snap in your face or something. But just tell you like "That's not really right" and then tell you what to do to make it better. |
| 33:59 | 424.Alice | Yea. Does he ever ask you questions, or does he ... |
| 34:01 | 425.Petrice | Yea, he ask us question, make us think. Sometimes. After a while, you'll get it. |
| 34:07 | 426.Alice | But you do think he's a good teacher? |
| 34:09 | 427.Petrice | Yea. He's a good teacher. |
| 34:12 | 428.Alice | Yea, yea. Okay! Uh, I hope I have another chance - I don't know when I'm working on this book. Will you be my consultant? |
| 34:19 | 429.Petrice | Mm hmm . |
| 34:20 | 430.Alice | Yea. And so you're saying if we're doing a book, we'd have to talk about the kids ... |
| 34:22 | 431.Petrice | The kids. |
| 34:25 | 432.Alice | And we'd have to talk about the teacher. |
| 34:26 | 433.Petrice | The problems. |
| 34:27 | 434.Alice | The problems. |
| 34:28 | 435.Petrice | And how we work together. |
| 34:29 | 436.Alice | And how you work together. |
| 34:32 | 437.Petrice | And how we socialize, like ... |
| 34:33 | 438.Alice | And how you socialize. |
| 34:35 | 439.Petrice | How did we get a problem done. |


| 34:37 | 440.Alice | Yea, yea. That's great. And one last little thing. Do you remember all those nicknames? |
| :---: | :---: | :---: |
| 34:43 | 441.Petrice | Yea. |
| 34:45 | 442.Alice | Is that good? Is that bad? What do you think? |
| 34:49 | 443.Petrice | I don't know. The kids made up the nicknames for themself though. That's what they wanted to be called, so ... |
| 34:55 | 444.Alice | Oh really? You got to say you were gonna be? Some of them were not very complimentary. |
| 35:00 | 445.Petrice | Yea. I'm sure Bryant, he didn't make up his, or Kevin, kids just ... like Janae, she made up hers Ms. Neo (??), or I think her name is Racoon ... |
| 35:11 | 446.Alice | Who was Racoon? |
| 35:14 | 447.Petrice | Her. Janae. |
| 35:16 | 448.Alice | Who? |
| 35:18 | 449.Petrice | This one. |
| 35:19 | 450.Alice | That one is - oh Janae. Oh I just didn't hear. |
| 35:21 | 451.Petrice | Janae, she call herself Racoon. Yea, she'll be - she'll be ragging (??) on herself, so it's not good to call people out of their name, cause that's not what the person - that's not what their parents named them. But I don't really call them that, cause I don't really remember all them names. |
| 35:34 | 452.Alice | I couldn't either. It was - that was one whole day that I was ... |
| 35:37 | 453.Petrice | Yea, I couldn't remember all them names. I just call them by their names. |
| 35:40 | 454.Alice | Yea, yea. It sort of got in the way sometimes. |
| 35:42 | 455.Petrice | Yea, we start arguing sometimes cause they don't want people call them that. |
| 35:46 | 456.Alice | Mm hmm . And you could tell some people [inaudible] |
| 35:49 | 457.Petrice | Was aggravated. |
| 35:50 | 458.Alice | Maybe felt worse than [inaudible], yea. I don't know. Anyway, uh, is that - did that happen in math class, or did it happen somewhere else that ... |
| 35:59 | 459.Petrice | The names? Math class, when we had a substitute. |
| 36:02 | 460.Alice | Oh. This year, though, but when there was a substitute. |
| 36:05 | 461.Petrice | Yea, when there was a substitute, they would just start cracking on each other, so they'll just start giving each other name, and they got it ever since. |
| 36:12 | 462.Alice | Yea, yea, yea. Still - what'd they say you're gonna have to do [inaudible], we'd have to have a chapter in our book? |
| 36:18 | 463.Petrice | Hmm? |
| 36:20 | 464.Alice | We'd have to have a chapter in our book? |
| 36:21 | 465.Petrice | About the names? |


| $36: 22$ | 466.Alice | I don't know. What do you think? |
| :--- | :--- | :--- |
| $36: 24$ | 467.Petrice | No, cause I don't think kids would wanna hear them names being called other <br> than their names in the book. |
| $36: 32$ | 468.Alice | So they really don't - aren't very complimentary. Okay, I'll come back when I <br> need consulting on the book, okay? Great - thank you so much. |
| $36: 39$ | 469.Petrice | You're welcome. |

APPENDIX C1

## MM Affect Study Survey Responses

 Jana| Survey Item | Grade 7 Entrance 9/22/2006 (age 12) | Grade 7 Exit 6/15/2007 (age 12) | $\begin{gathered} \text { Grade } 9 \\ 5 / 22 / 2009 \text { (age 15) } \end{gathered}$ |
| :---: | :---: | :---: | :---: |
| 1. I usually like doing math. | Agree | Agree | Strongly agree |
| 2. I don't expect to use much math when I get out of school. | Disagree | Neither | Strongly disagree |
| 3. I'm not the type to do well in math. | Strongly disagree | Disagree | Strongly disagree |
| 4. I usually feel good when I'm doing math. | Agree | Neither | Agree |
| 5. Math problems are boring. | Disagree | Neither | Disagree |
| 6. Sometimes things outside of school make it hard for me to concentrate in math class. | Disagree | Disagree | Disagree |
| 7. I don't enjoy math class very much. | Disagree | Neither | Strongly disagree |
| 8. I study math because I know how useful it is. | Agree | Neither | Agree |
| 9. For some reason even if I study, math seems hard to me. | Disagree | Disagree | Disagree |
| 10. When I am stuck on a math problem my teacher encourages me to keep trying. | Neither disagree nor agree | Disagree | Agree |
| 11. Math doesn't scare me at all. | Neither | Agree | Agree |
| 12. No on ever helps me with my math homework. | Disagree | Disagree | Disagree |
| 13. My family would be proud of me if I were a good math student. | Neither | Neither | Agree |


| 14. I expect to use math lots of ways when I'm an adult. | Agree | Strongly agree | Agree |
| :---: | :---: | :---: | :---: |
| 15. Math has been one of my worst subjects. | Disagree | Disagree | Strongly Disagree |
| 16. I usually like to share my ideas in math class. | Agree | Agree | Strongly agree |
| 17. Math usually makes me feel uncomfortable and nervous. | Disgree | Disagree | Strongly disagree |
| 18. Finding a chance to do math at home is difficult for me. | Disagree | Neither | Disagree |
| 19. My grades aren't very important to my family. | Strongly disagree | Strongly disagree | Strongly disagree |
| 20. Taking math is mostly a waste of time. | Strongly disagree | Disagree | Strongly disagree |
| 21. I am good at doing hard math problems. | Agree | Agree | Neither |
| 22. My teacher usually gives me the answer when I'm stuck on a math problem. | Strongly disagree | Disagree | Disagree |
| 23. I like challenging math problems. | Disagree | Disagree | Agree |
| 24. My life outside of school makes me want to do well in math class. | Neither | Neither | Neither |
| 25. If I'm stuck on a math problem, I like it if my teacher gives me the answer. | Neither | Disagree | Strongly disagree |
| 26. I am sure I can learn math. | Strongly agree | Strongly agree | Strongly agree |
| 27. It would mean a lot to me to get A's in math. | Strongly agree | Disagree | Strongly agree |
| 28. In math most solutions are either right or wrong. | Strongly disagree | Neither | Neither |


| 29. It is easy to find time to do math homework after school. | Agree | Disagree | Agree |
| :---: | :---: | :---: | :---: |
| 30. Once I start working on a math problem I find it hard to stop. | Neither | Agree | Agree |
| 31. Sometimes doing math in school makes me feel bad. | Strongly disagree | Disagree | Strongly disagree |
| 32. I have a lot of self-confidence when it comes to math. | Strongly agree | Neither | Strongly agree |
| 33. I don't care about being a good math student. | Strongly disagree | Disagree | Strongly disagree |
| 34. Mathematics can be very creative. | Strongly agree | Neither | Agree |
| 35. When I share my ideas in math class I often feel frustrated. | Disagree | Disagree | Disagree |
| 36. I sometimes get help with math outside of school. | Agree | Neither | Agree |
| OE37. Does doing math ever make you feel good? | Yes it does. When I get the right answer and and I explain it to the class so they could understand, it makes feel smart. | Yes it does because when I answer a question right, then I feel smart. | Doing math doesn't make me feel good but I am always proud of myself when I have the correct answer and can explain my strategy on how I got it. |
|  |  |  |  |


| OE38. Does doing math ever make you feel bad? | Yes. Sometimes. When I don't <br> understand a problem and <br> everybody else does, I don't feel <br> very smart. | Yes, if I get an answer <br> wrong. | Doing math never makes me feel bad. |
| :--- | :--- | :--- | :--- |
|  |  | Yeah. Multiplying and counting <br> my money. (My homework) | Yes, counting my <br> allowence. |
| OE39. Is there anything that you do outside of school that <br> requires math? | Yes! When I bake brownies I use math, <br> when I wash and dry dishes I use math <br> even when I'm sleeping. I use math. |  |  |
| OE40. How do you think you will use math when you are an <br> adult? | If I don't have a calculater then I <br> could count my money. or I can <br> see if a cashier at the store is <br> trying to short. | When I count my <br> money or at work. | One way I will use math when I am an <br> adult is calculating my money. another <br> is if I get my own apartment or house <br> and I want a new would or tile floor. |

APPENDIX C2

## MM Affect Study Survey Responses

Tyana

| Survey Item | Grade 7 Entrance 9/22/2006 (age 12) | Grade 7 Exit 6/15/2007 (age 12) | Grade 11 9/14/2010 (age 16) |
| :---: | :---: | :---: | :---: |
| 1. I usually like doing math. | Strongly agree | Strongly agree | Strongly agree |
| 2. I don't expect to use much math when I get out of school. | Neither agree or disagree | Disagree | Disagree |
| 3. I'm not the type to do well in math. | Strongly disagree | Strongly disagree | Strongly disagree |
| 4. I usually feel good when I'm doing math. | Agree | Neither disagree nor agree | Agree |
| 5. Math problems are boring. | Disagree | Strongly agree | Disagree |
| 6. Sometimes things outside of school make it hard for me to concentrate in math class. | Agree | Neither disagree nor agree | Neither disagree nor agree |
| 7. I don't enjoy math class very much. | NR | Strongly disagree | Strongly disagree |
| 8. I study math because I know how useful it is. | Agree | Agree | Disagree |
| 9. For some reason even if I study, math seems hard to me. | Disagree | Strongly disagree | Strongly disagree |
| 10. When I am stuck on a math problem my teacher encourages me to keep trying. | Agree | Strongly agree | Strongly agree |
| 11. Math doesn't scare me at all. | Agree | Agree | Agree |
| 12. No on ever helps me with my math homework. | Disagree | Strongly disagree | Strongly disagree |
| 13. My family would be proud of me if I were a good math student. | Agree | Strongly agree | Agree |
| 14. I expect to use math lots of ways when I'm an adult. | Agree | Agree | Neither agree or disagree |


|  |  |  |  |
| :---: | :---: | :---: | :---: |
| 15. Math has been one of my worst subjects. | Disagree | Disagree | Strongly disagree |
| 16. I usually like to share my ideas in math class. | Agree | Agree | Strongly agree |
| 17. Math usually makes me feel uncomfortable and nervous. | Disagree | Neither disagree nor agree | Neither disagree nor agree |
| 18. Finding a chance to do math at home is difficult for me. | Disagree | Disagree | Strongly disagree |
| 19. My grades aren't very important to my family. | Neither agree or disagree | Strongly agree | Strongly disagree |
| 20. Taking math is mostly a waste of time. | Strongly disagree | Strongly disagree | Strongly disagree |
| 21. I am good at doing hard math problems. | Agree | Neither agree or disagree | Agree |
| 22. My teacher usually gives me the answer when I'm stuck on a math problem. | Disagree | Disagree | Strongly disagree |
| 23. I like challenging math problems. | Agree | Neither disagree nor agree | Strongly agree |
| 24. My life outside of school makes me want to do well in math class. | Disagree | Strongly disagree | Agree |
| 25. If I'm stuck on a math problem, I like it if my teacher gives me the answer. | Neither disagree nor agree | Agree | Agree |
| 26. I am sure I can learn math. | Strongly agree | Strongly agree | Strongly agree |
| 27. It would mean a lot to me to get A's in math. | Agree | Strongly agree | Strongly agree |
| 28. In math most solutions are either right or wrong. | Neither disagree nor agree | Neither disagree nor agree | Agree |
| 29. It is easy to find time to do math homework after school. | Disagree | Strongly disagree | Neither disagree nor agree |
| 30. Once I start working on a math problem I find it hard to stop. | Agree | Agree | Agree |


| 31. Sometimes doing math in school makes me feel bad. | Disagree | Strongly disagree | Disagree |
| :---: | :---: | :---: | :---: |
| 32. I have a lot of self-confidence when it comes to math. | Agree | Neither agree or disagree | Strongly disagree |
| 33. I don't care about being a good math student. | Strongly disagree | Strongly disagree | Strongly disagree |
| 34. Mathematics can be very creative. | Neither disagree nor agree | Neither disagree nor agree | Agree |
| 35. When I share my ideas in math class I often feel frustrated. | Disagree | Strongly disagree | Neither disagree nor agree |
| 36. I sometimes get help with math outside of school. | Agree | Strongly disagree | Agree |
| 37. Does doing math ever make you feel good? | yea because say if I am mad and science the when I get mad I feel better | yea because if I know [t]he answer they say good job | yeah sometimes because you get a right answer on a hard you proud well I know I do. It also make me feel good when I shop because the percent in how much |
| OE38. Does doing math ever make you feel bad? | no because I learn from my mistake | no because I know how to do it | no cause I like doing it if I get it wrong unless I know I try. |
| OE39. Is there anything that you do outside of school that requires math? | Yea when I home I am counting change | Yea count my money | yeah when I shop I add the prices in my head and I work out the amount that I have off. |
| OE40. How do you think you will use math when you are an adult? | By working with a cash [ $x x x$ ] say If I I on a [ $x x x]$ I [xxx] count money | When I am a vocation I count the [xxxx] [xxx] count money | I use math when I'm adult by going food shopping and paying my bills. |

## APPENDIX C3

MM Affect Study Survey Responses
Shaniyah


| 15. Math has been one of my worst subjects. | Disagree | Disagree | Disagree |
| :---: | :---: | :---: | :---: |
| 15. Math has been one of my worst subjects. | Disagre | Disagre | Disagre |
| 16. I usually like to share my ideas in math class. | Neither | Neither | Agree |
| 17. Math usually makes me feel uncomfortable and nervous. | Neither | Neither | Disagree |
| 18. Finding a chance to do math at home is difficult for me. | Disagree | Neither | Disagree |
| 19. My grades aren't very important to my family. | Strongly disagree | Strongly disagree | Strongly disagree |
| 20. Taking math is mostly a waste of time. | Disagree | Disagree | Strongly disagree |
| 21. I am good at doing hard math problems. | Neither | Neither | Neither |
| 22. My teacher usually gives me the answer when I'm stuck on a math problem. | Disagree | Strongly disagree | Disagree |
| 23. I like challenging math problems. | Agree | Neither | Agree |
| 24. My life outside of school makes me want to do well in math class. | Strongly agree | Agree | Strongly agree |
| 25. If I'm stuck on a math problem, I like it if my teacher gives me the answer. | Neither | Neither | Neither |
| 26. I am sure I can learn math. | Neither | Neither | Agree |
| 27. It would mean a lot to me to get A's in math. | Neither | Agree | Agree |
| 28. In math most solutions are either right or wrong. | Agree | Neither | Disagree |
| 29. It is easy to find time to do math homework after school. | Agree | Neither | Agree |
| 30. Once I start working on a math problem I find it hard to stop. | Agree | Neither | Neither |


| 31. Sometimes doing math in school makes me feel bad. | Disagree | Neither | Disagree |
| :---: | :---: | :---: | :---: |
| 32. I have a lot of self-confidence when it comes to math. | Agree | Neither | Agree |
| 33. I don't care about being a good math student. | Disagree | Disagree | Strongly disagree |
| 34. Mathematics can be very creative. | Agree | Neither | Neither |
| 35. When I share my ideas in math class I often feel frustrated. | Neither | Disagree | Disagree |
| 36. I sometimes get help with math outside of school. | Agree | Neither | Agree |
| OE37. Does doing math ever make you feel good? | sometimes it make's me feel good because if I solved a hard problem then I will be happy. | sometimes it makes me feel good because I might know the answer and I might feel like I learned something | yes math does make me feel good because, it gives me confidence in the math area that I need. |
| OE38. Does doing math ever make you feel bad? | no because I can learn from my mistake | yes because I might not feel like it or I might not get something | usually math doesn't make me feel bad but it does its because I don't know the problems that I am doing and every body else does. So that makes me feel left behind |
| OE39. Is there anything that you do outside of school that requires math? | yes when I go to the store and I have to count my change | nope | outside of school when I go shopping and when Im at my job I have to calculate money. so I have to use math |
| OE40. How do you think you will use math when you are an adult? | In my job or using my car for gas | with my job | when I am an adult I will use math on my job because what ever I do I know Imma need my math, also shopping and of course taking care of business. |

APPENDIX C4 MM Affect Study Survey Responses Erica

| Survey Item | Grade 7 Entrance 9/22/2006 (age 12) | Grade 7 Exit Absent | $\begin{gathered} \text { Grade } 11 \\ 5 / 29 / 2009 \text { (age 15) } \\ \hline \end{gathered}$ |
| :---: | :---: | :---: | :---: |
| 1. I usually like doing math. | Agree |  | Agree |
| 2. I don't expect to use much math when I get out of school. | Strongly disagree |  | Strongly disagree |
| 3. I'm not the type to do well in math. | Disagree |  | Strongly disagree |
| 4. I usually feel good when I'm doing math. | Agree |  | Neither |
| 5. Math problems are boring. | Strongly disagree |  | Neither |
| 6. Sometimes things outside of school make it hard for me to concentrate in math class. | Strongly disagree |  | Strongly disagree |
| 7. I don't enjoy math class very much. | Strongly disagree |  | Neither |
| 8. I study math because I know how useful it is. | Strongly agree |  | Agree |
| 9. For some reason even if I study, math seems hard to me. | Strongly disagree |  | Disagree |
| 10. When I am stuck on a math problem my teacher encourages me to keep trying. | Neither |  | Disagree |
| 11. Math doesn't scare me at all. | Agree |  | Agree |
| 12. No on ever helps me with my math homework. | Strongly disagree |  | Disagree |
| 13. My family would be proud of me if I were a good math student. | Strongly agree |  | Agree |
| 14. I expect to use math lots of ways when I'm an adult. | Strongly agree |  | Agree |



| 31. Sometimes doing math in school makes me feel bad. | Strongly disagree | Disagree |  |
| :--- | :--- | :--- | :--- |
|  |  |  |  |
|  | Strongly agree |  | Disagree |
|  | Strongly disagree |  | Disagree |
| 33. I don't care about being a good math student. |  |  | Strongly agree |
|  | Neither |  | Agree |
| 34. Mathematics can be very creative. | Strongly disagree | Disagree |  |
|  | Strongly agree | no doing math do not let |  |
| 35. When I share my ideas in math class I often feel frustrated. | [look at original!] yes I do <br> because when I get the <br> answer right. |  | me feel good because I |
| don't get the help I need. |  |  |  |$\quad$| no I feel ok. |
| :--- |
| 36. I sometimes get help with math outside of school. |

APPENDIX C5
MM Affect Study Survey Responses
Pamela

| Survey Item | Grade 7 Entrance 9/22/2006 (age 12) | Grade 7 Exit 6/15/2007 (age 13) | $\begin{gathered} \text { Grade } 11 \\ 6 / 5 / 2009 \text { (age 14) } \\ \hline \end{gathered}$ |
| :---: | :---: | :---: | :---: |
| 1. I usually like doing math. | Strongly disagree | Strongly disagree | Strongly agree |
| 2. I don't expect to use much math when I get out of school. | Strongly disagree | Neither | Strongly disagree |
| 3. I'm not the type to do well in math. | Neither | Strongly disagree | Strongly disagree |
| 4. I usually feel good when I'm doing math. | Neither | Neither | Agree |
| 5. Math problems are boring. | Disagree | Neither | Strongly disagree |
| 6. Sometimes things outside of school make it hard for me to concentrate in math class. | Disagree | Disagree | Strongly disagree |
| 7. I don't enjoy math class very much. | Disagree | Strongly agree | Strongly disagree |
| 8. I study math because I know how useful it is. | Agree | Strongly disagree | Agree |
| 9. For some reason even if I study, math seems hard to me. | Strongly disagree | Strongly disagree | Strongly disagree |
| 10. When I am stuck on a math problem my teacher encourages me to keep trying. | Agree | Neither | Agree |
| 11. Math doesn't scare me at all. | Strongly agree | Strongly disagree | Strongly agree |
| 12. No on ever helps me with my math homework. | Neither | Strongly disagree | Strongly agree |
| 13. My family would be proud of me if I were a good math student. | Strongly agree | Neither | Agree |


|  |  |  |  |
| :---: | :---: | :---: | :---: |
| 14. I expect to use math lots of ways when I'm an adult. | Strongly agree | Agree | Strongly agree |
| 15. Math has been one of my worst subjects. | Strongly disagree | Strongly disagree | Strongly disagree |
| 16. I usually like to share my ideas in math class. | Strongly disagree | Strongly disagree | Neither |
| 17. Math usually makes me feel uncomfortable and nervous. | Strongly disagree | Strongly disagree | Strongly disagree |
| 18. Finding a chance to do math at home is difficult for me. | Strongly disagree | Strongly disagree | Strongly disagree |
| 19. My grades aren't very important to my family. | Strongly disagree | Strongly disagree | Strongly disagree |
| 20. Taking math is mostly a waste of time. | Strongly disagree | Disagree | Strongly disagree |
| 21. I am good at doing hard math problems. | Strongly agree | NR | Strongly agree |
| 22. My teacher usually gives me the answer when I'm stuck on a math problem. | Strongly disagree | Strongly agree | Strongly agree |
| 23. I like challenging math problems. | Strongly agree | Neither | Strongly agree |
| 24. My life outside of school makes me want to do well in math class. | Neither | Neither | Strongly agree |
| 25. If I'm stuck on a math problem, I like it if my teacher gives me the answer. | Disagree | Strongly disagree | Strongly disagree |
| 26. I am sure I can learn math. | Strongly agree | Strongly agree | Strongly agree |
| 27. It would mean a lot to me to get A's in math. | Strongly agree | Neither | Strongly agree |
| 28. In math most solutions are either right or wrong. | Neither | Neither | Agree |


| 29. It is easy to find time to do math homework after school. | Strongly agree | Neither | Strongly agree |
| :---: | :---: | :---: | :---: |
| 30. Once I start working on a math problem I find it hard to stop. | Neither | Strongly disagree | Strongly agree |
| 31. Sometimes doing math in school makes me feel bad. | Disagree | Strongly disagree | Strongly disagree |
| 32. I have a lot of self-confidence when it comes to math. | Agree | Neither | Strongly agree |
| 33. I don't care about being a good math student. | Strongly disagree | Neither | Strongly disagree |
| 34. Mathematics can be very creative. | Neither | Neither | Agree |
| 35. When I share my ideas in math class I often feel frustrated. | Disagree | Strongly disagree | Strongly disagree |
| 36. I sometimes get help with math outside of school. | Neither | Strongly disagree | Strongly disagree |
| OE37. Does doing math ever make you feel good? | Yes, because sometimes I get the problem right. And when I get it right I learn from my mistakes, so than I get it right the next time. | No it does not! | So math does make feel good because I feel as though I'm good at something besides singing and dancing, and what others expect me to do. |
| OE38. Does doing math ever make you feel bad? | No, because math can help you later in math. So you know how much to get payed. | No it doesn't! | No math never make me feel bad |
| OE39. Is there anything that you do outside of school that requires math? | Yes, because you can use if are in a store and they will not give you all the money and you will know | Going to the mall I have to count my money | Yes there is something I do outside of school that requires math. I help my niece with he homework along with my cousins. |


| OE40. How do you think you will use math when you are <br> an adult? | When you are in a store and they <br> will not give you all the meony <br> (sic) and you will know. Or your <br> job will not give you all your <br> meoney and than your know. | Counting money! | I will use math when I'm <br> an adult when my cousins <br> need help with whatever <br> work they have. And since |
| :--- | :--- | :--- | :--- |
| I'm going in a science field |  |  |  |
| science and math go hand |  |  |  |
| in hand. |  |  |  |

## APPENDIX D1

## Jana Protocol 1 Interview

Date of Interview: 5/21/09
Date of Transcription: 11/21/2010
Transcriber Initials: A.S.

| Speaker Move | Transcript | Notes |
| :---: | :---: | :---: |
| 1. MJ | Ok umm would you introduce yourself and tell us who you are and how old you are and what grade you're in? |  |
| 2. J | Yeah um my name is Janae Hemmings and (laughs) I attend Plainfield High and I'm a $9^{\text {th }}$ grade student and I was in Mr. Pedrick's $7^{\text {th }}$ grade math class at Hubbard...at Hubbard Middle School... yeah |  |
| 3. MJ | Ok that was great I didn't even have to ask you to put that in. Um I would ask you just to remember to try to keep your voice up, ok? |  |
| 4. J | Ok. |  |
| 5. MJ | Um so I hope I refreshed your memory a little bit about um your math class um and we're going to assume that you took the math survey again (laughs). Um...So I'm going to start with the first um student interview protocol and I would just like for you to tell me about your math class this year um what kind of math you're taking uh what you've been studying...? | In error, MJ did not have a math survey, so Jana completed it on the next day (May 22) |
| 6. J | Um, I'm in Algebra 1 this year and we've been working on like slopes and putting slope form and stuff and um right now I forgot what it's called um exponents and stuff yeah...we're doing exponents right now...yeah |  |
| 7. MJ | Are those things that you've worked on before or have you been doing a lot of things that are new in math class this year? |  |
| 8. J | (softly) let me see let me see...um...well but at the beginning we were working on percentage and stuff, percentage and you know turning it into fraction form and decimal and now... and the point slope form is new to me and yeah but the exponents I, I've learned exponents before in my younger grades | Jana spoke confidently about learning exponents in earlier grades |
| 9. MJ | So a combination of things that are new to you and some things that you have seen before that you worked on. |  |
| 10. J | Uh hmm |  |
| 11. MJ | Ok, um I would like to show you um a little bit um of the video tape that we took at Mr. Pedrick's class. Specifically I'm going to try to get to places where um you see yourself a lot |  |


| 12. J | (laughing) |  |
| :---: | :---: | :---: |
| 13. MJ | Bring back memories? |  |
| 14. J | (laughing) yes |  |
| 15. MJ | Who's that? |  |
| 16. J | What is she doing? (laughing) | Jana is watching a $7^{\text {th }}$ grade video clip when she was sitting next to Daquanna |
| 17. J | What were we doing? |  |
| 18. MJ | What does the time say down there? Cuz I want to go to about 8 minutes |  |
| 19. J | Uh, it says...wait it says 8 minutes |  |
| 20. MJ | It's at 8 minutes? Ok I just want to fast forward to another part at about 19 minutes |  |
| 21. J | (Laughing) |  |
| 22. MJ | You look happy |  |
| 23. J | (laughing) |  |
| 24. Jana's sister | So are those photos the only ones you were taking? | Jana's sister was curious about the classroom videotape that had taken place in Jana's $7^{\text {th }}$ grade math class |
| 25. MJ | Well we had different cameras, see there's a young lady standing there, we had stationary cameras... |  |
| 26. MJ | Ok um I just wanted to give you a sense of one of the times we came in and videotaped the class. Um so based on that, can you sort of describe what you saw and what you remember? Not necessarily about the content because I don't have the problem here but just describe...how would you describe your math class in general in Mr. Pedrick's class? |  |
| 27. J | Um it was fun sometimes. Um like if you needed um help with something he would tell you to ask 3, wait, I think we asked 3 students and then we asked him for help or...I liked it better working in group stuff because like if I needed help I wouldn't have to raise my hand if he was working with another student I wouldn't have to raise my hand and wait if I needed help I could just ask somebody sitting next to me so... | Jana remembered that Mr. Pedrick advised everyone to ask classmates for help - to use classmates as resources for learning. <br> Social interaction: communalism |
| 28. MJ | And in this particular...on this particular day you were sitting with a group of girls. Tell me what you remember about that and who were the girls and....a little bit about how you worked with them. |  |
| 29. J | Um I was sitting with Daquana and Naomi I don't remember who was the other one...the other girl but I really don't remember what we were working on |  |


| 30. MJ | Um but you remember working in groups a lot? Did you often sit with girls? |  |
| :--- | :--- | :--- |
| 31. J | Yeah umhmm |  |
| 32. MJ | Were there times when you sat with boys in the group? |  |
| 33. J | I think I sat with...Kenyatta once for a project, I don't know I don't really <br> remember... |  |
| 34. MJ | Um and I know again, I appreciate you trying to think back 2 years. Do you <br> think you remember anything about how you felt about whether you worked <br> with boys or with girls? In Mr. Pedrick's class? |  |
| 35. J | No... |  |
| 36. MJ | No? ok... | Jana felt the same working in groups with boys or <br> girls |
| 37. J | It was the same |  |
| 38. MJ | Um maybe you don't remember specifically about this lesson but is there a <br> specific lesson that you can recall when I say Mr. Pedrick's class in 7h grade? <br> Yeah? You shook your head right away. |  |
| 39. J | (laughs) yeah it was a lesson where we had a big graph paper and we had to <br> choose like an object or something and like draw it on the graph paper like <br> name the coordinates yeah it was, that was a nice project. | Jana remembered immediately the enlarging a <br> picture onto large graph paper lesson |
| 40. MJ | And you describe it as being a nice project... |  |
| 41. J | Well it was fun... |  |
| 42. MJ | It was fun? Is that why you remember it? |  |
| 43. J | Yeah |  |
| 44. MJ | Are there any other lessons uh that you can remember? |  |
| 45. J | No... | But you remember about this because it was fun, it was fun. What made it <br> fun? |
| 46. MJ | Because you could use any object we wanted, like... |  |
| 47. J | You could use any object to do what? |  |
| 48. MJ | To um...to put it on a graph paper (laughs) |  |
| 49. J | So...tell me what you remember about the math specifically. So how did you <br> choose any object that you chose to put it on the graph paper? What were you <br> doing? | Um...we had to expand it like, hmm...at first you put it on the regular sized <br> graph paper like because, I used a hat because... |
| 50. MJ | What did you use? |  |
| 51. J | A hat cuz at the time I liked the singer Ne-yo and he always wears those hats |  |
| 52. MJ | 53. J |  |


|  | or whatever so I put it, well I drew it on the graph paper and then the point of it was to see like see how much we had to multiply it to fit the object to make it big enough on the bigger graph paper so that's what we... |  |
| :---: | :---: | :---: |
| 54. MJ | Oh... |  |
| 55. J | Yeah... |  |
| 56. MJ | And who's $\mathrm{Ne}-\mathrm{Yo}$ ? |  |
| 57. J | The singer/song writer R\&B (laughs) |  |
| 58. MJ | Oh yeah (laughs) Have you done anything like that since? |  |
| 59. J | (shakes head no) uh uhh |  |
| 60. MJ | No? So uh last year you were in $8^{\text {th }}$ grade and what math did you have in $8^{\text {th }}$ grade? Did you take? |  |
| 61. J | Algebra I think. I think it was Algebra or math I don't know (whispering) | Jana doesn't remember for sure the math class she took in $8^{\text {th }}$ grade |
| 62. MJ | And so you don't remember doing anything quite like that in $8^{\text {th }}$, either in $8^{\text {th }}$ grade or in $9^{\text {th }}$ grade? Cuz it's just about the end of the year... |  |
| 63. J | No...(shakes head no) uh uhh |  |
| 64. MJ | No? um so if I asked you how is your current math class like Mr. Pedrick's? What would you say? |  |
| 65. J | I don't know... |  |
| 66. MJ | Well let me put it this way. Is your math class now that you've had this year, is it like Mr. Pedrick's class? Or different? |  |
| 67. J | It's different |  |
| 68. MJ | Can you tell me why? Anything specific? |  |
| 69. J | Because we don't really, we haven't done any projects like cuz we used to do projects in Mr. Pedrick's class I really can't remember what we did. I just remember that one but in this year in $9^{\text {th }}$ grade in the Algebra 1 class we don't do any projects. He gives us work, he teaches it and yeah. He teaches it very well, like I understand but it's different than Mr. Pedrick's class. | Jana thinks the teacher "teaches well" but not through projects |
| 70. MJ | It's different ok. So uh you worked a lot um in groups in Mr. Pedrick's class and well what about last year? What do you remember about last year? How you worked in math class? |  |
| 71. J | I worked with 2 people cuz that's how the tables were, it was 3 people to a table so I worked with 2 people or I worked by myself. That's how it was. | Jana would work with the 2 people at her table or alone. |
| 72. MJ | Was it the same two, the same two uh classmates? |  |
| 73. J | No it was different |  |
| 74. MJ | It was different. But you did have a chance to work with someone else? |  |


| 75. J | (nods head yes) |  |
| :---: | :---: | :---: |
| 76. MJ | Um, how do you think, what kind of class do you think helped you learn more math? |  |
| 77. J | My $8^{\text {th }}$ grade... | Jana feels that she learned a lot in $8^{\text {th }}$ grade algebra class |
| 78. MJ | Can you tell me why? |  |
| 79. J | It's, it's just the way that my teacher teach, like the math, like he would explain it on the board and like he would give examples, like other examples if you didn't understand it. And like he would talk to you one on one if you didn't understand it. I don't know I just, I learned a lot in that class. | Refers to teacher giving "one on one" attention when students don't understand |
| 80. MJ | Um hmm so if I asked you to compare um how you learned and whether you think you learned the most. You had Mr. Pedrick's class in $7^{\text {th }}$ grade, you had um $8^{\text {th }}$ grade math? And you said that was Algebra as well? |  |
| 81. J | Yeah |  |
| 82. MJ | And this year in $9^{\text {th }}$ grade, so if you were to compare which environment, which classroom environment and teaching do you think you learned the most? |  |
| 83. J | Wait, what's the question? (laughs) |  |
| 84. MJ | Um...it's been, this is the $3^{\text {rd }}$ year, um, ok you had $7^{\text {th }}$ grade math, you had $8^{\text {th }}$ grade math and you had $9^{\text {th }}$ grade math, if you could think back and compare the 3 years, which year did you think you learned the math? Learned the most math? |  |
| 85. J | Umm...this year. It's between $8^{\text {th }}$ grade and this year. I learned a lot this year, um, yeah | Although Jana describes Mr. Pedrick's class as fun and enjoyed the projects, she says she believes that she learned the most math during $8^{\text {th }}$ and $9^{\text {th }}$ grade |
| 86. MJ | Um if I asked you if there was some specific things you remember learning very well what would they be? |  |
| 87. J | Hmmm...I don't, I don't know what it's called but it's like if you have a triangle and you have two angles that has um the labels like the numbers and you need to find one I liked that very well I forgot, I forgot what it's called... | When Jana describes something that she learned very well, she cannot recall/explain exactly what she wants to convey |
| 88. MJ | The sides of a triangle... |  |
| 89. J | Yeah... |  |
| 90. MJ | You could find the length. Um that sounds like geometry. Is that what you had last year? |  |
| 91. J | Yeah I think so...I don't remember |  |
| 92. MJ | Ok um what else can you tell me about math class and learning math? For |  |


|  | you personally. |  |
| :---: | :---: | :---: |
| 93. J | It's....math is easy to me, once you learn how to do a certain thing and it's very important and like it could be fun... |  |
| 94. MJ | Ok I'm gonna get back to that but um I have a fantasy question for you. (laughs) |  |
| 95. J | (laughs) |  |
| 96. MJ | Ok? You can imagine anything because it's your story and your fantasy. I'd like for you to imagine and tell me what the perfect math class for you would look like. I want you to describe, think about it, I want you to describe your teacher, I want you to describe your classmates umm I want you to describe the kind of things you'd be doing the size of the room if you can imagine ok if you could say "ok this is the perfect math class from Janae, I learn a lot" um whatever it is that you think would help you learn math. What would be the best way for you to learn math? Just picture it and describe it in as much detail as you can think of. What would the classroom look and sound like? What would the teacher be doing? What would the teacher look like? |  |
| 97. J | (laughs) Umm, wow...it's like, certain problems are easy for me if I see the formula. I could do it, like point slope form or like dealing with negative numbers. I would say that on the wall it would be a whole lot of like charts with formulas and stuff and like all the definitions of words like linear and stuff and I don't know...it would be big numbers all around the ceiling going from 1 to 10 and the doorknob would be a 0 . And what else, the teacher, like if the teacher asks the question every hand in the class goes up and um... | Perfect classroom description: charts on the wall with words, formulas, numbers, all students participate by answering teacher questions ("every hand in the class goes up") |
| 98. MJ | Hmmm ok good, good I like these details, more details. Like I said this is "Janae's perfect math class" |  |
| 99. J | Umm... |  |
| 100. MJ | Anything else about what it would look like or sound like? |  |
| 101. J | I can't really think of any more... |  |
| 102. MJ | Umm, what about your classmates? Who would be in your perfect math class? |  |
| 103. J | My friends |  |
| 104. MJ | Your friends? Would that include boys and girls? just girls? any, all the details | [why just friends?] |
| 105. J | Boys and girls. |  |
| 106. MJ | Yeah? Say that again. |  |
| 107. J | Boys and girls. |  |


| 108. MJ | Boys and girls? Ok. Ok and you talked a little bit about what they would be <br> doing. You gave the example that if the teacher asked a question, everybody's <br> hand would go up. Why would everybody's hand go up? |  |
| :--- | :--- | :--- |
| 109. J | Cuz everybody would know the answer. Everybody would understand how to <br> get the answer... |  |
| 110. MJ | And you talked a little bit about what would be on the wall, the doorknob. <br> Um, what other kinds of things would be in the room? What kinds of things <br> do you think would help you learn math? |  |
| 111. J | I don't know... |  |
| 112. MJ | Well one of the reasons you said um that you remember a specific lesson <br> from Mr. Pedrick's class was because it was the graph paper and you could <br> use anything you wanted as your object um so graph paper or something <br> would be in your room, anything else? | Jana had difficulty envisioning a math classroom that <br> would look very different from those she'd been in - <br> described typical classroom materials and <br> teacher/student behavior |
| 113. J | A number line |  |
| 114. MJ | Ok... |  |
| 115. J | Um...shapes and stuff |  |
| 116. MJ | Umm...so let me ask you another question about, still on this fantasy <br> classroom, "Janae's perfect class perfect math class". How would the teacher <br> know if you were learning? What kinds of things do you imagine the teacher <br> would do? So that they would know that you were learning |  |
| 117. J | Just pop out with a question to ask anybody, see if you know it, if you were <br> paying attention when he was teaching it umm... |  |
| 118. MJ | Ok...uhm, anything else about this classroom? Would it be a large <br> classroom? Would there be a lot of students? A lot of your friends in there <br> with you? Or a few? |  |
| 119. J | Not a lot but not like a few. Maybe about 16, 17 |  |
| 120. MJ | Yeah? |  |
| 121. J | That's a pretty good size... |  |
| 122. MJ | So um when you looked at the videotape of Mr. Pedrick's class would that be <br> a large class to you? Would that be too many of your friends in there? |  |
| 123. J | (laughs) yeah it was a pretty big class I think yeah...it was a pretty big <br> llass... | So it sounds like you would prefer not as many students as was in Mr. <br> Pedrick's class... |
| 124. MJ | Yeah a little less.. |  |
| 126. MJ | Ok...a little less ok...um you started to talk a little bit about this before but |  |


|  | um my specific question is what importance if any does school math have for <br> you? |  |
| :--- | :--- | :--- |
| 127. J | Umm ummm...well I think I'm gonna need to know... |  |
| 128. MJ | Make sure the camera can hear you |  |
| 129. J | Oh um I'm gonna need to know math because I'm gonna be working with <br> money and stuff, well not working with money but like when I get my check <br> and stuff I'm gonna need to know how to count my money and stuff |  |
| 130. MJ | That's a pretty important reason to know math |  |
| 131. J | Yes (laughs) |  |
| 132. MJ | (laughs) I agree with that. Um can you think of any other important reasons? |  |
| 133. J | Um if you want to become a baker or something or an inventor, whatever <br> materials and ingredients you need in your stuff to make it taste right or make <br> it be right you would need to know the certain amount of things you need to <br> make it invention good or the best | Janecific amounts of materials or ingredients in <br> certain combinations |
| 134. MJ | Um has that ever happened to you? Have you ever tried to invent something <br> and you realize "uh oh I need to learn how to do this" or have you ever tried <br> to follow a recipe? |  |
| 135. J | Yeah |  |
| 136. MJ | Yeah? |  |
| 137. J | I put too much water in brownies, I think, yeah brownies, I was making some <br> and I put too much water in the mix |  |
| 138. MJ | And why did that happen? Did you have to calculate how much water or did <br> you make a mistake in measuring...? |  |
| 139. J | Yeah I think I yeah I made a mistake cuz in the measuring cup it has like 2, 2, <br> um types of measuring and I put it in the wrong one cuz I didn't read <br> (laughs) |  |
| 140. MJ | Have you ever had...do you cook a lot? |  |
| 141. J | No |  |
| 142. MJ | No? |  |
| 143. J | I don't know how to cook |  |
| 144. MJ | Oh right...me either... |  |
| 145. J | I only make macaroni and cheese and that's it |  |
| 146. MJ | Out of the box? |  |
| 147. J | Yeah (laughs) |  |
| 148. MJ | Or from scratch? |  |
| 149. J | Out of the box |  |


| 150. MJ | Out of the box? |  |
| :--- | :--- | :--- |
| 151. J | Yeah |  |
| 152. MJ | Ok...so um actually you just follow the instructions right? There's no <br> measuring |  |
| 153. J | Yeah (laughs) |  |
| 154. MJ | (laughs) there are...when was the last time you had to follow like a recipe? |  |
| 155. J | I don't remember |  |
| 156. MJ | You don't remember? Have you ever had to like double a recipe? Like say a <br> recipe's for two people... |  |
| 157. J | Oh no... |  |
| 158. MJ | Ohh she said "oh no!" (laughs) if you had to do that how do you think you'd <br> handle that? |  |
| 159. J | I would put it in two different pans (Laughs) |  |
| 160. MJ | Ohhh hmmm |  |
| 161. J | That's what I would do to make it easier |  |
| 162. MJ | You would just make two single recipes and.... |  |
| 163. J | Yeah |  |
| 164. MJ | Ok...that sounds like me I, I don't cook either. Um how else do you use <br> math? |  |
| 165. J | Umm... | How else have you used math? You know just give me some other examples <br> where you're like "ok this is math and I'm using it" |
| 166. MJ | I know I used math a lot of times when I was doing stuff...I really <br> can't...can't remember...I don't remember |  |
| 167. J | Ok well think about, you've got your lovely sister here, can you think about <br> other way that, that family members or friends use math? |  |
| 168. MJ | Um I don't remember but I guess I could give an example if like you have a <br> sleepover with all your cousins and friends and you guys decide to play tug of <br> war it would you would count how many people it is I mean how many <br> people it is all together and then you would separate each other so it would be <br> a fair game...yeah...laughs) I guess... | Jana thinks of an example of equal parts in a tug-of- <br> wath cousins and friends |
| 169. J | That's math. We use numbers in math all the time you're absolutely right. <br> Um so when you think about yourself in relation to math you already <br> explained and I agree we don't cook so, we don't relate to math in terms of <br> cooking but um how do you think of yourself in relation to math? |  |
| 171. J | Like what do I think of math basically? Or... |  |


| 172. MJ | Well how do you think of yourself in relation to mathematics? Um you've been studying math since you've been in school, right? |  |
| :---: | :---: | :---: |
| 173. J | Yeah |  |
| 174. MJ | Even starting in kindergarten and now you're in $9^{\text {th }}$ grade um so how do you think of yourself in relation to math? When you think about your experiences this far... |  |
| 175. J | Umm...I don't know I could say I'm pretty good in math |  |
| 176. MJ | Say it again... |  |
| 177. J | I think I'm pretty good in math umm yeah |  |
| 178. MJ | Would you say do you think that you think that you've always been good at math? |  |
| 179. J | Yeah |  |
| 180. MJ | Um ok and in terms of it being, aside from being a subject that you have to study in school, um do you enjoy math? |  |
| 181. J | (nods head) yeah |  |
| 182. MJ | I don't want to put words in your mouth |  |
| 183. J | Yes. Sometimes, sometimes it could be, you know difficult like some subjects well, some things in math until like I really like, understand it yeah mhmm... | Jana thinks that math is difficult until she understands it |
| 184. MJ | Do you think everybody feels that way about math? |  |
| 185. J | Yeah...I think...yeah cuz some cuz I had witnessed that if we was in class and a student next to me or someone else in the classroom would say that the teacher was teaching a certain subject they would say "oh I don't understand this, I hate math, I hate math" but then when, when the teacher comes to them and really like explains it they're like "oh, this is easy!" umm, yeah | Jana believes that her peers think they can learn math despite hating it when they don't understand; Jana has "witnessed" how individual attention and explanation from teacher can change a student from "I hate math" to "oh, this is easy" |
| 186. MJ | So what do you think it means when they say "oh this is hard I can't do this" and then when the teacher explains it to them and they say it's easy? What do you think that means? |  |
| 187. J | That means that you like, things, like you have to get to understand things, I don't know, well, it's a, (sighs) umm yeah...you have to understand things, well, get to understand things before you make judgments on them. |  |
| 188. MJ | If I were to ask you about um...I'm sorry this isn't on the protocol but if I were to ask you about other subjects um do you have the same feeling about other subjects? Or is there something special or different about mathematics? |  |
| 189. J | I think...yeah...I think there's something different about math |  |
| 190. MJ | Do you think you could explain what makes math different for you? |  |
| 191. J | Because it's like...I can't explain it. It's like cuz math is like, it, it has, its |  |


|  | certain formulas for things I mean like you could be wrong but like its...I don't know how to explain it... |  |
| :---: | :---: | :---: |
| 192. MJ | That's ok you take your time there's no rush. See if you can try to explain. |  |
| 193. J | Umm....(laughs) I guess I could say that there's always like a formula for something so like if you think you got something wrong or something then you could always check to see if the formula is like...I don't know...I don't know how to explain it (laughs) | [Jana takes a very long pause] and finally says "there's always a formula for something" |
| 194. MJ | So um just to try to help you a little bit and then we can wrap up...um...it sounds like you might be saying that um math, when you think of math you think of a specific formula or way of figuring out an answer. Does that pretty much describe how you think of math? |  |
| 195. J | Yeah...it's....yeah |  |
| 196. MJ | Are there times when a formula is not gonna help you...solve a math problem? In other words, is there a time when you can do math and it doesn't have anything to do with a formula...? |  |
| 197. J | Oh! Yeah like adding or subtracting, yeah you don't really need a formula, that doesn't have to do with a formula or something... |  |
| 198. MJ | So you mentioned specifically adding and subtracting. What about multiplication and division? |  |
| 199. J | That too (laughs) |  |
| 200. MJ | (laughs) don't let me put words in your mouth (laughs) you know? Just uh...ok...and the other things besides addition and subtraction, multiplication and division um and I think I'm hearing you say that maybe after that there's um formulas and specific ways to do things? |  |
| 201. J | Uhh |  |
| 202. MJ | That's not what you're saying |  |
| 203. J | No....uh uh I don't remember saying that |  |
| 204. MJ | Ok um again this interview was all about the math part of it so is there anything else that you can think of about math that you wanna say um in terms of what you remember about math in school even as early as kindergarten or what you think about math in the future, what you'd like to take, what you think you might be doing cuz you're just finishing up $9^{\text {th }}$ grade so you got $10^{\text {th }}, 11^{\text {th }}$ and $12^{\text {th }}$ then beyond. What do you think math is gonna look like for you beyond this year? |  |
| 205. J | I think math it's gonna get....well math is not hard for me but I think it's gonna get like more difficult to understand like when I get older and stuff...I |  |


|  | don't know... |  |
| :--- | :--- | :--- |
| 206. MJ | So ok that makes me think of one more thing...um...do you think your <br> teacher knows that math, that you don't think math is difficult for you? |  |
| 207. J | Yeah |  |
| 208. MJ | How so? |  |
| 209. J | Because I don't know, it's like, |  |
| 210. MJ | Can I ask you, is your teacher male or female? |  |
| 211. J | Male |  |
| 212. MJ | Male, have you ever had a math teacher who was a woman? I guess in <br> elementary school... |  |
| 213. J | Yeah! In elementary school |  |
| 214. MJ | Yeah and they sort of taught everything anyway... |  |
| 215. J | Yeah... |  |
| 216. MJ | But in middle school, did you have a teacher who was a woman? |  |
| 217. J | Nope...all my math teachers was males in middle school |  |
| 218. MJ | Have you ever thought about that, whether it would make a difference? |  |
| 219. J | Nah...uh uh... |  |
| 220. MJ | Um you have lady teachers in other subject areas? |  |
| 221. J | (shakes head) Yeah... | Never considered differences in teachers based on <br> gender |
| 222. MJ | But you never really thought about, "hmm if my math teacher were a lady it <br> would be different."? I'm just curious... |  |
| 223. J | Nah I never thought of that |  |
| 224. MJ | Cuz I believe I girl power (laughs) |  |
| 225. J | (Laughs) |  |
| 226. MJ | Um...ok I think that's it unless there's anything else you want to tell me <br> specifically about math...um so what do you think? Have you made out your <br> schedule for next year? |  |
| 227. J | Um yeah I did | Unsure of course title but has scheduled a math class <br> for next year |
| 228. MJ | Yeah? You have a math class in there right? |  |
| 229. J | Yeah I think...I forgot...I think I put down ...I think either...is it biology? |  |
| 230. MJ | Biology is a science... | Oh! No! no! it's.... forgot! It's something, something...I either put algebra 2 <br> or something, something else in math I forgot what it's called |
| 231. J | Trigonometry? |  |
| 232. MJ | Yeah, wait... |  |
| 233. J | Ye |  |


| 234. MJ | Or....I don't know what it might be cuz you said you already had geometry <br> last year...with the shapes, you like that |  |
| :--- | :--- | :--- |
| 235. J | Yeah... |  |
| 236. MJ | With the shapes and you like that...so um algebra 2 or maybe trigonometry? |  |
| 237. J | Yeah I think I put algebra 2 |  |
| 238. MJ | Do you plan on taking math all 4 years of high school? | Jana plans to take 4 years of mathematics in high <br> school. |
| 239. J | (nods head yes) Um hum... |  |
| 240. MJ | Good! Alright well I think that's it. Thank you very much and this ends the <br> first interview with Miss Janae Hemmings. |  |

## APPENDIX D2

## Tyana Protocol 1 Interview

Name of Participant: Tyquanna Jasper
Date of Interview: 9/14/2010
Date of Transcription: 11/29/2010
Transcriber: A.S.; Researcher: MJ

| Speaker Move | Transcript | Notes <br> Tyana often worked on problems during group work with Shaniyah in $7^{\text {th }}$ grade |
| :---: | :---: | :---: |
| 1. MJ | You know you always had something to say, you were always ready (laughing). You almost look exactly the same you got on a bluish short sleeve shirt. |  |
| 2. T | I was mad little |  |
| 3. MJ | You remember that class set up? |  |
| 4. T | Yeah we was little (laughing) I was asking mad questions...we was little! I keep looking so little... |  |
| 5. MJ | You see Nammi? |  |
| 6. T | Yeah |  |
| 7. MJ | And have you seen her since? |  |
| 8. T | Nah uh (no) |  |
| 9. MJ | Oh, I noticed everyone was sitting in groups but you and Shaniyah were paired together, do you remember anything about that? |  |
| 10. T | Nah uh |  |
| 11. MJ | No? ok... |  |
| 12. T | That is a good question, why me and Shaniyah always paired up? |  |
| 13. MJ | Um, I don't know... |  |
| 14. T | I never thought about that |  |
| 15. MJ | It didn't seem to bother you or Shaniyah |  |
| 16. T | Yeah...but...we was all lonely. |  |
| 17. MJ | So I mean I've looked at these tapes and I know exactly what's going on here, you probably don't cuz you were so little then but just to refresh your memory and then I'm gonna ask you to fast forward cuz I want you to look at some specific things you were doing like um you were discussing...Brian had...you were doing graphing and Brian had this crazy looking graph where he was connecting the dots and it looked real funny like connect the dots that's what you all were discussing and you had a whole lot of ideas about that a whole lot of questions you know "why didn't you do it this way" so...over a couple of days you were talking about that graph...there go your hand |  |


| 18. MJ | And if you'd like you can sort of fast forward a little bit you definitely come on the scene at about 20 minutes so you can fast forward a little bit so you can... | [I let Tyana use the laptop to cue video clips] <br> Remembered research that took place during $7^{\text {th }}$ grade math class <br> (Rutgers researchers and |
| :---: | :---: | :---: |
| 19. T | To 20 minutes you said? |  |
| 20. MJ | Mhmmm... |  |
| 21. T | Oh, he's in trouble? |  |
| 22. MJ | No, no, no |  |
| 23. T | I still got them jeans. |  |
| 24. MJ | (laughing) really? So you see you had no problem getting up and going over to Brian. |  |
| 25. T | Now I'm shy |  |
| 26. MJ | Now you're shy? |  |
| 27. T | Mhmmm |  |
| 28. MJ | I find that really hard to believe |  |
| 29. T | Like, like, like I won't be shy....at first I be shy to ask questions but once I answer the question right I kinda go around, check everybody else's answer |  |
| 30. MJ | Once you answer the question right, you're not shy so when you think you're not right you're shy a little bit? |  |
| 31. T | Mhmmm |  |
| 32. MJ | You heard him? He's like "he's a smart kid". So you went back and explained to Shaniyah after you found out what he was talking about? |  |
| 33. T | (nods head yes) |  |
| 34. MJ | Do you remember the math book you had? With the program, what the book was called? |  |
| 35. T | It was blue right? |  |
| 36. MJ | I think they were a lot of different colors but um it was method math right? |  |
| 37. T | Yeah, I think, yeah it was that. I remember when we had the interviews and we would go in this one room after class, I remember that stuff....Was we doing robots? |  |
| 38. MJ | Um not in this, not in this session, um, but there were some other sessions where you were doing all kinds of different projects...one time you had, you were doing play dough you were working with play dough and you were making spheres and cylinders and stuff... |  |
| 39. T | Oh I remember that...I wanna see this...oh I already got my hand up |  |
| 40. MJ | You were always doing stuff on the overhead too or going up to the board. Now I could see the picture, does it bring you back any memories? |  |
| 41. T | Yeah I think it was a robot well I called it a robot... I was mad little. How long is this? |  |
| 42. MJ | Um I think it's about an hour. Oh there's Erica |  |
| 43. T | Where? |  |
| 44. MJ | Right there. |  |
| 45. T | Oh she went back to High School now |  |


| 46. MJ | What? | videotaping) <br> Remembered participating a lot in $7^{\text {th }}$ grade (i.e. raising hand, asking questions) |
| :---: | :---: | :---: |
| 47. T | She went back to high school |  |
| 48. MJ | What do you mean came back? |  |
| 49. T | She wasn't going there first, she went to another high school some other school I think |  |
| 50. MJ | I remember we all had nametags, cuz there's Nala |  |
| 51. T | Mhmmm |  |
| 52. MJ | Alright, you know what, you can stop that. I want you to take a look at this cd, just a couple of minutes on here....and let's see, I think you have to go up to the...no, go up to the apple and... |  |
| 53. T | Where? Right here? |  |
| 54. MJ | Mhmmm and I think you have an eject there? Uh... |  |
| 55. T | Where? |  |
| 56. MJ | Uh... |  |
| 57. T | This not it right here? |  |
| 58. MJ | No, that's the on/off so... |  |
| 59. T | What about this button right here, this arrow? See? |  |
| 60. MJ | Oh, ok oh, I thought you were pointing to the other thing. Ok and you can put this one in and go to about 34 minutes and... |  |
| 61. T | You know the exact time! |  |
| 62. MJ | Huh? |  |
| 63. T | How long you been watching this? |  |
| 64. MJ | (laughing) oh you know... |  |
| 65. T | It's like 4 years old |  |
| 66. MJ | I know! We've been studying these ever since then lots of people, Mr. P. is studying this for his research...lots of people are studying these tapes. It's at about 34 minutes something interesting happens with you |  |
| 67. T | For real? |  |
| 68. MJ | Mhmmm (yes) |  |
| 69. T | This one makes me feel old |  |
| 70. MJ | (laughs) what, when did you say your birthday is? |  |
| 71. T | It was Friday |  |
| 72. MJ | It was Friday? And you were all of...? |  |
| 73. T | Huh? |  |
| 74. MJ | And you were all of how many years old? |  |
| 75. T | 16...I think in that class I was 12/13 [years old] |  |
| 76. MJ | Yes, you were 12 when you filled out...you did the survey and I interviewed you, cuz I interviewed you then, too |  |


| 77. T | Which one I go to? | Remarked that [she] was always "moving" in Mr. P.'s class, and worked with Shaniyah |
| :---: | :---: | :---: |
| 78. MJ | Oh, that's right you need the um, is there one that has your name on it? |  |
| 79. T | There's the one I'm wearing a blue shirt |  |
| 80. MJ | That might be the same day...yeah... |  |
| 81. T | That was a different day... |  |
| 82. MJ | Mhmmm...see, go to 34 minutes on that one |  |
| 83. T | That's Carla? |  |
| 84. MJ | Have you seen...is Carla around? |  |
| 85. T | No, she live in New York now |  |
| 86. MJ | Right, ok yeah |  |
| 87. T | How many minutes? How you... 34 minutes right? |  |
| 88. MJ | 34 minutes...I know...in this one you really look little. That's good though I guess. Yeah you and Shaniyah were always together |  |
| 89. T | We are, right? |  |
| 90. MJ | You don't remember? |  |
| 91. T | Nah uh (no) |  |
| 92. MJ | I don't know... |  |
| 93. T | You don't know either? |  |
| 94. MJ | No...so since we're looking at it tell me some things that you noticed about Mr. P.'s class room. This is another day and it's pretty much set up the same way um, there were always tables, you weren't always sitting in the same places then right? |  |
| 95. T | Yeah, I didn't notice that we were always moving, and me and Shaniyah were always together. Everyone was in a group |  |
| 96. MJ | So it was always like that in his class huh? You never had to sit, you know you never had to sit alone or worked by yourself...? |  |
| 97. T | It was always me and Shaniyah |  |
| 98. MJ | Were there any times when you worked with others? Or it was always just the two of you? |  |
| 99. T | I think it was others but it was mostly me and me and Shaniyah |  |
| 100. MJ | Mhmmm is that different than...I'm gonna sort of do this a little bit differently than I have since we're having a good time looking at the videos maybe it'll help refresh your memory. So is that, the way Mr. P.'s class was conducted is that different than the math classes you've had since then? |  |
| 101. T | Yeah |  |
| 102. MJ | What, what, how was your math class in $8^{\text {th }}$ grade? What'd you do? |  |
| 103. T | We sit in groups but we really didn't graph, we did when we was talking about slopes and stuff equations like $\mathrm{Y}, \mathrm{X}$ all that other stuff, we graphed a little bit but not really a lot. In Mr. P.'s |  |


|  | class we used to always graph and all sorts of stuff | Worked in groups in $8^{\text {th }}$ grade but remembers "doing" more math in $7^{\text {th }}$ grade |
| :---: | :---: | :---: |
| 104. MJ | And what about working together? Were you still expected to work together? Or...? |  |
| 105. T | Nah sometimes like if we work together it's for like a project but usually it was individually |  |
| 106. MJ | It was individual? Even if you were sitting in groups? |  |
| 107. T | If we were sitting in groups, we probably sit in tables like this it would be a long table and we would do our work and after we were done...and Mr. P...I mean what was his name? Mr. $\qquad$ was talking we used to do all the work ourselves and then he would start asking questions here and there |  |
| 108. MJ | Oh ok so that was $8^{\text {th }}$ grade you had Mr. |  |
| 109. T | Yeah | Sat in groups to work [in $8^{\text {th }}$ grade], male teacher asked questions during group work |
| 110. MJ | Still at Hubbard, right? |  |
| 111. T | (nods head yes) |  |
| 112. MJ | Um what about $9^{\text {th }}$ grade? |  |
| 113. T | $9^{\text {th }}$ grade was Ms. |  |
| 114. MJ | That was the first year at the high school? |  |
| 115. T | Yeah like the way she taught like is no way you could fail her class you couldn't fail I don't think cuz like she used to like if you didn't know it she would give us an example like something that we could relate lets say like texting she said well if you text this many numbers and this time that number what would be... we would learn it too |  |
| 116. MJ | So what was...in $9^{\text {th }}$ grade you had what math did you have what was the name of the class? |  |
| 117. T | It was Algebra | Had woman math teacher in $9^{\text {th }}$ grade algebra who tried to make math lessons relevant |
| 118. MJ | Algebra, algbebra 1 or just algebra? |  |
| 119. T | Just algebra I think it was just algebra it's algebra or algebra 1 I wasn't sure but I know it was an algebra |  |
| 120. MJ | And you had the same class all year? Or...? |  |
| 121. T | Yeah the same algebra class all year |  |
| 122. MJ | Ok how many times a week did you have math? Did you meet every day or? |  |
| 123. T | Yeah we met every day but then we had like another class too I think it's... |  |
| 124. MJ | Another math class? |  |
| 125. T | Yeah Mr. |  |
| 126. MJ | Ok with a different teacher? |  |
| 127. T | Yeah |  |
| 128. MJ | So you had two math classes in $9^{\text {th }}$ grade? |  |
| 129. T | I had one $3^{\text {rd }}$ period the I had one $8^{\text {th }}$ yeah $8^{\text {th }}$ period |  |
| 130. MJ | Ok and what was the name of the second class if you remember |  |
| 131. T | I don't know...I don't remember but it was like new I think....I think it was math modeling |  |


|  | something like that |
| :--- | :--- |
| 132. MJ | Say it again |
| I33. T | Ihink it was math modeling |
| 134. MJ | Math modern...? |
| Had 2 math classes in $9^{\text {th }}$ |  |
| grade |  |


|  | kinda hard like it wasn't hard but it's hard if you wasn't there all the time if you was late you wouldn't know what the lesson was but if you was there on time it was easier but she let us work on our own first and then she'll come around and show us what we did wrong and what we did right | Math teacher was woman for $10^{\text {th }}$ grade geometry, Tyana thought she was strict (e.g. late to class - "well you should've been there" <br> Remembers passing math class every year but not the grades |
| :---: | :---: | :---: |
| 158. MJ | So what's this called? Math 10 ? Or $10{ }^{\text {th }}$ grade math? |  |
| 159. T | No the first one was geometry and the last period they said it was algebra but on the paper it said $\qquad$ math 10 in that math we were dealing with slopes and stuff and in geometry we were dealing with shapes |  |
| 160. MJ | Ok so it was, you were doing a lot of geometry |  |
| 161. T | Yeah |  |
| 162. MJ | It was called math 10 ok |  |
| 163. MJ | Do you remember your grades? |  |
| 164. T | Nah uh |  |
| 165. MJ | You don't remember your grades? Do you remember the grade you for in Mr. P.'s class? $7^{\text {th }}$ grade |  |
| 166. T | Yeah I remember I passed |  |
| 167. MJ | Ok did you get a grade or just Pass? |  |
| 168. T | Um I thought it was like in the 80s |  |
| 169. MJ | Ok do you remember anything about your grade in $9^{\text {th }}$ grade? When you had algebra and modern math? |  |
| 170. T | I remember in modern math I had like a 73 and in my algebra class, $6^{\text {th }}$ uh $8^{\text {th }}$ period I had like a 82 but if I talk it'll go down so like and I like talking so it... |  |
| 171. MJ | I thought you said you were shy no I'm only kidding |  |
| 172. T | I was like like now I noticed since we got to the new building cuz like in the old building you had class with all freshmen like and like in the new building you would be with all the seniors or the sophomores and like you well like me I don't wanna be wrong so I just sit there, its like anybody know the answer? I say it if its right that's why I ask every question if I get it wrong I look around like but other people get it wrong too so I'll volunteer but you don't always gotta be right you're gonna be wrong at some point but I be shy sometimes there be mad people like usually I be in class with my friends like ever since up to like $6^{\text {th }}$ grade I be in class with my friends when I went to the new building it was juniors, seniors some freshmen, sophomores, it was a whole mixture of kids and like some people try to be the class clown like cuz they, they don't wanna, feel me, they don't wanna be wrong so instead of being wrong they make jokes and stuff I laugh like my laugh it don't stop it it was confusing it wasn't confusing like people didn't wanna be wrong everybodys looking around so nobody raise their hand they didn't wanna get it wrong so no one raises their hand so she just start picking and no one wanna go |  |

$\left.\begin{array}{|l|l|l|}\hline & \text { and people get scared to get it wrong } & \\ \hline 173 . \text { MJ } & \begin{array}{l}\text { So that's interesting I think you said that, I get the impression that it wasn't like that in Mr. P.'s } \\ \text { class }\end{array} \\ \hline 174 . \text { T } & \text { Nah } & \begin{array}{l}\text { Cuz you even notice you had your hand up all the time so how did you feel when you were in } \\ \text { Mr. P.'s class }\end{array} \\ \hline 175 . \text { MJ } & \begin{array}{l}\text { Like Mr. P.'s class like all they was my friends like some of them I went to school with since } \\ \text { elementary and Mr. P. he made it as like you can't be wrong if like you be wrong is always a } \\ \text { right answer to that you could be wrong but not in this situation like maybe in the next question } \\ \text { it'll be the right answer cuz he be staying quiet but you probably answer he made it seem like } \\ \text { you did right but then like you went off topic a little bit but he don't like put you down like he } \\ \text { only bring you up that's why like I wasn't scared to raise my hand cuz like I always right or I } \\ \text { was right a little bit or I was wrong, that's what I like, that class was nice }\end{array} \\ \hline 176 . \text { T } & \begin{array}{l}\text { So a class like that and the way he let you, the way he talked to you and the way he answered } \\ \text { your questions and the way he made you feel did it make you feel like you could do math } \\ \text { better? }\end{array} \\ \hline 177 . \text { MJ } & \begin{array}{l}\text { Yeah it felt like I knew what I was doing all the time like I knew what I was doing and like } \\ \text { nobody tell me I was wrong like I just go to math do all the work and be done }\end{array} \\ \hline 178 . \text { T } & \begin{array}{l}\text { Did you think you were good in math before if you could remember even further back before } \\ \text { Mr. P.'s class did you think you could do math then? }\end{array} & \begin{array}{l}\text { Liked working with friends, } \\ \text { wasn't afraid to participate } \\ \text { (e.g. raise hand and answer } \\ \text { questions), Mr. P. encouraged } \\ \text { and made it easy to participate }\end{array} \\ \text { (e.g. used incorrect answers } \\ \text { for learning) }\end{array}\right\}$

|  | class, um, other than that anything specific you remember about the math you did in Mr. P.'s class? Or anything else that stands out in your mind about Mr. P.'s class | Gained confident as math learner |
| :---: | :---: | :---: |
| 189. T | (shakes head no) |  |
| 190. MJ | Do you think your classmates felt the same way? You said you felt better you said that you could do math in Mr. P.'s class because he made you feel like even if you were wrong it was ok there was a way to make it right |  |
| 191. T | Yeah I think it was just like me and a couple of people cuz other people like they didn't seem like they didn't wanna answer questions but they don't answer till like people start answering, people won't just raise their hand, they'll wait till like if I answer the question or someone else answer the question, they look around and they're like aight, I think I can do it... |  |
| 192. MJ | It sounds like sometimes people don't want to be first they wanna just wait a little while |  |
| 193. T | Yeah |  |
| 194. MJ | That helps build confidence? You feel better? |  |
| 195. T | Mhmm but now look at here I was raising my hand too much |  |
| 196. MJ | Do we know that, who's talking here? |  |
| 197. T | Erica |  |
| 198. MJ | Oh that's Erica? So this is the very beginning of the new school year and so you've met a couple of times in a math class? Talk to me about your math class this year where have you been placed? |  |
| 199. T | My math class this year um algebra 2 | Believes classmates felt comfortable and learned in Mr. P.'s class, confidence increased |
| 200. MJ | Algebra 2 |  |
| 201. T | Cuz you gotta take like last year it was only like half of it they give half each year I think this year was algebra 2 but its better cuz algebra 2 like we basically worked on square roots like |  |
| 202. MJ | So you have, you got the text book and everything so... |  |
| 203. T | Nope we didn't get a text book yet |  |
| 204. MJ | Oh you didn't? |  |
| 205. T | Because I don't think it's enough to go out right now but we like we work with problems like here and there and like my teacher now like he the type of teacher like he love doing his job like if you ask him a question he gonna do it fast for you like he like he like working with children like alright lets do number 1 together how about number 2 how about number 3 then we like aight we got it we got it then he like aight then do it and like he like he like a teacher like that love his students he always like if we don't understand he'll go over it till we understand it so like it's good I think I'm gonna do good in his class |  |
| 206. MJ | You think you're gonna do good? |  |
| 207. T | Yeah |  |
| 208. MJ | You think that he'll make you feel like you can do the math? Like you're gonna be good at |  |



$\left.\begin{array}{|l|l|l|}\hline \text { 231. T } & \begin{array}{l}\text { If I had a class like that it would make me feel good I would wanna go to class like every single } \\ \text { day like I know sometimes those kids out here they like I wanna skip because of this that and } \\ \text { the third but me if I was in that class I would never skip class I would be in there the whole } \\ \text { time I'd probably be there after school it would be a fun class and I know I'd pass all the tests }\end{array} \\ \hline & \text { Do you think math is important? } \\ \hline \text { 232. MJ } & \begin{array}{l}\text { Yeah because my mom when we go to the food store she like I throw stuff in the cart she be } \\ \text { like no cuz I'm adding it up in my head but what you need that like every price she added up in } \\ \text { her head and then when we shop when we shop it be like 5\% off she'll be like aight I want this } \\ \text { she'll be like well it's only this much percent off basically like you need math because you } \\ \text { wanna know what percent off they could jip you aight I could give you 30 dollars back but if } \\ \text { you don't know whats going on be like aight but take that but knowing you'll know it'll cost } \\ \text { you 30 and then with the percent like in the percent its only like 30\% off you probably think } \\ \text { it's 30 dollars off or you probably think you pay 30 dollars or you give them extra money not } \\ \text { knowing how much to take off. I think math is really important }\end{array} \\ \hline \text { 233. T } & \begin{array}{l}\text { Are you good at it? }\end{array} \\ \hline & \text { Yeah sometimes } \\ \text { Selieves that Mr. P. and Ms. } \\ \text { T. cared about students, } \\ \text { wanted students to learn, tried } \\ \text { to make sure all students } \\ \text { learned, used mistakes for } \\ \text { learning instead of penalties }\end{array}\right\}$

|  | math do you see that calculators are valuable do you use it outside? Would you use it outside? | money <br> Believes calculator is useful tool in school and out of school |
| :---: | :---: | :---: |
| 251. T | Yeah I use it outside cuz um I know my mom use it she be like sometimes like doing taxes or something like that she use it and then like if I need it like say if I got money and I wanted to buy a $\qquad$ I use my phone um like yesterday my sister we was in the store and she don't look at tags at all but I use the calculator like aight it's gonna be this much money so a calculator you are gonna use sometimes say somebody needed to add something you could use the calculator like no you made a mistake because you forgot to add this one or you left this one out |  |
| 252. MJ | Mhmm but there are also um, do you use mental math a lot? |  |
| 253. T | Yeah sometimes |  |
| 254. MJ | What kind of kind of problems, what kind of situations are you in where you can use mental math? |  |
| 255. T | Like if me and my friends wanna have a hotel party like we all chippin in and stuff and we trying to find out how much it costs say it cost like 300 dollars me and my friends are 8 friends we sit around and we come up with different numbers like we was thinking about well 8 friends might all put this amount of money |  |
| 256. MJ | You use estimation a lot? |  |
| 257. T | Yeah like we need 300 knowing that its really 293 that's how it be |  |
| 258. MJ | Um, so we talked a lot about math and I just wanna ask you if you could tell me a little bit more about how you think of yourself in relation to mathematics like what does it mean in your life what might it mean in the future what did it mean in the past just talk to me a little bit about you and your relationship to mathematics and how its going |  |
| 259. T | I like math a lot because like it's like easy for me to comprehend like I'd rather be in a math class than in English class like my mind is set like in all my math classes and all my math teachers they always tell me you're gonna need math so I like math because I know I'm gonna need it if I know something that I know I need something I'm gonna get it like I'm gonna try to stick to it because imma need it in the future that's I like math like like math class I don't really have a problem with math class unless there's someone in there disturbing the class but math is a good subject to me like even when I have tests I be hoping like aight say you know what the state tests is? Like I wish we had math first I'd be done and I'll check my answers over like English I take my time cuz I know I gotta read all that stuff but math what you know like once you learn something you can't forget it you cant forget a problem but English you forget a story or something but math I did that $6^{\text {th }}$ grade $7^{\text {th }}$ grade and I never forget like you could never forget formulas like you'll learn another formula like $a+b=c$ |  |
| 260. MJ | Wow I hope not sometimes I forget but then I kind of refresh my memory |  |
| 261. T | Yeah like you can't just forget like I don't know over the summer if we read we might forget read yeah but math they never say math oh forget it you can't forget math cuz math is all |  |


|  | summer you gotta add stuff you gotta divide stuff you tax taxes out mad stuff | Uses math and calculator outside of school (e.g. shopping) |
| :---: | :---: | :---: |
| 262. MJ | Sounds like you really understand that you use it all the time |  |
| 263. T | Yeah I do |  |
| 264. MJ | Like all around you |  |
| 265. T | Mhmmm |  |
| 266. MJ | Cool. Wow. Um, let's see um anything else you wanna tell me that you can think of that maybe we didn't include when you think about math...? Do you think of yourself as a "doer" of math? |  |
| 267. T | I do math a lot? |  |
| 268. MJ | Uhhuh |  |
| 269. T | Sometimes I be doing a lot of problems in math I know what I'm doing that's what I be thinking in math class but like if there's a problem that I don't know like I'll ask for help a lot of people that's one thing like if I need help. Ima ask for help I cant just sit like I don't know if I could get it I'mma ask for help even if you get aggravated ima keep asking questions until I get it when I get it I got it I can't get rid of it |  |
| 270. MJ | It sounds like you're describing that's part of what you do as a math as a person who does math | Uses estimation |
| 271. T | Yeah |  |
| 272. MJ | That's part of what it is to do math. Excellent oh that was the bell in there alright anything else that you could think of? |  |
| 273. T | I think I said it all |  |
| 274. MJ | You think you said it all? Well you can always add anything. We're going to get together again as I said for another interview um with some slightly different questions all related to mathematics but slightly different alright? Thank you Tyquanna |  |
| 275. T | Bye | Continues to like math |
|  |  | Believes she will remember some school math forever! |


| " | a |
| :---: | :---: | :--- |

R/I = Researcher/Interviewer
$\mathrm{T}=$ First initial of girl

## APPENDIX D3

Shaniyah Protocol 1 Interview
Date of Interview: 6/1/2009
Date of Transcription: 11/25/2010
Transcriber Initials: A.S.

| Speaker <br> Move | Transcript |  | Notes |  |
| :--- | :--- | :--- | :--- | :--- |
| 1.MJ | Well, thank you Miss Samiyah um for agreeing to come back and meet with <br> me. This is the first of three interviews that I'd like to do with you, the first of <br> the individual interviews. Um and the purpose of this interview is to talk to <br> you about your math classes. To reminisce a little bit about when you were in <br> $7^{\text {th }}$ grade and you saw some of the video last week and I'm gonna have that <br> sort of playing in the background just to refresh your memory about your $7^{\text {th }}$ <br> grade math class with Mr. Pedrick and then I'd also like to know what went <br> on in your 8 ${ }^{\text {th }}$ grade math class and then your math class this year. So to start <br> off just for the record, can you tell me your name and your age and your <br> grade and that kind of stuff. |  |  |  |
| O.S | Ok um, Samiyah Tillman, 15 years old and 9 ${ }^{\text {th }}$ grade |  |  |  |
| 3.MJ | $9^{\text {th }}$ grade at? |  |  |  |
| 4.S | Plainfield High School |  |  |  |
| 5.MJ | Oh yeah I guess we weren't supposed to say that but that's ok. Ok Um, tell <br> me about your math class this year. |  |  |  |
| 6.S | My math class this year is kind of...I like it but the teacher to me seems like <br> she teaches a little bit fast...like she's a good teacher but sometimes it's like I <br> don't always get it and then but I usually get it later on while she teaches I | "I like it $\left[9^{\text {th }}\right.$ grade math <br> class] but the teacher to <br> me seems like she | "...sometimes I don't <br> always get it...but I <br> usually get it later on |  |

$\left.\begin{array}{|l|l|l|l|}\hline & \text { usually get it later on but its kinda fast when she teaches... } & \text { teaches a little bit fast"" } & \text { while she teaches" } \\ \hline \text { 7.MJ } & \text { Mhmm...is this the first time you've ever had a lady teaching math? } & & \\ \hline \text { 8.S } & \text { No... } & & \\ \hline \text { 9.MJ } & \begin{array}{l}\text { Aside from like um, elementary school like most of the times teachers in } \\ \text { elementary school are...but what about middle school? During middle school } \\ \text { did you have female teachers? }\end{array} & & \\ \hline \text { 10.S } & \text { No } & & \\ \hline \text { 11.MJ } & \text { No? so this is the first one } & \\ \hline \text { 12.S } & \text { Yeah } & & \\ \hline \text { 13.MJ } & \text { So tell me a little bit more about what goes on in your math class } & \\ \hline \text { 14.S } & \begin{array}{l}\text { Um...the students are very easy they keep up with my teacher and some of } \\ \text { them are very fast learners and some of 'em can sometimes just like sit there } \\ \text { and just observe and some of 'em could just don't really be like in the } \\ \text { discussion that we have so it's a pretty ...we have a bit of everything in our } \\ \text { class I sit and do like I observe and I do stuff in the class too }\end{array} & \begin{array}{l}\text { "I observe and do } \\ \text { stuff in the class too" }\end{array} & \begin{array}{l}\text { "we have a } \\ \text { bit of } \\ \text { everything } \\ \text { in our class" }\end{array} \\ \text { [some...are } \\ \text { fast learners; } \\ \text { some...can } \\ \text { sometimes } \\ \text { just like sit } \\ \text { there and } \\ \text { just observe; } \\ \text { some...don' } \\ \text { t really be }\end{array}\right]$

| 18.S | Yeah Algebra 1 |  |  |
| :--- | :--- | :--- | :--- |
| 19.MJ | Algebra 1? And have you have the same course all year? |  |  |
| 20.S | Yeah |  |  |
| 21.MJ | A full year? And the same teacher? |  |  |
| 22.S | Yes |  |  |
| 23.MJ | Yeah? Ok um so what are you working on now? Just like so I could get a <br> sense of where you are at this point | "we just got finished <br> doing, um, finding <br> like the slope and <br> stuff like with the <br> equations and..." |  |
| $24 . S$ | Now...we um we're on like direct variation and indirect variation and we just <br> got finished doing um finding like the slope and stuff like with the equations <br> and... | "I think I've seen the <br> slopes" "the direct <br> and indirect variation <br> is new to me" "I'm <br> just like taking notes <br> so I can learn it <br> more" |  |
| 25.MJ | So how much of that is new for you or and how much of it have you seen <br> before? | I think I've seen the slopes but the direct and indirect variation is new to me <br> so I'm just like taking notes so I can learn it more. | "I usually take <br> notes...sometimes I <br> summarize in my <br> own words so I could <br> get it more in my <br> writing" "...and I just <br> write not write draw <br> pictures of it just so <br> mainly I could get it <br> more so when I read <br> my notes I know <br> what I'm talking <br> about" |
| $27 . M J$ | So you mentioned you take notes, what kind of things do you do during class? |  |  |


|  | new about this year being a freshmen in high school in an Algebra 1 class, do you do things differently? |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 30.S | Um to me if I have to learn, like to me if I feel like I have to learn at that moment instead of, like cuz, like she go over it but it's like, it's like she basically teaches us something different every day, so I have to learn when she teaches us | "...if I have to learn it at the moment [she go over it but...she basically teaches us something different everyday] so I have to learn when she teaches us" |  |  |
| 31.MJ | And you think that's different than the way you um the way you learned before in math class? |  |  |  |
| 32.5 | Kind of sort of cuz like in my other math classes like in junior high school, I liked it there better in a way not because it was like the students or the teacher it's just basically cuz I felt like I got it more but this year I get math "I feel like I'm slacking a bit" but I don't know I feel like I'm slacking a little bit | "I feel like I got it more [in junior high] but this year...I feel like I'm slacking a little bit" |  |  |
| 33.MJ | Ok that's interesting so I want to ask you to talk a little more about that when you say, how do you know when you're getting it and how do you feel when you're getting it? Like um, what happens with that? |  |  |  |
| 34.5 | Oh when I get it I feel like I could like tell other people or help other people or sometimes I just know when I get it cuz I be like anxious to know more about it but then when I don't get it it's like I gotta ask the teacher or ask a peer more about it or like read my notes more cuz it's like I don't get it I don't know or I might ask her to do what she did again on the board or demonstrate it in another way | "I be like anxious to know more about it but when I don't get it it's like I gotta ask the teacher or ask a peer...or like read my notes more" | "I might ask her to do what she did again on the board or demonstrate it in another way" | "oh when I get it I feel like I could like tell other people or help other people" |
| 35.MJ | Mhmm...and so how do you think she knows that you got it? |  |  |  |
| 36.S | Um because of the way I participate I might put more participation into the class and she'll just know that I have it or that she let me know what I'm doing is right |  | [the teacher knows she's got it] "because of the way I participate I might put more participation into the class and she' 11 just know that I have it or that she let me know what I'm doing is |  |


|  |  |  | right" |  |
| :---: | :---: | :---: | :---: | :---: |
| 37.MJ | Mhmm so can you give me some examples of how you participate? When you say you participate what does that mean to you? |  |  |  |
| 38.S | I usually when she write a problem I usually am the first to answer it or like when or I might explain how I got the answer or give her or I might go up to the board and stuff or like I don't know just have fun with it I guess | "...just have fun with it" | "I'm usually the first to answer [when teacher writes a problem]" "I might explain how I got the answer" "I might go up to the board" |  |
| 39.MJ | Mhmm...and do you have quizzes and tests and things like that? |  |  |  |
| 40.S | Yeah we usually get a test like every week like usually every Friday but we usually have one every week if we can't do it on Fridays |  | ["we usually get a test like every week"] |  |
| 41.MJ | And how does that work for you? Do you think that helps her understand how much you know or things that you don't know? |  |  |  |
| 42.S | Yeah I recently did that in $8^{\text {th }}$ grade so I think it's a good idea by letting her do that cuz it shows her how much I've learned or how much I need to learn | S appreciates regular testing so her teacher knows about her learning | "I think it's [test] a good idea cuz it shows her how much I've learned or how much I need to learn" |  |
| 43.MJ | Ok...well that's a great segue I was gonna ask let's go back here can you tell me about your $8^{\text {th }}$ grade math class |  |  |  |
| 44.S | $8^{\text {th }}$ grade math class I really liked cuz my teacher he like made me understand what we was doing I did really good in $8^{\text {th }}$ grade he was another one we got tests every Friday or like every week it was just good because I don't know the environment that was around me made me have fun with math and my teacher was also he made me have fun in math so I really liked $8^{\text {th }}$ grade math and I really understood it so... | S feels good and has fun in math class | "I really liked [8 ${ }^{\text {th }}$ grade math class] cuz my teacher...made me understand what he was doing" "he was another one we got tests every Friday" | "the environment around me made me have fun with math" "my teacher...ma de me have fun in math so I really liked $8^{\text {th }}$ grade math and I really understood |


|  |  |  |  | it so..." |
| :---: | :---: | :---: | :---: | :---: |
| 45.MJ | And do you remember what that class was? What math was that? Was that geometry or pre algebra? |  |  |  |
| 46.S | I think it was pre algebra |  | Note: $8^{\text {th }}$ grade math class was pre-algebra |  |
| 47.MJ | It was pre algebra? |  |  |  |
| 48.S | Yeah |  |  |  |
| 49.MJ | Mhmmm...ok and what about your classmates? Was it a big class? Or do you think it was a big class? |  |  |  |
| 50.S | We had a good amount of students it wasn't a big class I've never had a big class so it was a good size and some of the people that were there I was with my friends so we had fun while we was doing our work and stuff so it was fun |  |  | "I've never had a big class so it was a good size and some of the people that were there I was with my friends so we had fun while we was doing our work" |
| 51.MJ | Do you like having um...so this year you're in $9^{\text {th }}$ grade in algebra and last year was $8^{\text {th }}$ grade pre algebra so did you always have friends in class with you? |  |  |  |
| 52.S | Yeah |  |  |  |
| 53.MJ | People who you would consider to be friends were also in the class? |  |  |  |
| 54.S | Yeah |  |  | S has friends in her $9^{\text {th }}$ grade math class |
| 55.MJ | Do you think that helped you? |  |  |  |
| 56.S | Yes I think that it did because like in a way if I didn't know something then they would help me but sometimes I thought that maybe I shouldn't have people that I know in my class cuz I think that would give me a more hunger | S feels good when she has friends in math class |  | "I think it [having friends in |



|  |  |  |  | ss it's like a person that I know?] |
| :---: | :---: | :---: | :---: | :---: |
| 59.MJ | Mhmm...and it sounds like you think math is important to yourself |  |  |  |
| 60.S | Yeah | [math is important to her] |  |  |
| 61.MJ | So you also have friends who think that math is important to them? |  |  |  |
| 62.5 | Yeah cuz they know how much they're gonna need it when they grow up |  |  | S has friends who also think that math is important |
| 63.MJ | Ok um and can you give me an example of something you remember studying in $8^{\text {th }}$ grade? In that pre algebra class? I know it was a long time ago but um if you could think of anything specific maybe a lesson from that class that stands out? |  |  |  |
| 64.S | Um I don't remember the particular name but I know we used to do stuff with shapes and then um we'll like describe what the shape was and how, how like um...I can't remember it but I remember but I can't say cuz I forgot we used to like say the shapes and stuff and then we'll like, like we'll say how it, how it um...I can't say cuz I forgot |  | $\begin{aligned} & \text { "...we used to do } \\ & \text { stuff with shapes [in } \\ & 8^{\text {th }} \text { grade math class]" } \end{aligned}$ |  |
| 65.MJ | That's ok... |  |  |  |
| 66.S | But I just know we used to do shapes and stuff and then later on in the year we used to do some other stuff like graphs and stuff |  | "later on in the year [in $8^{\text {th }}$ grade math class] we used to do some other stuff like graphs and stuff" |  |
| 67.MJ | Mhmm, but it sounds like you're still enjoying it, there was nothing that happened in $8^{\text {th }}$ grade math that made you not like math or anything like that...or was there? Let me put it another way was there anything that you remember in $8^{\text {th }}$ grade math that made you feel that it's not such a great thing for you? Or that made you feel that you weren't a math learner? |  |  |  |
| 68.S | No it was like sometimes if he like if I missed a day or something then I'll come back and then I could always get what we was learning and I could always know what we was talking about then and then other people was always moving ahead I mean stuff like that but never not that bad | "[but never] not that bad" [when she missed a day or something... | "I'll come back [after missing a day] and then I could always get what we was learning |  |


| 69.MJ | Mhmm, well since you mentioned that sometimes you if you weren't there then you'd have to catch up, tell me about that, how you handled that when you think you had to catch up on something. What do you do to help yourself catch up? |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 70.S | Um, I usually stay after school with that teacher and catch up like what I didn't get and I'll usually get the work and he'll do it and if I needed help he'll help me with it or if I can't get the teacher then I'll ask a friend to give me the work that I needed to get |  | "I usually stay after school with that teacher" [to help catch up] | "I'll ask a friend to give me the work that I needed to get" |
| 71.MJ | Is that something that you pretty much do when you don't know something in math whether it was this year or last year or..? |  |  |  |
| 72.5 | Mhmm I usually do that |  | "I usually do that" [stay after school with teacher or ask a friend when she doesn't know something in math] |  |
| 73.MJ | Ok good. Ok now let us go back to um $7^{\text {th }}$ grade math class um and like I said I do have some video here in some of it you've seen before when we met but um I do want to help you refresh your memory again about what that class looked like we can get a sense of how many people were there you had a mix of boys and girls in the class obviously um and you remember your teacher and who was that? |  |  |  |
| 74.S | Mr. Pedrick |  |  |  |
| 75.MJ | And you were in his class all year during that $7^{\text {th }}$ grade? |  |  |  |
| 76.S | Yes |  |  |  |
| 77.MJ | Yeah? Um so...I can turn it up a little bit when we get to um...the camera was moving all around the room and then the times when it was on you, you seemed to work with Tyanna a lot |  |  |  |
| 78.S | Yeah... |  |  | [worked with Tyana a lot] |
| 79.MJ | But um can you describe using this as a way to help you remember, can you describe, how would you describe Mr. Pedrick's class? |  |  |  |
| 80.S | It was like full of different people with different ideas and sometimes we be like it would be like half the class would get something and then another part | She feels good about/enjoys this type | "then at the end of the day we all had | Mr. P's class was "full of |


|  | of the class would go against that so we all just had different ideas and then we combine them all and then we would seem to work it out and then at the end of the day we all had different ways of solving a problem so it was just different sometimes we would have just different stuff going on but... | of classroom environment | different ways of solving a problem" | different people with different ideas" "we combine them all and then we would seem to work it out" |
| :---: | :---: | :---: | :---: | :---: |
| 81.MJ | Um so how did that, how did you feel about having a class where people had different opinions? |  |  |  |
| 82.S | I liked that because what I had maybe had thought of something it was good but then I had other people that thought of something in different way so it gave me a different look of a problem or something that I didn't know | She feels good about/likes this type of classroom environment | "...gave me a <br> different look of a <br> problem or <br> something I didn't <br> know" | "I had other people..." |
| 83.MJ | Ok um I noticed that like you said there's a lot of discussion I see students asking other students questions did that happen a lot? |  |  |  |
| 84.S | Yeah |  | [students often ask each other questions] |  |
| 85.MJ | What about during $8^{\text {th }}$ grade? Did that happen a lot? Were you having discussions about math? |  |  |  |
| 86.S | Yeah sometimes I'd ask my friend how did she get that or why does she think that cuz it was like sometimes it seemed impossible but then she or he would end up explaining it to me and then I'll understand it | Curiosity: "...it seemed impossible" | Asks "how did she get that or why does she think that..." "...and then I'll understand it" | "I'd ask my friend" "...but then she or he would end up explaining it to me..." |
| 87.MJ | So if I were to ask you to describe what it is, what it is to "do math" based on your experience from $7^{\text {th }}$ to $9^{\text {th }}$ grade, what is it that you do during math class? |  |  |  |
| 88.S | At first I usually like hear what we're talking about then I, I'll, if I don't know it then I'll just write down what I know and then if it's wrong or right then I'll help my teacher and then like in the middle I'll just let them discuss it and then once we discuss it then I'll just like talk over it and then write | Confidence | Listens, writes down what she knows, discusses what is wrong or right, writes | "I'll help my teacher" |



|  | probably more individually than we do in groups and that like, I don't know, it's not really a difference though I don't think so |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 103.MJ | Well it's interesting that you, you're first impression which is what I want was that it was a little bit different in that you work a little bit more individually than you used to work in Mr. Pedrick's class. So if that's your first impression then that's probably true. Um, how do you think that affects how you learn in that class? Whether you're working with someone or not, how do you think that affects how you learn? |  |  |  |
| 104.S | Because like in groups it like let me know what my other peers were thinking and why they think that but when I'm working individually it makes me focus more on what I'm doing and like it just gives me more focus on what I'm doing like if I have a mistake I'll know what I'm doing instead of thinking of somebody else and what they're doing it'll give me more focus on what I'm doing. |  |  |  |
| 105.MJ | Ok that's interesting can you talk a little more about that so if I heard you right you when you're working by yourself you can focus more on what you're doing? But I also heard you say that you like working with a partner or with groups, so which do you think for you helps you learn better? |  |  |  |
| 106.S | I think in a group it makes me learn better because when I work by myself sometimes it gives me like, I could sometimes think too hard and then I could sometimes think I'm wrong or like sometimes I lose concentration cuz I'm working by myself but when I'm working with a group it depends who I'm working but I don't know it helps me because I have these ideas so its like giving me more ideas like it helps me when I have other people like helping me |  | "I could sometimes think I'm wrong or like sometimes I lose concentration [cuz I'm working by myself]" "when I'm working with a group...it helps me because I have these ideas so it's like giving me more ideas" | "I think in a group it makes me learn better" "when I work by myself...I could sometimes think too hard..." "...it helps me when I have other people like helping me" |
| 107.MJ | Ok um yeah in this particular class you focused on you working with your partner. Now I'm just gonna put this down or I'm just gonna mute it so we don't hear it. So this was $7^{\text {th }}$ grade now you went to $6^{\text {th }}$ grade at hubbard as |  |  |  |


|  | well um can you think of differences between your $6^{\text {th }}$ grade math class and Mr. Pedrick's? |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 108.S | Who did I have for $6^{\text {th }}$ grade? Oh... in $6^{\text {th }}$ grade I didn't really have a good experience in math because I had a little it was like a little class but everybody was just everywhere and then sometimes our teacher couldn't get his point across but I always listened but it really wasn't a good experience with math cuz I really didn't get the chance to get to know math the way I wanted to get to know math because of like the class so and $7^{\text {th }}$ grade it was like a good opener for me to get to know math cuz I didn't know a lot of stuff and I did different stuff to know math like I did shapes and stuff and graphs so it was just like a good way to know math |  | "I wanted to get to know math" |  |
| 109.MJ | Ok good and you kind of started to summarize like I would ask you to summarize when you say you're getting to know math and if you could describe that to someone what would that look like? |  |  |  |
| 110.S | Um getting to know math for me is getting know math the way I picture math like big numbers and just different stuff a fun way of getting to know math not the boring math like I don't know like a good experience in math like having fun in math but doing math at the same time good math is getting to know math to me |  |  |  |
| 111.MJ | Ok good so um that kind of brings us to this question and I call it a fantasy question because you to, I would like for you to imagine for yourself for Samiyah, what would be the perfect math class? For you to learn as much as you can, for you as a math learner for example, it's your fantasy there's no right or wrong I just wanna see if you can help me picture what it would be. What would the classroom look like, what would the teacher look like what would they be doing what would you be doing, what kind of classmates would you have, what would you be working on, what's, you know just fantasy, what's Samiyah's math class? |  |  |  |
| 112.S | My fantasy math class, to me would look like um like a good teacher, I would prefer to have um a man cuz it seems to me a man, I don't know I just like I'd rather have a man math teacher cuz I'm used to having man teachers than a woman so I would have a man teacher um like a full class but not no a medium class no a little class because I don't want it too big | "I would prefer...I'd rather have a man teacher" (because she's used to a man teacher!) |  | "a little class because I don't want it too big" |
| 113.MJ | (laughs) see its ok whatever you to think about it you went from full class...so when you say a small class like |  |  |  |
| 114.5 | A good like 8 people or 9 and um then like we all have like the same level of math that we want to learn we're all on the same level and we all have the | "we all have the same hunger that we want for | "we all have like the same level of math | " 8 people or $9 "$ |


|  | same hunger that we want for math like we all on the same level of what we want for math and like fine and not too stressed out cuz you know you don't want to get too stressed out but you know just have fun like while we do math | math" "not too stressed out...just have fun like while we do math" | we want to learn" |  |
| :---: | :---: | :---: | :---: | :---: |
| 115.MJ | So you talked about people working together and discussing, and would that still be a part of it? Tell me a little bit more of what you would be doing with 8 or 9 or maybe 10 students in the class with you... |  |  |  |
| 116.S | Um I would like to do like X and Y problems cuz I seem to like that, graphs would be alright, and um just like learning different stuff every day and then at the end of the week we'll like take tests on what we learned but just really when we learn stuff we really have to buckle it down what we know and then sometimes the teacher would ask us what we wanna learn and then we'll tell him what we wanna do that for that day so we could do what we wanna do but at the same time learning math at the same time |  | "I seem to like that [x and y problems]" "[teacher] would ask us what we wanna learn" | "we'll tell him [teacher] what we wanna do that for that day... at the same time learning math at the same time" |
| 117.MJ | So I noticed but I didn't ask this specifically but in all of your math classes it was always boys and girls together? |  |  |  |
| 118.S | (nods head yes) |  |  |  |
| 119.MJ | In your fantasy class would you have any preference? |  |  |  |
| 120.S | I would have... |  |  |  |
| 121.MJ | For any reason |  |  |  |
| 122.S | It would probably be like an equal amount of boys and girls cuz for me I like the equal amount of both worlds cuz I like boys and girls in my class |  |  | "I like boys and girls in my class" |
| 123.MJ | Ok good and just describe what your teacher would be doing, you describe that this teacher would be a man, and how would this teacher be teaching |  |  |  |
| 124.S | Um he'll probably be teaching like um, like, um, like when he'll teach he'll teach us all at the same time but then he'll like take a break and then like if we if one of the students in the class wanted to know something else or wanted to know he'll take or he'll help that person out while the rest of the class is still doing our work or whatever we wanted to do so he'll just be not everywhere at the same time everywhere at different times but just like fulfilling what everybody needs |  |  | "he'll teach us all at the same time but then he'll...help that person while the rest of the class is still |


|  |  |  |  |
| :--- | :--- | :--- | :--- |


|  |  | wanna do" "even if it didn't I just feel like math is still very, very important" "you could get places like really far to achieve what you want" "I think you would really need math" |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 130.MJ | So you said it's very important for what you wanna do, can you tell me what that is and it may not be one thing... |  |  |  |
| 131.S | I wanna dance but if I don't, my back up plan for dancing would be investment banking and you know you really have to know your math so I just and I just like math period so math is like in me and it's just always gonna be in me | "I just like math period" "math is like in me and it's just always gonna be in me" |  |  |
| 132.MJ | Mhmm ok and if I asked you the question, how do you think of yourself in relation to mathematics? |  |  |  |
| 133.S | I would have to say that me and math we do really good together like I don't get confused when somebody throw it at me I don't get confused like I don't back down from it I look at it at first and then decide what I would do as of then I don't just back up from it | "me and math do really good together" | "I don't get confused when somebody throw it at me...I don't back down from it" "I look at it...then decide what I would do" |  |
| 134.MJ | Ok wow you talked a lot about math. Is there anything else you can think of that I haven't asked specifically that has to do with you and mathematics? |  |  |  |
| 135.S | Um no... |  |  |  |
| 136.MJ | Um ok if I were to say Samiyah give me three words that describes you as a math learner what might that be? Those three words or three thoughts |  |  |  |
| 137.S | Um fast but slow but then it'll take me some time to learn it so what's the word....fast, slow but medium | Unsure of how to describe/characterize her math learning |  |  |


| 138.MJ | (laughs) you're so cute ok I think that refers specifically to what you're trying <br> to convey about how you learn it? |  |  |
| :--- | :--- | :--- | :--- |
| $139 . \mathrm{S}$ | Yeah | Comfortable learning <br> math at different rates |  |
| 140.MJ | Ok so aside from learning fast medium or slow, maybe 1 or 2 different words <br> that describe yourself in relation to math |  |  |
| 141.S | Um...like important and good like I really, like, I see myself going far with <br> math so it'll have to be important also valuable | "I see myself going far <br> with math" <br> "...it'll have to be <br> important also <br> valuable" |  |
| 142.MJ | Ok that's very good. I'm grinning from ear to ear but I'm not gonna be on <br> camera it's all you, you got a great smile and I thank you very much for this <br> interview. |  |  |
| $143 . S$ | You're welcome. |  |  |

## APPENDIX D4

## Erica Protocol 1 Interview

Date of Interview: 6/2/2009
Date of Transcription: 11/25/2010
Transcriber Initials: A.S.

| Speaker <br> Move | Transcript |  | Notes <br> Describes $7^{\text {th }}$ grade math class in <br> contrast to $8^{\text {th }}$ and current $9{ }^{\text {th }}$ grade math <br> class: |
| :--- | :--- | :--- | :--- |
| 1. | MJ | Alright so this is the first interview with Miss Petrice Green and she's going to introduce herself... |  |


| 12. P | Um, like just to get down to the problem. I guess the time we had to figure out an answer and like <br> kids would be helping us along with him. So it was like better and you felt comfortable even if you <br> was wrong or right. |
| :--- | :--- |
| 13. MJ | Was that important to you to feel like you were right or wrong |
| 14. P | Yes |
| 15. MJ | And do you remember times when you were right and other times when you were wrong? |
| 16. P | Yeah |
| 17. MJ | Can you describe some of those? |
| 18. P | I don't remember a specific time it was a long time ago. But even if we wasn't right I guess he <br> wouldn't be like "oh you're wrong" he would just try to maybe understand it more to help you get the <br> answer, he wouldn't just give it to you |
| 19. MJ | And um do you think that helped you learn the math better? |
| 20. P | Yes |
| 21. MJ | Um I see that most students here, including yourself, are working in a group. Some have 4 in a group <br> and some just 2. Is that how you usually work in Mr. Pedrick's class? |
| 22. P | Um sometimes it would be in groups and sometimes it wouldn't and um since we were like sitting <br> beside and sitting across from each other like we might ask them if we got it right or is this the way <br> you're doing it so it was like it was basically helping us. So it was better to sit in a group, I thought. |
| 23. MJ | And that helped you, to ask people if you were right? |
| 24. P | Like not if you was right, but if you were going in the right direction basically. |
| 25. MJ | And I noticed that there was boys and girls in your class, in this particular group you were sitting <br> across from Taquana, I understand Taquana moved to Atlanta, right? |
| 26. P | (nods head yes) |
| 27. MJ | Have you spoken to her? |
| 28. P | No... |
| 29. MJ | No? I wish I could uh find out how her math class was going. But on this day you were sitting with <br> Taquana and I think two other girls I see Noah was in that group and I see Karla's name tag but they <br> were boys in the class, did you ever work with boys? |
| 30. P | Mhmm... |
| 31. MJ | Do you think you worked differently when you work with them? |
| 32. P | No I think it was the same I think with boys they always think they're right so it was kind of a <br> challenge, I guess. |
| 33. MJ | And what did you do when um when the boys said they were right? |
| 34. P | I let them be "right"! |
| 35. MJ | (laughs) well let me ask you this, that's interesting, did you respond differently when boys thought <br> they were right than when girls thought they were right? |


| 36. P | No, I didn't act differently cuz girls always think they're right too! So, cuz I'm a girl and I think I'm <br> right. But boys think they're right too, so I really just didn't care. I just stuck with my answer and let <br> them stick with theirs. |
| :--- | :--- |
| 37. MJ | Whether it was a boy or a girl? |
| 38. P | Mhmmm... |
| 39. MJ | Um ok um, so we'll just let that play but I also want to ask you some questions, um about your 8 ${ }^{\text {th }}$ <br> grade math class that was still in Hubbard, right? 8 <br> th <br> grade Hubbard, do you remember that? |
| 40. P | shakes head no) |
| 41. MJ | You don't remember your teacher? |
| 42. P | No (laughs) Oh I had Mr. Giple! I remember my teacher. |
| 43. MJ | Oh Mr. Giple. I know him. |
| 44. P | Best teacher ever. |
| 45. MJ | Yeah? So um so, we won't go back to $6^{\text {th }}$ grade but for 7 <br> th grade and $8^{\text {th }}$ grade you were at Hubbard <br> you had two men um can you describe what that's like? |
| 46. P | Um, no. (laughs) |
| 47. MJ | You don't have any thoughts about it? |
| 48. P | No |
| 49. MJ | What was the name of the class? Was it a pre algebra class or...? |
| 50. P | (laughs) I don't even know, I think it was algebra. I don't know, I don't know what Mr. Giple was, I <br> just know he was a really good teacher. That's all I remember. |
| 51. MJ | Yeah? Well it's interesting you described Mr. Pedrick's class as, well let me ask you instead of <br> putting words in your mouth. If you had to describe Mr. Pedrick's class in a couple of words how <br> would you describe it? |
| 52. P | Um, comfortable and friendly and persistent and determined. I guess that's it |
| 53. MJ | And those are all words that describe how you felt in the class? |
| 54. P | Yes |
| 55. MJ | Ok so now you said Mr. Giple's class in 8 ${ }^{\text {th }}$ grade, so I'd ask you the same question, how would you <br> describe how you felt in his class? |
| 56. P | His class was more of, his class was comfortable I guess. But like sometimes... I don't know if it was <br> because we got older but sometimes when you got the answer wrong like they would try to make fun <br> of you or whatever. But still it was kind of ok, it was similar to Mr. Pedrick's just because he was <br> like he didn't let nobody say that the answer was wrong because he didn't think that was their place <br> to decide whether you're wrong or not so his class was comfortable too and he was really determined <br> to get our work done in his class because he would explain the work very well so |
| 57. MJ | Ok um as much as you can remember what other kinds of things did you do? In Mr. ? and Mr. <br> Pedrick's class in terms of what you did, how you behaved what you thought of yourself in the class? |


| 58. P | Um I was basically the same just trying to get my work done I liked math a lot in Hubbard it was <br> comfortable it wasn't easy but it seemed like it cuz when you pay attention to it and really understand <br> it seems easy then to others it might seem harder cuz like me, Naomi and Samiyah coming out of Mr. <br> Pedrick's class we knew most of the work already and like other kids come from another class they <br> was kinda behind so we kinda realized that and we tried to do our best in Mr. ? class... |
| :--- | :--- |
| 59. MJ | Oh ok so you mentioned two other classmates specifically Naomi and... |
| 60. P | Who'd I say? Samiyah? Oh yeah ok |
| 61. MJ | Interesting um I'm also of course I already interviewed Samiyah and I'm gonna interview Samiyah <br> later she actually moved to another school district |
| 62. P | Piscataway |
| 63. MJ | Yeah Piscataway have you spoken with her? |
| 64. P | Mhmm |
| 65. MJ | Yeah you speak to her a lot? |
| 66. P | (nods head yes) |
| 67. MJ | Oh ok so you can tell her that it's relative |
| 68. P | She's out here every Saturday |
| 69. MJ | She's here every Saturday? |
| 70. P | Every Saturday, Sundays she goes to church sometimes she comes Friday then Saturday |
| 71. MJ | Wow ok I started to suggest interviewing her on the weekend cuz I know she comes by then, ok but <br> we diverge from you, oh! There you are beautiful (laughs) um ok so lets talk about this year this is <br> just about the end of 9 |
| grade year so what math class did you have? |  |$|$| 72. P | Mr. Carrie and I have two math classes I have algebra and math modeling |
| :--- | :--- |
| 73. MJ | You have two math classes? Now tell me how that happens tell me how that works? |
| 74. P | Math Modeling is a back up basically to algebra stuff that you're, its kinda to make you understand <br> the work better Algebra thats all they really did |
| 75. MJ | So how long did you have that? |
| 76. P | I had it the whole year |
| 77. MJ | You had it the whole year? And so what other math do you have? |
| 78. P | Algebra |
| 79. MJ | So you're taking the two together? |
| 80. P | (nods head yes) |
| 81. MJ | So you have double math? |
| 82. P | Yeah |
| 83. MJ | Do you know why and how that happened? |
| 84. P | No...I guess it went by the testing grades because I got above perfection in English so they placed <br> me in Honors English and Honors History and I guess I just have to take two math class I guess cuz I |


|  | didn't too well on the tests probably |
| :---: | :---: |
| 85. MJ | Maybe to make sure you're honors math doubled up oh ok so those are two different math classes um tell me about that are they two different teachers as well? |
| 86. P | Yes |
| 87. MJ | So lets talk about the math modeling class, that's interesting, oh there you're working with Carla, oh! And there I am... have you seen Carla around? |
| 88. P | No |
| 89. MJ | No? |
| 90. P | I don't know where she lives |
| 91. MJ | Ok yeah I think that someone said that she moved to Brooklyn or something |
| 92. P | She moved somewhere |
| 93. MJ | She was quite interesting she was all over the place in that class but um ok so um back to you so this math modeling and algebra 1 |
| 94. P | Yes |
| 95. MJ | Two different teachers? |
| 96. P | Yes |
| 97. MJ | So it must be different experiences |
| 98. P | Yeah |
| 99. MJ | Ok which one you wanna talk about first? |
| 100. P | Algebra |
| 101. MJ | Algebra ok so you have this algebra tell me about the teacher |
| 102. P | Mr. Camie he doesn't do nothing he comes and sits down and gives us a |
| 103. MJ | Say that again I didn't hear you |
| 104. P | He doesn't do anything he comes in the class takes the attendance for like almost the half of the period and then asks if you want to do soduku or soduko or whatever that thing is |
| 105. MJ | Oh the numbers game |
| 106. P | Yes |
| 107. MJ | Ok alright well I'm much more interested in you I guess I should ask the question a little bit better. What is it that you do in class or what is that you would like to do tell me about |
| 108. P | We don't do anything in that class we should do math problems, work sheets and stuff but we don't we just sit there and talk and he sits there and watches |
| 109. MJ | Alright let me ask |
| 110. P | Seriously... |
| 111. MJ | Ok which of course doesn't make me happy to hear which is another interview, another issue, another topic let me ask you this, what would you like to be doing in math class given what it's supposed to do for you? |


| 112. P | I like to be like learning math new like $9^{\text {th }}$ grade problems not like $9^{\text {th }}$ grade problems but like more advanced math that we like need to do at high school I'd like to be doing group projects like stuff like that, homework we don't get homework um I'd just like it if we worked on math problems basically and doing what we're supposed to be doing in that class other than just sitting there cuz it's a waste of 40 minutes |  |
| :---: | :---: | :---: |
| 113. MJ | Um ok so it sounds like you don't get a chance to do much of anything with other students |  |
| 114. P | No |  |
| 115. MJ | Um would you like to be working with other students doing group projects |  |
| 116. P | Yes |  |
| 117. MJ | Tell me about the other class then |  |
| 118. P | Um math modeling we have Mr. Bullock he's ok teacher I guess he gives us a lot of work but he helps us he's more better basically we get worksheets he explain the work on the worksheets and then like probably two Fridays or the next Friday we take a test and that's about it we don't really do group projects or anything like that we don't do nothing but worksheets and tests but he explains the work and he really aint determined to get you to the answer but if you listen you listen if you don't you don't he looks at it like if you wanna fail you fail and come back to his class the next year and if you want to listen you're quiet and you do what you have to do |  |
| 119. MJ | Ok and again that gives me a good sense of the environment that you're in ok I want, if I could ask you to be a little bit more self centered in other words, so that's why I say things like what is it that you would like to be doing what does it mean for you to do math what would you like to be doing what would be good for your to be doing because in this context we really can't address that now that's for another time ok? |  |
| 120. P | Ok |  |
| 121. MJ | Um, so given what you're supposed to be learning in this class given that's its an algebra 1 class and it's a freshmen class um what is it that you would like to be doing and what is that you think you should be doing |  |
| 122. P | I think we should be doing...I don't even know what we should be doing we still do work that we did last year that I already know I don't know if the other kids already know it but we just basically the whole year we did everything we did last year I wasn't introduced to anything new like I would like to be introduced to what we're supposed to be introduced to I don't even know what we're supposed to be introduced to like Algebra I know I did some of it last year like exponents and stuff like that but like... |  |
| 123. MJ | Ok I was gonna ask you if you could just give me a couple of examples so you mentioned exponents, you were exposed to that last year maybe even in Mr. Pedrick's class two years ago um, can you think of anything else, you may not be able to but can you think of anything else specifically that you've already done that you... |  |


| 124. P | Slope and run that we're doing that's all I remember slope and run and exponents and stuff like that but we don't even do anything so it's nothing to even talk about |
| :---: | :---: |
| 125. MJ | I see so it sounds as if part of what you're saying is that you don't even have a chance to... |
| 126. P | Yeah I don't even remember stuff like |
| 127. MJ | Talk about new things ok so then let me, that's unfortunate let me give you a hypothetical supposing you were introduced in either class and say the math, what was it math modeling or algebra, suppose tomorrow something happened where you were introduced to a new topic that something that was new I won't even say it was interesting you can tell me what might be interesting ok you can imagine if you were introduced to a new topic tell me what you would do how you would handle that what kind of things you might be thinking |
| 128. P | Um it'll be interesting I guess but it wouldn't even get through to me because of the kids in the class like I know you're supposed to be thinking about yourself but how can you be thinking about yourself when like everybody else is talking over you and you don't have enough discipline to like quiet them down like so it would be hard to learn |
| 129. MJ | Ok so it sounds like you would have to do something for yourself |
| 130. P | You would probably have to go to the table and ask him to explain it to me again or stuff like that |
| 131. MJ | Oh ok well that gives me a sense so um you're respectable of what the other students would be doing somehow you would need to communicate with the teacher asks questions, you would hope that he asks you questions things like that. Ok um, if I were to ask you, without specifically referring, without comparing the teachers for yourself, if I were to say between $7^{\text {th }}$ grade, $8^{\text {th }}$ grade and this year math class can you tell me which of those years you think you learned the most? And why that might be? |
| 132. P | I think I learned the most in $8^{\text {th }}$ grade year in Mr. ? class because we were introduced to a lot of new things yeah we were just introduced to a lot of stuff because every cuz he gives a test every end of the month or every two weeks about what we've learned and then we moved on and then so we just continue really long what we know and learning new stuff so that was good |
| 133. MJ | And it sounds like that's one of the things you think about when you're learning math you build on new stuff and then you move on and you said that that was, I'm not really interested in the teacher but what year was that? That was $8^{\text {th }}$ grade? |
| 134. P | $8^{\text {th }}$ grade |
| 135. MJ | $8^{\text {th }}$ grade I thought you said you had Mr. ? for $8^{\text {th }}$ grade? |
| 136. P | Yeah Mr. ? |
| 137. MJ | I thought you said Mr. Bullock in $8^{\text {th }}$ grade? |
| 138. P | I said I had Mr. Bullock in $8^{\text {th }}$ grade? No Mr. Bullock is math modeling |
| 139. MJ | That's what I thought so um $8^{\text {th }}$ grade |
| 140. P | Was Mr. ? |


| 141. MJ | Was Mr. ? not that the teacher was necessarily important but you felt like you learned some things you kind of had a chance to give some feedback take a test to show what you know and then you moved on and learned some things so that's how, is that generally what you would think of learning math? |
| :---: | :---: |
| 142. P | I think of learning math.... |
| 143. MJ | For you? |
| 144. P | Yeah I think of learning math like that for me because when you take the test you get to realize how you're doing and then like if you know you're not doing well on it based on the test results then you can go for extra help and stuff like that or he'll make you sometimes if you did poorly he'll make you test over till you get it so I think that math should be you try until you finally get it then you can move on |
| 145. MJ | Let me ask you a question, are there times when you thought that you couldn't get something or wanted to know something better but maybe on the test you did ok so the teacher moved on? |
| 146. P | Not really like I would understand most of the math problems I guess I didn't really have a problem with the tests which was proving that I fully understand what he taught so it wasn't really difficult |
| 147. MJ | I know that sort of you said that that's never happened to you but |
| 148. P | I don't remember I could be wrong |
| 149. MJ | Yeah...um what do you think you would do if you felt that way? Supposing you took a test and you did ok but |
| 150. P | You still don't get it? |
| 151. MJ | You, you still didn't feel that you got it as well as you wanted to what do you think you might do? |
| 152. P | I'm gonna go back to him and tell him that the questions on the test I probably got but I'd like to hear different questions on the same subject to see if I..or I would ask him to elaborate more to explain more to me so I know that I'm comfortable that I get it |
| 153. MJ | Mhmm interesting I know that well I believe that in up to middle school you um had one teacher who taught everything and then starting in middle school you had teachers for different subjects um but so I wanna ask you just briefly since middle school you've had men who taught math um so it's sort of related to what I wanna, I call this my fantasy type of question for you, for you Miss Petrice, ok you could imagine anything cuz this is your story I'd like for you to imagine and help me visualize and understand what for you would be the perfect math class. What would that look like in order for you to learn and in order for you to enjoy and in order for you to have these great feelings about it. Can you describe your teacher? Can you describe your classmates? Can you describe what you would be doing? But how you would approach the class how you would interact with your classmates give me as much detail as you can and this is your fantasy this is for the best for Petrice like if I was gonna write a policy this is what math class would be how long would it be? Would it be math all day? You know anything, any details you can tell me |

$\left.\left.\begin{array}{|l|l|}\hline \text { 154. P } & \begin{array}{l}\text { Um I would like my class to be a little longer 40 minutes is not enough to elaborate a lot of stuff, 40 } \\ \text { minutes is not enough so I would probably wanna make it } 80 \text { minutes like it was in Hubbard, um, I } \\ \text { probably want students that can get what you're }\end{array} \\ \hline \text { 155. MJ } & \text { Face this way.... } \\ \hline \text { 156. P } & \begin{array}{l}\text { Ok (laughs) I'd probably want students that like I'm comfortable with that is as determined to learn } \\ \text { math just as I am and that gets along with each other and that always doesn't think they're right but } \\ \text { they try to help you either way and I want a teacher that's just there for you like Mr. Pedrick he had a } \\ \text { good he had a good I don't know how to say it but like we had a good connection with him he was } \\ \text { like a good person we had a friend connection and a teacher connection it was like comfortable to } \\ \text { like understand him and work with him and I think that a good relationship with your teacher is very } \\ \text { important because sometimes teachers like ok you're not respecting them so they're not gonna } \\ \text { respect you but still they're gonna yell at you cuz they're a teacher and I would want the strategy like } \\ \text { the I'm gonna say outline of the schedule to be like first we come in and do like a sample problem } \\ \text { then we um then we get down to whatever we gonna do like the new problem of the day or something }\end{array} \\ \text { like that and then the elaboration and then...yeah and then the solving and stuff like that, that's what } \\ \text { I can think of }\end{array}\right\} \begin{array}{l}\text { Um yeah I just want as much detail as you can tell me about how you would be doing the math what } \\ \text { when you think of yourself in math doing math class what do you picture? When you picture yourself } \\ \text { doing math. Like I know if someone said to me how do I picture myself doing math I can think of } \\ \text { things that I would do that I would be doing so I just wanted to throw that out there and of course it's } \\ \text { been a long time since I've been in school but for example I like small classes not a lot of people I } \\ \text { learned like no more than maybe what would fit in this room like for me that would be ideal some } \\ \text { people like huge classes I know that, are there classes in high school that are much more larger than } \\ \text { what you had in middle school? }\end{array}\right\}$

| 164. MJ | This is a continuation of the interview with Miss Petrice Green and I'd like to ask you Petrice, what <br> importance if any does school mathematics have for you? And why? |
| :--- | :--- |
| 165. P | Um school mathematics has a lot of importance to me because when I grow up I want to be a <br> veterinarian so I think that calculation and stuff and plus when you're an adult you have to pay a lot <br> of bills and you just have to be on your own so you would have to know math cuz of course you're <br> not gonna walk around with a calculator and stuff so you need to check stuff and make sure you're <br> paying your bills right and when you go to the grocery store make sure you got the right change so I <br> think mathematics is very important in life period |
| 166. MJ | Ok and along those same lines again I want you to think about you and be as specific as you can how <br> do you think of yourself in relation to mathematics? For example another way to think about that is if <br> I ask you to describe yourself in relation to mathematics |
| 167. P | Oh ok well I like counting my change I don't know I like calculating stuff sometimes I, let me see <br> what did I do...like since I'm working, I love calculating my paycheck I don't know why the hours <br> that I work and then, and then sometimes I like doing my wardrobe like this shirt and go how many <br> skirts so I think math with myself is really important I do it a lot by myself when I'm home so I like <br> math I just don't like it this year (laughs) |
| 168. MJ | (laughs) oh I'm not supposed to laugh um you think, do you hope to like it better next year? |
| 169. P | I do hope to like it better next year actually, I was trying to get into a different one this year but of <br> course they're not gonna think that they're teacher is not doing nothing they're gonna try to say it's <br> the kids but sometimes I think they should surveillance their teachers |
| 170. MJ | When you think about, so you got 3 more years in high school, when you think about math and high <br> school um for yourself, what are you thinking of? |
| 171. P | I think I have to do a lot of catching up because I know that like in 12 ${ }^{\text {th }}$ grade we're, it's really <br> supposed to be your relaxing year if you did everything you're supposed to 9, 10 th and 11 th so I will <br> try to catch up as much as I can next year and be up to date with the math, I'm trying to be up to date <br> with the standards that we're supposed to be in 10 $0^{\text {th }}$ grade cuz I know I'm behind cuz my math class <br> is so yeah |
| 172. MJ | Any thoughts beyond high school? When you think of math beyond high school what do you think <br> of? What do you think of if anything? |



## APPENDIX D5

## Pamela Protocol 1 Interview

Date of Interview: 6/5/2009
Date of Transcription: 11/25/10
Transcriber Initials: A.S.

\begin{tabular}{|c|c|c|}
\hline Speaker Move \& Transcript \& Notes <br>
\hline 1.MJ \& So good afternoon, Pamela um for the record, I started the video tape recorder um and you've agreed to meet with me for several interviews and thank you very much this is the first interview. We are going to be talking about mathematics um about what you doi and what you think about math in mathematics class okay? So, for the record, um introduce yourself tell me who you are and how you would describe yourself. Any interesting things I should know? \& \multirow{19}{*}{Claims math identity

Algebra 1 full year} <br>
\hline 2.N \& Um my name is Pamela XXXXX, interesting facts about me I'm $\qquad$ except that I am a really good math student especially so math is like one of my strongest points. \& <br>
\hline 3.MJ \& Oh that's good. Do you have any brothers or sisters? \& <br>
\hline 4.N \& I have two brothers, no two sisters, and one brother. \& <br>
\hline 5.MJ \& Two sisters and one brother? \& <br>
\hline 6.N \& Uh huh \& <br>
\hline 7.MJ \& Oh what about your sisters are they older or.. \& <br>
\hline 8.N \& Yea, I'm the youngest \& <br>
\hline 9.MJ \& Oh you're baby sister huh? \& <br>
\hline 10.N \& Mmmm hmmmm \& <br>
\hline 11.MJ \& Ok, well I'm glad to hear that you uh, think you're good at math so that's a good way to start, lets continue with that um first tell me about your math class this year. \& <br>
\hline 12.N \& This year math is pretty much easy, we're doing algebra right now \& <br>
\hline 13.MJ \& Ok, the name of the course this year is algebra, algebra one? \& <br>
\hline 14.N \& Mm hmm \& <br>
\hline 15.MJ \& Ok, ah is it, have you been in algebra one all year? \& <br>
\hline 16.N \& Oh yea, mm hmm \& <br>
\hline 17.MJ \& Ok, so tell me a little bit about it \& <br>
\hline 18.N \& Algebra is basically like the beginner's algebra that we learned in well that I learned in fifth grade, so its pretty much like its easy to me so its pretty much the same so I like it. \& <br>
\hline 19.MJ \& So in fifth grade you um were doing some algebra and a lot of what you're doing this year and what you've been exposed to? \& <br>
\hline
\end{tabular}

$\begin{array}{|l|l|}\hline \text { 20.N } & \text { Mm hmm } \\ \hline \text { 21.MJ } & \begin{array}{l}\text { So what do you do when you have something that's um that you're talking about this year in ninth } \\ \text { grade and you've already done it? How does that make you feel, what do you do? }\end{array} \\ \hline \text { 22.N } & \begin{array}{l}\text { I just do my work and since the teacher realizes that I'm done, he asks me to help the other students } \\ \text { so that's what I do }\end{array} \\ \hline \text { 23.MJ } & \text { Can you give me one or two examples of something that you uh learned in fifth grade? } \\ \hline \text { In.N } \\ \text { In fifth grade I learned how um I'm not pretty sure how its called but I learned the Pythagorean } \\ \text { theorem which is a squared plus b squared plus c squared, and I learned.. }\end{array}$ Believes she learned/remembers $\left.\begin{array}{l}\text { some algebra1 content in } \\ \text { elementary school [5 } 5^{\text {th }} \text { grade] }\end{array}\right\}$

| 44.MJ | So did you understand the way he was doing it? | Learned some content differently from $5^{\text {th }}$ grade, teacher acknowledged different ways, she believes she understands different way <br> Works in groups but does own work |
| :---: | :---: | :---: |
| 45.N | Yes I did |  |
| 46.MJ | And even though you knew that there was a way that you learned..yea? |  |
| 47.N | Yea I understood |  |
| 48.MJ | Um so you said he so it's a man |  |
| 49.N | Mm hmm |  |
| 50.MJ | Okay umm tell me more about a little bit about the class. Was it a large class? Lots of boys? Lots of girls? |  |
| 51.N | It's pretty evened out, boys and girls class, and its kinda average - small class..it's a small class. |  |
| 52.MJ | Small umm can you give me an approximate number like 20 or less or |  |
| 53.N | Fourteen, fifteen, sixteen |  |
| 54.MJ | Oh okay um tell me some more about what kind of things you do during class for example um I have the video tape of Mr. P's class just running in the background just to remind you uh there's certainly more than fourteen or fifteen in this class and everyone seems to be sitting in groups |  |
| 55.N | Mm hmm |  |
| 56.MJ | So, um tell me about how you learn and what kinds of things you do in class this year |  |
| 57.N | In class this year? |  |
| 58.MJ | Mm hmmm in your class this year |  |
| 59.N | Uh what do you mean like |  |
| 60.MJ | Well for example in Mr. P.'s class um you were a lot of times you were sitting in groups with other people. So uh I wanna really get a sense of how the class this year, the algebra class ninth grade is alike or different |  |
| 61.N | It's very much different because now we work individually sometimes we work in groups but most of the times when we work in groups I work alone mostly because I usually work better when I'm working alone but other people like here my work doesn't get done because everyone keeps on talking so I usually work alone |  |
| 62.MJ | Ohhh so that's something that's sI'milar so here a lot of times in Mr. Pedrick's class even though you were sitting in groups you worked alone |  |
| 63.N | Mhmm |  |
| 64.MJ | And you tend to do that this year but you don't it sounds like you don't get a lot of chances to work in group |  |
| 65.N | No we don't. the only time that we really work in a group is like a game thing that he does to try and help other people in your class that don't really get it during the game so but other than that we really don't do anything in groups |  |
| 66.MJ | So can you tell me when you're working alone um I'd like to know about what things you do when you work alone |  |


$\left.\begin{array}{|l|l|l|}\hline \text { 90.MJ } & \begin{array}{l}\text { So you feel pretty much confident in your math class and you don't need an explanation and you } \\ \text { kinda... }\end{array} & \\ \hline \text { 91.N } & \text { I got it } & \begin{array}{l}\text { Oh ok when I asked several of your classmates I asked them about Mr. Pedrick's class I know that } \\ \text { was two years ago um and you already told me that its very different this year in that math class, in } \\ \text { Mr. Pedrick's class you worked a lot in groups doing something together um I'd like for you to tell } \\ \text { me a little bit more about that um did you think that was a good thing? For you? }\end{array} \\ \hline \text { 92.MJ } & \begin{array}{l}\text { No I really don't work a lot when I'm working in groups than when I work by myself because I'm } \\ \text { more of a visual person and in groups you talk so that wouldn't work }\end{array} \\ \text { Remembers asking teacher for } \\ \text { help for procedure, believes she } \\ \text { could do it after explanation }\end{array}\right\}$

| 106.MJ | Not since middle school right um any thoughts about that? |
| :--- | :--- |
| 107.N | I think that they pick more males because they feel that they that the male can handle the class more <br> if not handle the class better but in my perspective since a woman is a better caretaker with children <br> since they're the ones who have them then it would be better for the women to teach the class yeah <br> so I feel that more women should be math teachers but there aren't so |
| 108.MJ | So um in your experience with other classes I guess other than math you have women teachers? |
| 109.N | Mhmm (nods head yes) |
| 110.MJ | Um and for you personally you see a difference? |
| $111 . \mathrm{N}$ | Yeah I see a big difference I see the fact that more than likely since the female teachers tend to be <br> more motherly with the class that students respond better than they would with a male because the <br> male in my experience, the male is just there to be the teacher and nothing else they don't feel they <br> have any type of concern except for my teacher this year yeah |
| 112.MJ | So um that's interesting I'd like to ask you a little bit more about that um if your math teacher were <br> a woman do you think you would behave differently in the class? And you described how you like <br> to work by yourself because you're visual um do you think if you had a woman teaching math you'd <br> be different maybe not I'm just asking |
| $113 . \mathrm{N}$ | No <br> $114 . \mathrm{MJ}$ |
| That wouldn't affect how you learn math? | Men are better math teachers |
| because they can "handle" the |  |
| class (i.e. classroom management) |  |


| 126.MJ | So when you say lets talk a little more so I guess there's easy and then there's easy, easy then <br> there's maybe not so easy you know can you give me can you think of examples when it's maybe <br> not so easy | Believes school math is important |
| :--- | :--- | :--- |
| in life |  |  |



| 165.MJ | One friend, can I ask you is it a boy or a girl? | notes in class, explaining to others( Used on-line sources for helpHas friend as learning resourcebecause they "learn math the sameway" |
| :---: | :---: | :---: |
| 166.N | It's a girl |  |
| 167.MJ | A girl yeah? If you were to describe her given that I don't know who she is, do you think she has a similar way of learning math? |  |
| 168.N | Yeah she does we learn math the same |  |
| 169.MJ | Now let me see if I could picture this you're a visual learner and you sort of like to think things out and learn things out on your own rather than a group would she do the same thing do you think? |  |
| 170.N | Yes she would |  |
| 171.MJ | So what would happen if the two of you were learning math together? Would you talk to each other do you think? |  |
| 172.N | Yeah it would have its difficulty but more than likely if we was in a class together then I don't think we'd get much work done but it's we're pretty much the same we work alone and then that's it we work alone |  |
| 173.MJ | Ok um your other friends or other class mates um who don't work alone um do you think it's a real challenge for you all to work in the same class? |  |
| 174.N | No its not a challenge |  |
| 175.MJ | No? oh ok |  |
| 176.N | If they, cuz if we're like all working in a group together then usually we'll each do what we think we have to do for the math problem and then we'll all come together and then the person, if a person in the group doesn't know exactly how to do it but they have an idea to do it then me and my other friend both of us would both help that other person out |  |
| 177.MJ | Ok great um wow that's interesting you're giving me a lot to think about um is there anything else in terms of how you think of yourself as a mathematic learner or someone who is good at math or likes math, anything else that you could say or would say to me about that? We're just about at the end of the $9^{\text {th }}$ grade year so you got 3 more maybe 3 more years of high school depending on how quickly you go through it um would you like to take more math? Is it your intention to take more math? |  |
| 178.N | Yeah, yes it is |  |
| 179.MJ | Is it your intention to do math or study math after high school? |  |
| 180.N | Like in college? |  |
| 181.MJ | Mhmm whatever it is that you might want to do after |  |
| 182.N | Well after high school I'm going to college and in college I'm going more towards a medical/scientific field but since science and math really do go together so yeah I'm planning on doing math |  |
| 183.MJ | And of course nobody can predict the future but do you think that um you might change the way you think about learning math when you get to the upper grades in high school or maybe in college |  |


|  | have you maybe you haven't thought about it yet I know it's a long way off | Believes that she is able to learn while working alone <br> Is willing to help others |
| :---: | :---: | :---: |
| 184.N | No I don't think my views of math will change I don't cuz since I like math so much |  |
| 185.MJ | Well that's good so you don't think you don't think there's gonna be anything that happens to change how you feel about math |  |
|  |  |  |
| 186.N | No |  |
| 187.MJ | Good have you always felt that way maybe even going back to elementary school? |  |
| 188.N | I have always felt that way I'm a very stubborn person so my view doesn't change on that |  |
| 189.MJ | Interesting well I think that's it um thank you very much I really appreciate you talking to me. Now just smile big for the camera! Cool. | Intends to go to college, believes she will "do math" after high school <br> Continues to like math |

## APPENDIX E1 <br> Jana Protocol 2 Interview

Date of Interview: 6/22/2010
Date of Transcription: 11/23/2010
Transcriber Initials: A.S.

| Speaker <br> Move | Transcript |  | Notes |  |
| :--- | :--- | :--- | :--- | :---: |
| 1.MJ | Hey Janae...first of all let me say thank you very much for agreeing to do this <br> interview. All of the interview questions I'm going to ask have to do with you <br> and mathematics, your experiences in math class um what math means to you <br> and how you feel and think about yourself in math. So are you ok talking to me <br> about these things and yourself? |  |  |  |
| Yes. | Ok...alright so let's start out with some general questions about math ok? |  |  |  |
| 2.J | Mhmm |  | Asking Qs, <br> practicing and <br> going over |  |
| 4.JJ | What do you think makes someone good at math in school? |  |  |  |
| 5.MJ | Studying, practicing, asking questions if they don't understand something, <br> going over the problem a lot. |  |  |  |
| 6.J | When you say studying and practicing, can you say a little bit more? Give some <br> examples of those kinds of things? <br> 7.MJ | Um like, if you're working with a certain problem and you don't like, like say <br> you get the concept but it's like you still stumble like maybe you need more <br> practice with it at home like, homework or something and then you practice the <br> problem but different problems but similar. You practice it so you can get better <br> at it |  |  |
| 8.J | So um, tell me about math class this year cuz I haven't spoken to you in about a <br> year |  | Practice at home |  |
| 9.MJ | I have, I had geometry this year, 10 th grade and it was...some parts was difficult <br> but I like math, like math is one of my favorite subjects so...it was...some parts <br> was easy to me but some parts I had to ask a little more questions and get a little <br> more help with it like math" <br> "one of my favorite <br> subjects" <br> "some parts was <br> easy" | "had to ask a little <br> more Qs" | "get a little more |  |
| help" |  |  |  |  |


| 11.MJ | Were there certain things in geometry, like some of the things you found easier? |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 12.J | (nods head) mhmm |  |  |  |
| 13.MJ | What are...can you remember some of those? |  |  |  |
| 14.J | Um yeah I know one was Pythagorean theorem I liked that a lot and um | "liked that a lot" | Pythagorean theorem |  |
| 15.MJ | What do you like about it? |  |  |  |
| 16.J | That its easy I don't know I think it's real easy that's why I like it | "it's real easy that's why I like it" |  |  |
| 17.MJ | Mhmm...can you think of another thing in geometry that you liked? |  |  |  |
| 18.J | Working with interior angles and exterior angles and you know like finding X and stuff mhmm yeah... |  | Interior and exterior angles |  |
| 19.MJ | And what was it that you liked about that? |  |  |  |
| 20.J | That like, cuz its like a certain rule for it like once you get the rule like if you give me any problem I could just like answer it...I don't know like I feel good every time I had the answer in class... | Having answers feels good | Uses [geometry] rules |  |
| 21.MJ | The rule makes it easier for you? |  |  |  |
| 22.J | Yeah...mhmm... |  |  |  |
| 23.MJ | Um...so can you tell me a little more about why you're good at math? |  |  |  |
| 24.J | (laughs) umm... |  |  |  |
| 25.MJ | Did you actually say that? I said that right? |  |  |  |
| 26.J | Yeah... |  |  |  |
| 27.MJ | Yeah. Would you say you're good at math? |  |  |  |
| 28.J | Yeah. |  |  |  |
| 29.MJ | Think about this year in geometry you described two things that you kinda like to do, so what things make you good at math? What are the things you do or did this year that make you good at math? |  |  |  |
| 30.J | Um I don't know I think I'll always be good at math but its just my dad always tells me to like study and practice so I said that...but I don't know...I don't know if I like it so much I just... | "I'll always be good at math" [father's influence to like math?] |  |  |
| 31.MJ | Mhmm..ok um when you hear um for example if I said that everyone can be good at math in school...what do you think about that statement? That everyone can be good at math in school. |  |  |  |
| 32.J | I agree with it | Feels that everyone can be good at math |  |  |


| 33.MJ | Why? |  |  |
| :--- | :--- | :--- | :--- |
| 34.J | Because math is like...it's a subject that like you...it's a rule for everything <br> and...I don't know how to explain but its like a rule for everything like all you <br> have to do is study a lot and practice and everybody can be good at math cuz <br> like it's numbers like everybody's familiar with numbers so... | Math is rules <br> "everybody's <br> familiar with <br> numbers" |  |
| 35.MJ | Ok...um good. So let's stay with that for just a moment. So when you hear a <br> statement like, there are some people who are good at math, what do you think <br> about that statement? If somebody said, "some people are good at math"? |  |  |
| 36.J | That they're really smart and they practice, I don't know yeah I think that <br> they're really smart and if you give them like any problem, like off the top of <br> their head they could answer it or do the problem in a short time. | [people who are <br> smart at math know <br> answers "off the <br> top of their head" <br> or can do problems <br> quickly] |  |
| 37.MJ | So do any specific people, people that you know or that you've seen....does that <br> make you think of any specific people or people that you know? Could you <br> describe them? |  |  |
| 38.J | Um my dad he's really smart yeah, and my cousin from Maryland and my <br> mom's best friend, yeah one of my mom's best friends | [dad cousin and <br> mom's friend are <br> good at math] |  |
| 39.MJ | And how do you know they're good at math? I mean you described your father, <br> give us another example... |  |  |
| 40.J | He helps me a lot with my work... |  |  |
| 41.MJ | Cuz he helps you a lot with your work? |  |  |
| 42.J | Yeah and my mom's friend, I don't know she's just smart all the way around <br> she has I think her Master's degree or past that, I really don't know what its <br> called really...but... | [advanced degrees <br> make someone <br> smart] |  |
| 43.MJ | So she has advanced college degrees? Whatever that is...? |  |  |
| 44.J | Yeah | When someone <br> is good at math <br> they help others |  |
| 45.MJ | Uhhuh ohh, ok. Um, are there certain types of people in your mind that you <br> would think of when you'd say, "Oh these people are good at math"? If you <br> were to generalize people that are good at math, would you be able to <br> generalize? |  |  |
| You mean like tell you? |  |  |  |


\(\left.$$
\begin{array}{|l|l|l|l|}\hline & \begin{array}{l}\text { wondering if you think that also paves the way and has something to do with } \\
\text { girls and women? }\end{array} & & \\
\hline \text { 62.J } & \text { His daughters... } & & \\
\hline \text { 63.MJ } & \text { His daughters? } & & \\
\hline \text { 64.J } & \begin{array}{l}\text { Yeah maybe one day they'll be the president of the white house and if that's the } \\
\text { case then any other hard working black girl can be the president of the white } \\
\text { house } \\
\text { Obama girls } \\
\text { represent what } \\
\text { "hard working" } \\
\text { Black girls can } \\
\text { aspire to] }\end{array} \\
\hline \text { 65.MJ } & \begin{array}{l}\text { Nice, I was gonna ask, I was gonna bring up his daughters, he's got 2, Sasha } \\
\text { and one is Malia. I think Malia is the older one... }\end{array} & & \\
\hline \text { 66.J } & \text { Yeah } & & \\
\hline \text { 67.MJ } & \begin{array}{l}\text { Um, but they're still a little bit younger than you are. How old are you right } \\
\text { now? }\end{array} & & \\
\hline \text { 68.J } & \text { I'm 15 } & & \\
\hline \text { 69.MJ } & \begin{array}{l}\text { 15 right now? And I think Sasha is about 8 going on 9 and Malia is 11 going on } \\
\text { 12. um, what do you imagine them to be like? }\end{array} & & \\
\hline \text { 70.J } & \text { When they get older? } & & \\
\hline \text { 71.MJ } & \begin{array}{l}\text { Um, well now cuz I want to sort of talk about what you think their school } \\
\text { experiences might be like so yeah. They're a little bit younger than you, they } \\
\text { could be like your little sisters or something. What, if anything, do you think } \\
\text { about them? What do you imagine them to be like? }\end{array} & & \\
\hline \text { 72.J } & \begin{array}{l}\text { Um, I think they are smart, I think they're like respectful, I think that they're } \\
\text { hard working and disciplined because I hear that Miss Michelle, that she keeps } \\
\text { them like, she makes them make their bed still even though they're in the white } \\
\text { house and they have maids that they still have chores and stuff so I think they're } \\
\text { gonna grow to be, well right now I think they're good kids and I think they're } \\
\text { going to grow to be wonderful adults mhmm... }\end{array} & & \\
\hline \text { 73.MJ } & \begin{array}{l}\text { Oh, that's nice...ok um so I like that you uh mentioned that you heard that they } \\
\text { still have to do their chores (laughs) just like regular girls um, what do you think } \\
\text { about their school experiences? Um you know, they have to go to school too, } \\
\text { just like everybody else so if you could imagine them...um, first what do you }\end{array}
$$ \& \& <br>
\hline [refers to "Miss <br>
Michele" and <br>
believes that <br>
Obama girls have <br>
regular chores <br>
like she does <br>
with potential to <br>
be "wonderful <br>

adults"]\end{array}\right]\)|  |
| :--- |


|  | think their school experiences are like and then we'll get a little bit more <br> specific |  |  |
| :--- | :--- | :--- | :--- |
| 74.J | I think it's kinda awkward for them a little bit just cuz of the fact that their dad's <br> really famous, he's the president like he runs the United States and that they <br> have secret service like with their..with their every move with them so I think <br> it's kinda difficult not difficult but like awkward for them sometimes and like <br> they get a lot of attention... |  |  |
| 75.MJ | Do you know anything about the school that they go to? |  |  |
| 76.J | (shakes head) no |  |  |
| 77.MJ | You haven't heard anything? Um, ok so we know they go to school they have to <br> go to school cuz they're kids and they have to take math like all kids do. So if <br> you could imagine them learning math as kids in school, how would you <br> describe it? Um, for example if you were to imagine them in math class what do <br> you think it would look like and sound like? Just as an example, do you think <br> they have a lot of books? Books that are different than you have just kinda <br> imagine cuz I don't know either about their school |  | [believes that <br> Obama girls have <br> access to better <br> math resources] |
| 78.J | Um...I don't know, I think they do have like different books just cuz of the fact <br> that they're in like a whole other state they probably do different things... |  |  |
| 79.MJ | You think they get a lot of homework? |  |  |
| 80.J | Yeah probably |  |  |
| 81.MJ | Why would you say that? |  |  |
| 82.J | (shrugs) I don't know... |  |  |
| 83.MJ | You think they get help with their homework? |  |  |
| 84.J | Yeah I think they do... |  |  |
| 85.MJ | You think they get a lot of help? (laughs) why? |  |  |
| 86.J | Yeah from their dad, cuz their father is smart |  |  |
| 87.MJ | (laughs) ohhh ok...um...so, so again lets go back to the math do you think that <br> they're good at math? You think they might be good at math? |  |  |
| 88.J | Yeah...maybe...because of their father and mother yeah they have smart <br> parents so if they're not good at math yet they will be. |  |  |
| 89.MJ | Yeah? |  |  |
| 90.J | Mhmmm... |  |  |


| 91.MJ | You think the parents, their parents huh?...have a lot of influence um actually <br> that reminds me of a question I didn't ask you up here um you mentioned <br> having smart parents, um if I ask you, and I think that's an example of <br> something that can help someone be good at math, um are there some other <br> things that you can think of, some specific things that you think would help <br> people be good at math? Or help school kids, kids learning math. Anything else <br> that you think they would need in order to be good at math? |  |  |
| :--- | :--- | :--- | :--- |
| 92.J | Um we need to get rid of the calculators....yes... |  |  |
| 93.MJ | Tell me more about that... |  |  |
| 94.J | Because like when we were little like, like in elementary they just put <br> calculators in our hand so that's what we used and I know in other countries <br> they don't...like my dad's from Jamaica and he told me that they really don't <br> use that much technology instead so from young they already know how to <br> calculate with their, in their head, with their heads, mental math and stuff cuz I <br> thnk the calculator just mess our mind up like that's all we depend on <br> calculators now... |  |  |
| 95.MJ | You use a calculator a lot? |  |  |
| 96.J | A lot |  |  |
| 97.MJ | In math...? |  |  |
| 98.J | Mhmmm (nods head) |  |  |
| 99.MJ | Ohhh...um do you think that if you didn't use the calculator and now that <br> you're in high school, let's talk about that, and this year you had geometry. Did <br> you use the calculator a lot in geometry? |  |  |
| 100.J | Yes... |  |  |
| 101.MJ | Yeah? Can you give me an example of how you used the calculator in <br> geometry? |  |  |
| 102.J | Like when we're um multiplying and stuff and dividing and like square roots <br> and all that cuz like we worked with square roots and stuff |  |  |
| 105.MJ | Oh will it help you solve the problem? Do you use it to help you solve the <br> problem? Or just to get answers? |  |  |
| 103.MJ | So does the calculator help you do problems or does it help you do, say the <br> arithmetic like the calculation? | [believes that <br> calculator can be <br> used to get <br> answers] |  |
| 104.J | Yeah well it gives like the answer |  |  |




| 147.MJ | Well I was gonna ask you um if I have a couple of questions do you know <br> anyone who goes to this school? |  |  |
| :--- | :--- | :--- | :--- |
| 148.J | Mhmmm...some friends...or acquaintances I guess, people that I know or you <br> know say "hi" and "bye" to, one of my cousins go there |  |  |
| 149.MJ | Oh you have a cousin who goes there? Yeah? |  |  |
| 150.J | Mhmmm... |  |  |
| 151.MJ | You mentioned that uh...I was gonna ask would you want to go to this school <br> and you mentioned that's very cool to have a school named after him. What do <br> you think that means to have a school named after the president? |  |  |
| 152.J | I think it's....wait do you mean what I think about the school or the President <br> knowing that he has a school named after him? |  |  |
| 153.MJ | You think he knows? |  |  |
| 154.J | No..I don't know |  |  |
| 155.MJ | No well I would imagine that he knows that there are a lot of schools around the <br> country because this isn't the only school in Plainfield. I know I heard a news <br> story about a school in New York, and I'm sure there are a lot of schools <br> whether it's elementary, middle or high school are named after the new <br> president. Um, what do you think it means to the students in the school and say <br> a little bit more about what that means to you to have a school named after the <br> president. |  |  |
| 156.J | Um if he knows that then it means a lot to him to have school named after him <br> like, cuz he like, he was the first black president I don't know, I guess it should <br> be important to me too because I'm black and...I don't know... | President Obama <br> and family are <br> important <br> because they are <br> Black like she is |  |
| 157.MJ | Well yeah I think you're right I think he can anticipate at least a school in every <br> state, I would hope, I mean I don't know you know uh it depends on who, <br> where the school is and what the community wants to do but I'm sure there are <br> gonna be a lot of schools named after him. Um, when you started to say a little <br> bit about what it means um, he's the first black president, um, and to have a <br> school named after him. What do you think it means for students in that school? <br> And you did mention you would like to go to a school, you wanted your school <br> named after him |  |  |
| Yeah |  |  |  |
| 159.MJ | Like instead of Plainfield High School it would be Barack Obama Independent <br> High School or whatever (laughs) yeah? You think that's important? What do |  |  |


|  | you think it means to students? |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 160.J | That they have a very important president that...I don't know... |  |  |  |
| 161.MJ | Do you think it might mean something different um to um black students as opposed to students who aren't black? |  |  |  |
| 162.J | Yeah maybe... |  |  |  |
| 163.MJ | Again...I mean it's just conversation...so um, I mean I know that you've always been honest but just really interested in what you think and if you don't really know then that's fine just say you don't know but I'm just curious and I'm always curious about math do you think since we, since you talked about math being important um, do you think if you went to Barack Obama High School um that learning math would be different? |  |  |  |
| 164.J | No... |  |  |  |
| 165.MJ | No? you don't think it would be different? Why would it not be different? |  |  |  |
| 166.J | Because it's gonna be like the same teachers like the same rule book, the same district it's just the name of a school |  |  | [has doubts that opportunities for all Black kids will change because of President Obama] |
| 167.MJ | Just the name of a school. So um just so that I understand what you're saying so it's just the name of the school um reflects the president, so is there any other connection with what goes on in the school or importance for the students other than the school that's named that? It doesn't sound like you think it would make any difference like in the classes or the instruction or what you had to do |  |  |  |
| 168.J | Yeah...I don't think it would be different... |  |  |  |
| 169.MJ | Do you think it should make a difference? And this is purely your own opinion, your thoughts... |  |  |  |
| 170.J | Yeah because it's like you have a school named after the president I know it's like just the name of the school but it does reflect the president and if say that the test scores are poor like so what are you saying about the president cuz like we should care about the school and I don't know... |  |  | [has doubts that a school named after President Obama means more opportunity] |
| 171.MJ | And that would be for every student that goes there? |  |  |  |
| 172.J | Yeah |  |  |  |


| 173.MJ | Good um ok...just before we started this interview I asked you to take this inventory and it consisted of 21 statements and um you indicated whether you agreed, really agreed, um, to really disagree on that scale. So um just in general, what do you think about it? I'll put it in front of you just to remind you |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 174.J | You want me to read it? |  |  |  |
| 175.MJ | No I just want to um if there's something specific you want to refer to I just wanna get a sense of what you think about that survey. What are your thoughts about it? What do you think it's for? Or what questions do you have about it? |  |  |  |
| 176.J | Um the white and black questions... |  |  |  |
| 177.MJ | Can you, yeah can you read that? |  |  |  |
| 178.J | Is it important for blacks to go to a white school so they can learn how to act around whites? And this one: I think it is important for blacks to not act black around white people. Like I don't know... |  |  |  |
| 179.MJ | Yeah tell me what you thinking about that... |  |  |  |
| 180.J | Cuz when people say "act black" like in general they mean like loud and ghetto and obnoxious and stuff but I don't know...that's just how people view it and around white people it's you know...some white people already think that every black person is like that I don't know it says is it important for black people to not act black in front of white people I really don't know what acting black is instead of the things I said but that's not really acting black that's just a, it's a personality cuz people have different personalities like not all black people act black as they say some white people act that way and different races so I mean, I think it's important for anybody of any race not to act obnoxious around other people so I guess that's what I have to say about that question |  |  | [believes that anyone can act "obnoxious"; is concerned that Blacks who act that way are used to generalize that all Blacks may act that way] |
| 181.MJ | Mhmm...so it sounds like it was really difficult for you to respond without adding all of what you just did |  |  |  |
| 182.J | No like it was easy to respond cuz I already knew like what they meant, what they mean to act black around white people but that's just what I had to say about it (laughs) |  |  |  |
| 183.MJ | Yeah you know when you see that phrase you have your own set of...you know what's generally meant by that um why do you think I, do you have any sense of why I would ask you those questions? And I didn't create the questions they came out of someone else's research but I thought it was interesting um to maybe help um both of our thinking. So I would ask you, one of the reasons I wanted to use that is to see, to get a sense of whether you thought there was any connection between racial identity and mathematics identity um so in other words, do you think there's a connection between being a black girl and doing |  |  |  |


|  | mathematics? And what it may mean, what it has meant to you, what it may <br> mean to you in the future and what you're able to accomplish? |  |  |
| :--- | :--- | :--- | :--- |
| 184.J | Being a black girl and doing mathematics? |  |  |
| 185.MJ | Mhmm...do you think there's any relationship between those two things? |  |  |
| 186.J | Yeah I guess like...I really don't know...black girls do mathematics...I don't <br> know... | [feels confident <br> that she and other <br> Black girls have <br> ability to "do <br> math"] |  |
| 187.MJ | Yeah I get the sense that it's like you're wondering why? |  |  |
| 188.J | Mhmmm.. |  |  |
| 189.MJ | Ok...black girls do mathematics (laughs) right? So you don't think...when you <br> think about mathematics you can easily see yourself learning mathematics, you <br> have friends who do mathematics, you have relatives who do mathematics, you <br> have your parents' friends who do mathematics so um you don't think there's <br> anything special or unusual about black girls doing mathematics? |  |  |
| 190.J | Yeah I think I'll be kinda proud like when I see a black person on top of their <br> game in school and doing their work, getting good grades because that's not <br> what other people see of us they see, the people of other races they see us <br> failing and they see you know us being out in the streets you know and not <br> being successful so I, I am kinda proud like when I think of black people and <br> mathematics cuz you know other people think we're dumb so I do be kinda <br> proud | [takes pride that <br> other Blacks <br> demonstrate ability <br> to do math] |  |
| 191.MJ | Did um, and specifically for black people doing mathematics or in mathematics. <br> Can you name someone who you think of that way can you think of someone <br> black doing that way, beside me, no I'm only kidding (laughs) |  |  |
| 192.J | Um, you mean like someone famous or like anybody? |  |  |
| 193.MJ | Anybody, yeah...someone who is a role model or exemplifies what you say <br> yeah someone who's on their game with mathematics that makes you proud. |  | [does not make <br> connection <br> between math, non- <br> math careers, and <br> success] |
| 194.J | Oprah |  |  |
| 195.MJ | How you know she does mathematics? I'm only joking |  |  |
| 196.J | I mean she doesn't do it, she probably doesn't do it she had to at one point in <br> her life you know through school and college and she has her own show so she <br> had to, probably had something to do with math, like making her show, creating <br> her show and she has other things that she do too. |  |  |


| 197.MJ | So it sounds like even when people aren't in mathematics fields that there's <br> something about um math that influences it has to do with success. Well you <br> gave me an idea maybe I should ask her to do an interview and ask her whether <br> she was good at math and how she thinks about it. I appreciate that, it's great. <br> Um, ok, anything that I've asked you today that you wanna add to or go back to <br> anything? Anything you wanna tell me about your math this year? |  |  |
| :--- | :--- | :--- | :--- |
| 198.J | Um I don't know. Well, next year I'm taking algebra 2 and everybody says that <br> algebra 2 is hard |  |  |
| 199.MJ | I was just gonna ask you do you have your schedule for next year? |  |  |
| 200.J | Nah I don't have my schedule yet but... |  |  |
| 201.MJ | But that's what you're gonna take? |  |  |
| 202.J | Mhmmm... |  |  |
| 203.MJ | Algebra 2, and...in 9 grade you had algebra 1? |  |  |
| 204.J | (nods head) |  |  |
| 205.MJ | And how'd you do? |  |  |
| 206.J | Really good |  |  |
| 207.MJ | Really good! And this year you had geometry, you did good? |  |  |
| 208.J | Mhmmm... |  |  |
| 209.MJ | So that's the typical, I think that's pretty much the sequence, Algebra 1, <br> achievement during <br> HS math classes] |  |  |
| Geometry, Algebra 2 and then I know senior year is 2 years away but what math <br> do you see yourself taking when you're a senior? |  |  |  |
| 210.J | Uh it's only 3 years of math so in high school it's just Algebra, Geometry and <br> Algebra 2 |  |  |
| 211.MJ | And Algebra 2 so you don't think you're going to be taking a math senior year? |  |  |
| 212.J | (shaking head no) calculus I heard is beyond hard so I don't know, I think it's a <br> pre calculus class but I don't think ima take it. | [fearful of 4 <br> of HS <br> math/calculus] |  |
| 213.MJ | I was gonna say if you don't take calculus maybe there's something else you <br> might want to take you may wanna, it sounds like you're still considering taking <br> the pre calculus which is good um, I don't know if you know is there any other <br> math option that you can take? Got the calculus in 12th grade there may be a pre <br> calc that you can take instead if you don't wanna do the calculus um do you <br> know if there's any other kinda math class that you can take? |  |  |


| 214.J | I don't know... |  |  |
| :--- | :--- | :--- | :--- |
| 215.MJ | You don't know? There may be some other I don't know like maybe a special <br> topics course just for fun um but um, so it doesn't sound like you, it sounds like <br> you may have to decide whether you want to take a 4 ${ }^{\text {th }}$ year of math, why is <br> that? |  | [believes doing <br> well/GPA/good <br> grades is <br> important] |
| 216.J | I don't know cuz I heard its hard and I don't wanna get bad grades and mess up <br> my GPA so |  |  |
| 217.MJ | So do you think you'll be needing or studying math, not needing, you think <br> you'll be studying math if you don't take pre calculus as a senior? |  |  |
| 218.J | Yes I'm gonna finish studying algebra 2 cuz I know it's gonna take me a long <br> time to get it cuz my sister hasn't, when I watch her do her homework it's <br> like... |  |  |
| 219.MJ | Mhmmm...(laughs) alright so if you uh if you go to college after high school do <br> you think you'll take math? |  |  |
| 220.J | Yeah |  |  |
| 221.MJ | You'll have to take some....whatever math you take do you think you'll be <br> good at it, whichever one you choose I think you're... |  |  |
| 222.J | Yes because I don't wanna choose nothing that, like I don't want to choose <br> nothing hard | [reluctant to take <br> difficult math <br> class] |  |
| 223.MJ | So whatever math you choose you want to be successful and you want to do <br> well and from the way you described it at the beginning you've got the qualities <br> that make someone good at math. Well that's terrific. I really appreciate <br> speaking to me about this and its gonna be fun watching the videotape and we <br> have, you've agreed to meet with me again with at least one other girl in the <br> group maybe a few more...ok great! Thanks! |  |  |
| You're welcome! |  |  |  |

## APPENDIX E2

Tyana Protocol 2 Interview
Name of Participant: Tyquanna Jasper
Date of Interview: 9/15/2010
Date of Transcription: 11/30/2010
Transcriber Initials: A.S.

| Speaker Move | Transcript | Notes |
| :---: | :---: | :---: |
| 1. MJ | Ok how are you today? |  |
| 2.T | Fine |  |
| 3.MJ | Fine just tell me your name again for the record, who you are, what grade you're in, how old you are... |  |
| 4.T | Um my name is Tyquanna Jasper I'm in $11^{\text {th }}$ grade and I'm 16 |  |
| 5.MJ | Ok and actually we just met for an interview yesterday it's still pretty early in the school year. Um, so how was your day today? |  |
| 6.T | It was good today we had an assembly $9^{\text {th }}$ period |  |
| 7.MJ | An assembly? What was the assembly about? |  |
| 8.T | Um it was Barack Obama' speech, back to school speech when he was in Philadelphia giving a speech at one of them schools |  |
| 9.MJ | Oh so you watched it live? |  |
| 10.T | I don't think it was live |  |
| 11.MJ | Oh he gave it yesterday but you watched it... |  |
| $12 . \mathrm{T}$ | Yeah we watched it today |  |
| 13.MJ | Oh so what'd you think about the speech? |  |
| 14.T | I really couldn't hear it but I know he was saying like he was saying like if you keep going to school it will take you more in life and one day you might not be good in a subject but the next day you might you know when you fall of then you get back up again stuff like that |  |
| 15.MJ | So did that have any particular meaning for you or did you think the message was good? What did you think about it? |  |
| 16.T | Yeah I think it was good cuz some kids probably think like if they fail today that tomorrow like they gonna fail again but then during that speech they probably got inspiration like I'mma try again tomorrow |  |
| 17.MJ | That's really coincidental because there's some questions on today's interview that has to do with directly with Barack Obama, what a coinkidink hmm gotta play the lottery ok so lets just go right into it and then we could talk about the inventory a little bit afterwards, um, so can you tell me what you know or what you | Described President Obama's message as inspiring re: education |


|  | think about the office of president cuz you know Barack Obama is the first African American president so can you tell me what you think if anything about the presidency and about a Black man being president? | Proud and happy - believes that election of African-American as president benefits all Black people |
| :---: | :---: | :---: |
| 18.T | When I first heard he was president I thought there was gonna be more opportunities for the African American people I was thinking like we were gonna we really could be something if we try so I was thinking about it but then I was thinking again did people just vote for him cuz he's Black or did people vote for him because they know what he about and so that's how I was thinking...but when he became president I was sooped cuz he's African American like I'm Black I was jumping up and down I was just happy I was sooped I was jumping up and down matter fact I was at a party when the announcer ba ba ba President Obama is the new president it was good |  |
| 19.MJ | Um what do you think it has to do with education and schooling? |  |
| 20.T | Because like you know how people be like you can't be the president of the united states people say no Black person's gonna be president now people will look at it like its possible to do anything if a Black person is president its possible and I know a lot of people who try really hard because it teaches you that example Barack Obama is a Black president and look what he doing and that will inspire kids more because like he's Black and people look at it like well if he could do something then I could do something too |  |
| 21.MJ | Um so what about particular areas of schooling like this whole project and we've been talking about mathematics so can you start to narrow it down even more? um what do you think it means for being a student of mathematics and having that in school | Believes that other people do not hold Blacks in high regard but President Obama can change perceptions of Black people |
| 22.T | Hmmm I don't know I'm trying to think. Can you repeat the question? |  |
| 23.MJ | Well lets um, maybe a context would help so you know he has two daughters? |  |
| 24.T | Mhmmm |  |
| 25.MJ | Right um two girls, one is Sasha and I think she's 8 years old now and Malia is either 11 or 12, let me ask you first, what do you imagine them to be like? |  |
| 26.T | I be thinking like I don't think they be getting as much work as we do cuz when they in school people entertain them and say hi like they get like they fame...not famous but like they part of something big so I think they get so much attention they probably thinking like I don't have to go to class I don't have to work because they be like my dad Barack Obama so I think that's what they be like |  |
| 27.MJ | So you think they get attention because obviously their father is president now so they get all that kind of attention | Believes that Obama children are special and privileged |
| 28.T | Yeah they get attention |  |
| 29.MJ | Um what do you think their school experiences are like? You think that carries over into their school work? |  |
| 30.T | Yeah I think they school would try to try to make them look good by like pushing them hard trying to get new books I think they like show of so they could get new books new computers so they kids go home and say that my school we learned we got that we got this and like brag about it because they don't want them |  |


|  | to go home and be like daddy I didn't learn nothing today and then he go back to school and be like why <br> my child didn't and yeah I think their teachers do their best to make the kids smart |  |
| :--- | :--- | :--- |
| $31 . \mathrm{MJ}$ | So you think that whatever school that they go to has an influence on what happens because they're there <br> and it might not be the same...hmmm...um what do you think they're...so do you think that carries over to <br> their math experiences? Like they're in school, and again this is all about trying to a sense of what you <br> think about mathematics and how it relates to who you are so if you could think about mathematics and <br> their school experience how did you think it differs? If at all | Believes that school benefits from <br> having Obama girls as students |
| 32.T | Um like different for them? I don't think it's different for them they probably get taught math the same <br> way we get taught math but they probably got special attention like if they don't get it they gonna make <br> sure they get it like they gonna be, they probably get a tutor here a tutor there trying to look over them |  |
| 33.MJ | And you think that that's different that would be different for them than for say yourself? |  |
| 34.T | Yeah because if I don't get attention like he can't start the lesson yet because it's two other kids that's <br> learning but I think if they don't get it the teacher's gonna stop what they doing just to make sure they get <br> it while us students are still waiting to learn it | Believes Obama girls get special |
| 35.MJ | Hmmm, you think they're good at math? | attention |
| 36.T | They should be | Thinks Obama girls are assured of |
| 37.MJ | Why you think so? | learning math content |


| 43.MJ | Right so a lot of it has to do with how much you try? |
| :---: | :---: |
| $44 . \mathrm{T}$ | Yeah like you can't just sit there and look at the board and expect to learn math like that you don't learn like that |
| 45.MJ | So I was gonna ask you know sometimes maybe this has happened to yourself I guess if you don't get a question right say on a test or even in class if you're doing a problem that doesn't necessarily mean you're not good at math |
| 46.T | Its not, it means that you didn't understand that question |
| 47.MJ | Um what do you think about, if at all what do you think the relationship between being a girl and being successful in math is? Or do you think there's a relationship between being a girl and being successful in math? |
| 48.7 | No but sometimes like its not about like if a girl need help she would go to her boyfriend before she would go to a girl |
| 49.MJ | She would go where? |
| 50.T | To her boyfriend she know I mean when I was in class and then it was me and this boy so some girl needed help so I was like I'll help you and she was like alright but she went to him but when it come out to be she was wrong and I was right so some girl might be thinking he probably know it he probably know it good cuz some before I used to have a mentality as like girls are good at English and boys are good at math that's how I would think sometimes but when I started doing math good I didn't think about that no more |
| 51.MJ | And when did that change do you remember when that changed for you? |
| 52.T | Back when I was in middle school |
| 53.MJ | In middle school? |
| 54.T | Mhmmm |
| 55.MJ | Interesting, um talk to me a little bit more about some of the things you think about when you think about girls and math |
| 56.T | Me, like I like seeing other females doing good in math cuz it's not like to a boy like he probably attracted to them then they probably mad cuz she's smarter than him you know how they always say boys are smarter than girls boys are stronger than girls so when you see when you see a woman of your kind doing good in math it make you feel good because like we're not dumb we're smart females but sometimes it make me mad when girls sit there and say oh I'm not good at math I'm not gonna try, you could try you could still do you in math and then like I think girls and math I think that's a good combination cuz you need math in life like girls always shop girls they gotta hold the household down they gotta shop clothes they kids they gotta go food shopping, if you don't know math why you doing them things, you gotta add up you feel me? You gotta...that's why I think girls and math is a good combination |
| 57.MJ | And it's just important to your livelihood |
| 58.T | Yeah you need math to continue where you going |
| 59.MJ | So if I asked you to think about someone who's good at math does someone in particular come to mind? |

different ways of knowing and explaining)

Believes that engagement during math class helps learning

Different ways of questioning and answering - understanding questions is important

Used to believe that boys are better at math/girls think boys are better at math, changed mind during middle school - is confident that she and other girls are capable of doing math

|  | Can you think of someone who when I ask you that question oh yeah they're good at math... |
| :--- | :--- |
| $60 . \mathrm{T}$ | You |
| $61 . \mathrm{MJ}$ | Ok someone other than me |
| $62 . \mathrm{T}$ | Um good at math... |
| $63 . \mathrm{MJ}$ | And why do you think I'm good at math? By the way... |
| $64 . \mathrm{B}$ | Because like you when you do math it look easy I remember you explained a problem to me I forgot what <br> it was but you explained a problem to me and I got it |
| $65 . \mathrm{MJ}$ | So you remember there was a time when I helped you understand a problem and explained it |
| $66 . \mathrm{T}$ | Yeah |
| $67 . \mathrm{MJ}$ | Um, ok I do enjoy math I don't always get the right answer but like you said I like to work at it and it's ok <br> I'm not afraid to ask questions so I'm I think very much like you in that respect um, so um, ok so if I asked <br> you to think of someone else and that's great cuz we sort of have this relationship you've met me in the <br> math context, remember in Stillman? I used to be the math coach and I worked with Mr. Asante so you've <br> kind of always known me in a math context |
| 68.T | Yeah |
| $69 . \mathrm{MJ}$ | So aside from me, if you were to think of somebody who you think or you know is good at math, who <br> would come to mind? What kind of person would come to mind? If not anyone in particular |
| $70 . \mathrm{T}$ | One of my friends |
| $71 . \mathrm{MJ}$ | What kind of friend? Which...? |
| $72 . \mathrm{T}$ | Like she, me and her, we like sisters, |
| $73 . \mathrm{MJ}$ | But you're not related as sisters? |
| $74 . \mathrm{T}$ | No we really cousins |
| $75 . \mathrm{MJ}$ | Ok |
| $76 . \mathrm{B}$ | But like with her I think she really good at math because every time there's a problem going on she'll <br> always be like wait wait hold up hold up she'll be like no it's this because she'll argue down to make sure <br> she right if she wrong she gonna say she wrong but if she right she not gonna shut up she gonna keep like <br> that's why I think she good at math, if I'm stuck on a problem I ask her like she won't tell you the answer <br> she'll be like try it this way once I asked her she was like see that answer matches that answer, no so then <br> you wrong then but she want you to see what the answer is this that and the 3rd she'll teach you a way like <br> she'll show you examples like use this until you answer that question that's why I think she good at math <br> and she my age so like it feel good to have a person my age that's good at math like that |
| $77 . \mathrm{MJ}$ | Wow and can you just describe, so she's your cousin so she's Black as well? |
| $78 . \mathrm{T}$ | Mhmmm |
| $79 . \mathrm{MJ}$ | Alright um interesting um, do you think that being a girl and being good at math um well you talked about <br> how valuable it is but again I'm trying to see what you think about the real relationship and whether, <br> whether it's really important whether being a girl and not being good at math is something that you see a |



|  | when I was in $5^{\text {th }}$ grade I was thinking like the summer come and I forgot some stuff in my head I was thinking like I forgot but somewhere in my body said I didn't forget in my head I'm thinking I forgot | Reading was more important in elementary school grade than math, has come to feel good about doing math and has more confidence in her own ability to do math during middle school |
| :---: | :---: | :---: |
| 89.MJ | Cuz you had, does it surprise you that my recollection of that lesson in $5^{\text {th }}$ grade was that you were interested in math you were good at math you were involved and asking questions does that surprise you? |  |
| 90.T | Yeah cuz like I never expect a woman to be coaching math over a man but I be thinking like a man coach come in and coach so like I didn't have a girl math teacher up until $8^{\text {th }}$ grade I always had a male math teacher but then my math teacher in $9^{\text {th }}$ grade it was like is she gonna know what she doing is she gonna do it right? Then when she start breaking it down I go oh she good yeah like |  |
| 91.MJ | Oh so she had to sort of prove herself |  |
| $92 . \mathrm{T}$ | Yeah cuz at first I always had a male teacher ever since I was in elementary $5^{\text {th }}$ grade $6^{\text {th }}$ grade $7^{\text {th }}$ grade $8^{\text {th }}$ grade all I had was male teachers my freshman year is the first year I ever had a female math teacher |  |
| 93.T/I | So you if you had had math teachers that were women before that like all through school do you think you would've had a different attitude? Cuz it wouldn't have been strange? For a high school teacher to be a math a... |  |
| 94.T | Yeah I think now like if I had women teachers and a man teachers I probably be like I'm bout to ace this like I'm bout to like cuz I already have one teacher so now I'm thinking like I'ma see how he teach I'll probably think I'm bout to prove him wrong like no because I probably have a girl/boy battle like no because my teacher told me who your teacher Ms. Miss Mrs. Never mister it's Mrs. And then like I could stick up for a woman part of math cuz he's a male with the male teacher I just thought like I was like aight he probably right I never had a woman math teacher |  |
| 95.MJ | Mhmm so it sounds like I'm hearing you say you assume that if a math teacher is a man that he's gonna know his stuff |  |
| 96.T | Yeah |  |
| 97.MJ | If a math teacher is a female |  |
| 98.T | She probably a little shakey I don't know why I think that but like I'ma be honest like the first day of school if she know something I don't know I'll be like ohh she good but if its something I do know ima be like ima talk to my friend she teach me the same stuff I learned last year I'm like is this freshmen class or is this $8^{\text {th }}$ grade class? But once she teach me something new I'll be like oh she good and I'ma get focused but once I know and she gonna do something on the board that I already know I'll probably talk dude we already know this dude we already know this I'm like I know this already I don't know why you doing it but if I don't know it im gonna be quiet still |  |
| 99.R/T | Interesting so um whatever you do after school, I don't know if you plan to go to college you may so what if you have female teachers in college? | teachers who are men, skeptical of female math teachers until they prove themselves! |
| 100.T | That's gonna be good |  |
| 101.MJ | Yeah? Do you think it would influence you to think about how you are gonna perform? How good you're gonna be? | Has come to expect math teachers to |



|  | good teacher |
| :---: | :---: |
| 123.MJ | Yesterday you said you remember me being strict do you think she was strict too? |
| 124.T | No I never had her but when you came in everyone was like she from the army, I'm like no she not |
| 125.MJ | (laughing) what I joke, like I was from the army? |
| 126.T | No! |
| 127.MJ | I didn't have an army suit |
| 128.T | That's what they were saying |
| 129.MJ | But you knew me! |
| 130.T | I didn't know you, that's the first time I met you! |
| 131.MJ | That's right you... that's when we first met and then I... |
| 132.T | I remember you kept telling us pay attention pay attention pay attention pay attention and stuff and people was looking around like where she from like kids were like I think she from the army she strict |
| 133.MJ | (laughing) oh that's embarrassing so anything else again around this issue of learning math being a girl and being a Black girl anything else come to mind when you think of yourself in terms of how you think of yourself being a girl being Black and being good at math |
| 134.T | Its like sometimes a Hispanic kid be like, if I'm in class with a Hispanic kid it's like we always going head to head in math, like I'm Black, this is the answer, well the other girl Black, well we could do it this way. I look at them like no, we could do it this way like it be like, sometimes it be like a little competition but then at the end of the day we end up combining heads, like if I did something wrong she be like no you didn't! Then I be like well can you show me, at first it be like a little bit of a vibe going on, competition back and forth, back and forth, back and forth and the teacher would notice but the teacher won't say nothing because it won't be an argument, it be a math competition and math competition is not really a bad thing. It's a good thing so like they may end up, well how about you work with Tyquanna and then she'll be like aight. At the end of the class we'll like, when you come to class tomorrow right and then we exchange numbers... at first it'll be a little shakey but at the end of the period me and the Hispanic kid we closer a little bit... |
| 135.MJ | You mentioned competition do you think some competition in math helps you as a learner? |
| 136.T | Yeah, cuz like competition with me is like aight boom, she said the answer, I know the answer, we go back and forth and if I win a competition she be like oh I aint know that. I'll be like I won, I won, I'm proud I won. But then if I lose the competition I won't be mad because I gave all, I did everything I could do and she know something I don't know. I probably know something she don't know, so what she know I don't know and that's good for her cuz I don't know it. And if I'm in a competition with somebody else I'm gonna use the same thing that she said to me on them... |
| 137.MJ | Do you think competition in math class is different if it's boys and girls? Or does it make any difference? |
| 138.T | Well boys try to go hard like they be trying like no she wrong because and then no you wrong cuz this that and the $3^{\text {rd }}$ all because theres always a competition with each other boys and girls |

Her sister (and others) praised a female math teacher in elementary school

Her sister's female teacher in

| 139.MJ | So I'm hearing you say there's something different about the way girls compete in math class | elementary school was "good" because she was "cool" and motivating |
| :---: | :---: | :---: |
| 140.T | When girls compete they would end up connecting when boys compete you can't tell them they wrong they wanna throw a fit like I aint wrong she lying this that and the $3^{\text {rd }}$ end up getting kicked out of the class but it's only them stubborn boys but them good boys they be like what you mean how you get that come here come here come here oh aight I got that too but I did this there's always that I got that too but, theres always a but in it |  |
| 141.MJ | And does that help you in math class for example what do you think it would be like if it was just a class of girls? In math, if everyone in math class was girls, do you think that would be different do you think you would interact with each other different do you think you'll do the math different? |  |
| 142.T | It would be good but we'd probably work good together but like I .... |  |
| 143.MJ | Try to think a little like you can talk in general but how do you think you would behave in math class with just girls |  |
| 144.T | With all girls? |  |
| 145.MJ | Uhhuh yeah |  |
| 146.T | I probably be like I don't know I probably feel crazy |  |
| 147.MJ | Why? |  |
| 148.T | Come inside and see all girls I probably be like, it probably be good for them but I wanna show them that I could do math like with a boy in your class like a boy will try to distract you try to do something like make faces but once you block him out he'll be like oh she trying to do work and she not off beat but once you got girl like you cant prove a girl wrong about your work cuz you're doing your work she doing her work too so all the girls would be doing their work its not about being proven in that class if a boy was in that class talking about this that and the $3^{\text {rd }} \mathrm{I}$ be like nah I'm doing my work talking about oh she doing her work she about her work this that and the $3^{\text {rd }}$ but if it was a girl they be about their work |  |
| 149.MJ | So sounds like you're saying there's some advantages to having boys in the class |  |
| 150.T | Yeah like if you have boys in the class like me I like to show off my math boy or girl I be like well and I ask questions about math and they be like oh she smart you think you smart if they say you think you smart that mean they think I'm smart too if you didn't think I'm smart then you wouldn't have said it it be funny it feel good it feel good to me if a boy ask me yo how did you get that answer? I be like well I aint telling you but I'll help him out figure out why | Acknowledges race - describes experience and racial competition with a "Hispanic kid" |
| 151.MJ | Interesting lets talk, lets sort of continue this and talk about um the President's wife Michelle Obama, do you know any, much about her? |  |
| 152.T | (shakes head no) | Is able to work together with Hispanic kids |
| 153.MJ | Other than being the president's wife? |  |
| 154.T | Nahuh |  |
| 155.MJ | Even though you don't know any specifics about her would you imagine that she was good in school and particularly in math |  |


| 156.T | I think she would be good in school probably because if Obama married...if Obama went to a good school he probably met her in one of those good schools he probably picked her up like I think she got some potential | Sees math knowledge as competition but believes that math knowledge is to be shared with others |
| :---: | :---: | :---: |
| 157.MJ | I mean sometimes you've seen her on the tv the news or whatever you've seen her |  |
| 158.T | Like she a good speaker like she got good speeches so like to me if I know she give good speech that tells me that she was never shy she was doing her thing she up there motivating doing this that and the $3^{\text {rd }}$ cuz if you really don't know nothing you wouldn't give in front of a bunch of people a speech because you'd probably be scared of what to say but if you know what you doing then you won't care what they say |  |
| 159.MJ | It would make you more confident ok so you said a lot about math and you're class and we kind of touched on the president how you feel he's sort of an inspiration talked a little bit about his kids what you think they might be like if you think they're good and about the first lady Michelle Obama so um in general let's sort of tie all that together and I'm gonna ask you does having a Black president and the first family being Black have anything to do with you or your life or your schooling how you think about school and in particular math |  |
| 160.T | Math like yeah it do because like say I can't do math then they be like you can't do math but Obama is a Black president and his family Black they motivate kids to do they work in math they do they work cuz like they say you gotta know what you doing to be president you gotta have your associates you gotta know your background to be president you gotta do math all that other stuff so that being like you can't really say I can't do math people are gonna look at you like how you can't do math Obama didn't say that when he became president that he couldn't be president so that motivate kids to do good in math and like I don't know it seem like kids love math now I don't know why don't get me wrong but like every time I be in math class they be like I don't get it they go back and they like oh I get it I get it now like in class everybody be raising they hand so how they get work done like today we had homework and most kids they was like they was getting it done in class cuz we was dealing with um what we was dealing with we were dealing with square roots again so it was square roots and finding the answers to the problems and stuff and people like they be like in class like people will be there early they be early for class they be doing they work and stuff its like people like more math now I don't know why they go in class they be tired I know I be tired and stuff | Competition between boys and girls in math class is different |
| 161.MJ | So again this is you're going into the $3^{\text {rd }}$ year Junior year of high school. So did something change? When you described kids now they wanna do their work they go to math class they're ready to work in class they're ready to do their homework |  |
| 162.T | I think I think it's like they probably think like it's my $3^{\text {rd }}$ year in school they probably think now colleges are gonna be looking at me now and now I gotta do this because if I don't do this if I mess up this year and people always say they always looking at the math and English people are probably like I gotta do this because if I don't do this colleges are gonna look at me I probably mess up my freshmen year but I won't mess up my junior year cuz that's when classes really look at our paperwork this that and the $3^{\text {rd }}$ and all this other stuff that's why I think there's more kids in the class this year like last year was the first year of | Girls compete with each other in math class |


|  | uniform but this year kids was they was doing they job | Boys like to "show off" in math class, girls should sometimes not show how smart they are |
| :---: | :---: | :---: |
| 163.MJ | Oh so last year was the first year that high school had to wear uniform |  |
| 164.T | Yeah |  |
| 165.MJ | You were in $10^{\text {th }}$ grade |  |
| 166.T | Yeah but last year people didn't really wear uniform like that but this year was the best school year the first week of school that people did great like people were in they classes the hallway was kinda clear what we had like 5 stragglers but like I think people probably like remember that no child left behind? That probably stayed with them and they didn't want to be the one that do and I know like no people want to repeat a math class cuz I wouldn't repeat a math class |  |
| 167.MJ | You don't want to repeat a math class |  |
| 168.T | No cuz like if you repeat a math class you be in class wit your friend's little sister and you're gonna be like I learned this last year if you learned it last year why you here again you know but you was fooling around so like people it's a whole different ball game so they be like aight ima do this |  |
| 169.MJ | Mhmm interesting um so tell me about your class again how many boys how many girls in your math class this year? |  |
| 170.T | In my math class |  |
| 171.MJ | How many all together do you know? |  |
| 172.T | I know its... |  |
| 173.MJ | Is it a large class? |  |
| 174.T | Its not large I know it's like probably like probably no more than ten girls in there |  |
| 175.MJ | About ten girls? |  |
| 176.T | And the rest boys |  |
| 177.MJ | About the same amount of boys? |  |
| 178.T | Yeah |  |
| 179.MJ | Or more boys? |  |
| 180.T | Its about the same |  |
| 181.MJ | About the same amount of boys? |  |
| 182.T | No it's probably more boys |  |
| 183.MJ | They're more boys in the class um have you, do the girls sit together? |  |
| 184.T | Nah not really some girls sit around back of the room like me and my friend we sit together we three girls |  |
| 185.MJ | Ok and you said yesterday you're in rows |  |
| 186.T | Yeah we in rows but like it's like a movie theatre cuz the front row like the two rows they aint answer questions and like me and my friend we answer questions a lot we're probably the only girls that answer questions a lot other girls are just laid back and they do their work unless like they chose one they don't like volunteer but me and my friend even if we wrong they be like shut up I bet we won't be wrong next cuz we need to get our confidence back once you get one wrong my friend be looking around and I be like |  |


|  | don't worry about it there's another question coming up and next one you'll get it right and she be back and motivated again | President Obama and his family motivate students to do [try hard] at math |
| :---: | :---: | :---: |
| 187.MJ | Good so that's one of your friends who's a girl but everyone else is sort of mixed in |  |
| 188.T | There's not like rows |  |
| 189.MJ | And how about the make up is everyone in the class Black? |  |
| 190.T | Its Hispanic people in the class too |  |
| 191.MJ | So you have Black students Black classmates and Spanish classmates? |  |
| 192.T | Mhmm |  |
| 193.MJ | Ok um is any what about the teacher? |  |
| 194.T | Hispanic, they both Hispanic, it's one that be in the back and one that be in the front |  |
| 195.MJ | Mhmm oh so there's two teachers in the class at all time so you could... |  |
| 196.T | Yeah because one schedule say one thing in the other schedule say another thing so it's two set of classes but it's together two teachers |  |
| 197.MJ | Interesting so in terms of the survey the inventory that you just took it was about you took it because it's a survey um it's called the Multidimensional inventory of Black identity and this one is especially designed for teens like I said its basically the same type of questions only fewer like the one for adults has more questions um but um you had some questions about it but in general what do you think about the questions? |  |
| 198.T | Some questions like that's how people be talking like that how most people be feeling like one question say um describe yourself well I'm Black I'm brown skin like people always you know what im sayin they like oh well I'm Black like it goes whats your race people put Black they don't put African American people put I'm Black and then like it like some people like if some people like it be Spanish kids around White people around and when we act they be like stop acting ghetto we got people here I be like I don't care I'm not changing the way I act for them like that's not how I am like people get around White people like Black people and they be trying to act more proper and not they selves they try to change it up me I don't do that I act the same way I always act like if they look at me I be like what what I do |  |
| 199.MJ | So one of the first things that you one of the first ways that you would describe yourself if someone said who are you describe yourself |  |
| 200.T | I be like I'm Tyquanna I'm 16 I'm Black brown hair I probably I know ima say I'm Black if people are like whats your race I be like I'm Black they probably no say African American same thing that's the same thing I'm Black |  |
| 201.MJ | And then girl would sort of come in there some place right? But you definitely would identify yourself as Black? |  |
| 202.T | (nods head yes) |  |
| 203.MJ | Um you had a question um on one of those can you tell me which one that was? |  |
| 204.T | Uh it was... |  |


| 205.MJ | One you didn't quite understand...and just make sure that I know exactly what, ok |
| :---: | :---: |
| 206.T | It was this one no it was this one |
| 207.MJ | Ok oh here you kind of started to get a little confused about whether you really disagreed or really agreed that was just because you didn't really agree and you didn't really disagree you kind of mixed up not a question about the question itself ok but the last one |
| 208.T | I have a strong sense of belonging to Black people, I really don't get what they're trying to say like be around them or like a strong sense like I cant be around them? I was a little confused but then I thought they were saying like I have a strong sense of belonging to Black people like strong sense like I like being around them I put I really agree cuz I like being with my own kind like it's just fun but one thing I don't like about Black people I don't get its like they talking about a White person oh she rich just because she White don't mean she rich that's why I be mad like some people say I'ma get a White wife cuz she rich a White person could be struggling not like we struggling but in different terms they can't pay our same bill and its lower than theirs |
| 209.MJ | So it'd be interesting to see what an inventory like this would be for a White person |
| 210.T | Yeah |
| 211.MJ | Ok but this question here but you're ok with your response based on how you interpreted? |
| 212.T | Mhmmm |
| 213.MJ | Alright and there was no other problem with any of the questions? |
| 214.T | Um I don't think so |
| 216.MJ | Can you think of any other question that could've been on there given the types of questions? |
| 217.T | Um |
| 218.MJ | Any question that you think wasn't on there that you would like to answer |
| 219.T | I think it should've been an open question saying like what do you think people do what do you think happens when a White person see a Black person in a White store to me they probably think oh she stealing or he stealing |
| 220.MJ | And you base that on personal experience? What you hear? What you see tv? |
| $221 . \mathrm{T}$ | Like yeah like on tv like I was watching these tv shows and I remember there was this Black person in a store and a lady she was just following her like how can I help you how can I help you I'm shopping just looking around peeking behind the door I'm like she only shopping I'm talking to the tv she only shopping and when they see the person got money then they like oh we got this on sale this on sale this on sale but if it's just like a person you don't know that walk in the store at first you gonna be like um how can I help you um you know this is __ be like yeah like I'm in here right I know whats going on |
| 222.MJ | So what do you think that's about let's turn that same sort of scenario towards the math class do you think that say for example a Hispanic teacher or a White teacher when they see Black students in their class |
| 223.T | I think if a White teacher see Black students in they class they say oh my god it's gonna be a rough year they probably think they're gonna have to stay after school and help once I think once a teacher see a |

The way Blacks (and "Spanish kids") act around White people

|  | Black person doing good in math they're gonna be shocked like you really doing math and they gone be shocked like they gone be shocked they be surprised like oh my god she know what she doing I like people to be shocked cuz I know they be like like my mom always tell me don't judge a book by its cover so like me like the teacher be like I'm gonna let her explain it first I be like let her explain it first see if we could do it and then explain it if we get it wrong you gotta try it first and then you go over it and then you'll be able to see what we did wrong what we did right and the go back and credit like me if I was a math teacher I would give out a test to see where people at and the if I see that most kids is smarter than the rest of the kids I would basically have math helpers like have kids helping kids cuz like because kids go around and you be thinking like you aint think you was gonna be ready for college that's what most kids so like then the kids helping I learned more cuz the kids put it in they language like say you was texting this amount of people and you X oh yeah I was texting this amount they gone get it right one thing I hate about a teacher is like if we doing math and stuff we talking about math and we get it wrong they be like well they say something they be like well I grew up here and start telling about they background. We don't care about your background we care about math why you talking about your background. One of my friends was like we don't care if you grew up in Trenton like what that gotta do with what we gotta do I'm trying to tell ya that I had one single parent I didn't have two so I feel like you assuming that we only have one single parent no I'm just sayin we the same well I had my mom and my dad and he was just quiet like Ok I was gonna ask you do you think you've ever been judged before you could before you started um | matters <br> Being Black is important to Tyana's identity |
| :---: | :---: | :---: |
| 224.MJ | doing the math whether you got answers correct or not correct do you think you've ever been in a situation where you were judged because you were a Black girl? You don't have to you know the name of the teacher isn't important but do you think you've um been judged like that? And did it have any impact on you? | Tyana likes being around other Black people but questions the MIBI-t item re: feeling strong about "belonging to Black people" |
| 225.T | Like I be in one math class before like and I raised my hand he picked someone else and they got it wrong so he went over I was like I know the answer so wait I'ma explain to her how to do it if I know the answer let me see if I got wrong first and then you could explain it so basically while you were explaining you know what the answer is now yeah it's on the board now so I can't tell them so I felt like we both had our hand up she got it wrong so that means its my turn so because basically I'm like if I had it wrong you were doing it cuz that was her answer but this is my answer no it's not that, it is that I was really upset like they were like don't worry its just a answer we gon' go over the problem after let me answer first you should get at least 5 kids answers and then like go over it once you see that no kid got it right but if a kid got it right let her explain to the next person don't just go ahead and just explain to that person what everybody else is gonna hear who who wanna try it now its too late now the answer already on the board |  |
| 226.MJ | Sounds like you'd be a good teacher you'd give a whole lot more students a chance to answer before you just gave the answer or put it on the board you ever think about teaching? Is that what you want to do? |  |
| 227.T | No I wouldn't I don't think I'd teach because like me I see how kids disrespect teachers |  |
| 228.MJ | How kids disrespect teachers? |  |
| 229.T | Yeah like how they get smart with them and I don't think I could handle that like cuz I never came from a |  |

$\left.\begin{array}{|l|l|}\hline & \begin{array}{l}\text { disrespectful family so I don't know how I would react to that I never thought about teaching I don't know } \\ \text { how like kindergarten yeah but like high school like smart kids like they strong but I remember like } \\ \text { Hubbard like substitutes quit sometimes cuz kids was being rude and I felt bad cuz I remember once there } \\ \text { was a White teacher there somebody made her cry I'm like yo you making us look bad you making our } \\ \text { school look bad because like you saying you doing that oh I'm not going back because them kids } \\ \text { disrespectful this that and the 3 }\end{array} \\ \text { wasn't I remember a substitute said that and I was like that's messed up like that the kids it was only one kid so basically you go to a school you pick one teacher a } \\ \text { teacher is not gonna say that kid they gonna say a whole school them kids they gonna say them kids they } \\ \text { not gonna say that particular kid }\end{array}\right]$

Is aware/has personal connection to everyday racism (e.g. Black people are suspected of stealing in stores)

Believes that White teachers have pre-conceptions about Black students' abilities, may treat Black students differently in math class

Believes that "good" math teachers care about and [try] to understand students

|  | they gonna be like you know what Ima go in there and do what I gotta do cuz I know if I'm in an interview <br> with another girl I'ma be laughing like they gonna be looking but like ima be like well I don't know but <br> once a girl start asking questions well no no not that remember what she talking about you gonna rewind it <br> and flashback and all that other stuff |  |
| :--- | :--- | :--- |
| 246.MJ | So you think girls are a good influence on other girls? Believes that some students' <br> participation is valued more than her <br> own or other Black students in math <br> class <br> $248 . \mathrm{MJ}$ Yeah think so too that's why I'm doing this study on girls and not the boys alright thank you very much Tyana | Believes that students should be <br> respectful to teachers but sometimes <br> teachers don't respect students |
| Alright |  |  |



## APPENDIX F

## Protocol 3 Group Interview

## Jana, Tyana, Shaniyah

Date of Interview: 11/11/2010
Date of Transcription: 12/1/2010
Transcriber Initials: A. S.

| Speaker <br> Move | Transcript | Notes |
| :--- | :--- | :--- |
| 1. MJ | First of all let me thank you all for this interview um all the interview questions I'm <br> gonna ask you have to do with you and mathematics your experiences in math classes <br> what math means to you and how you feel and think about yourself and mathematics. So <br> are you ok talking to me in this group about those things about yourself? |  |
| 2. J,T,S | Yes | Ok um I'd like for you to share as much as you can about yourself um as a learner of <br> mathematics how you feel about learning mathematics what you think about learning <br> mathematics and it may help to think of um such statements such as I feel this way or I <br> think this way or for me it's this way um whenever possible and I hope that talking to <br> each other in a group like this and listening to each other will encourage you to use <br> phrases like that throughout this interview ok so is everyone comfortable? |
| 3. MJ |  |  |
| 4. J,T,S | (nod yes) |  |
| 5. MJ | Oh let me give you water since you're gonna be talking um ok so to start off with, will <br> each of you say your name and your age |  |
| 6. S | Alright, my name is Shaniyah and I'm 16 |  |
| 7. J | My name is Jana and I'm 16 |  |
| 8. T | My name is Tyana and I'm 16 |  |
| 9. MJ | Ok great. Um, so just to start off and get you talking. Um, what do you think about this <br> study? I mean what do you think about the interview so far, you took the math survey |  |


|  | again, the same one you took in $7^{\text {th }}$ grade, Shaniyah you just took the inventory uh multi dimensional inventory of black identity for teenagers. Are any of the interview questions... what do you think so far? |  |
| :---: | :---: | :---: |
| 10. T | I like it. |  |
| 11. MJ | What do you like about it? |  |
| 12. S | I like these questions, the MIBI-t, cuz um, it made me think about certain stuff and certain situations as far as like black people and all of that... | MIBI-t primed Shaniyah to think about Black identity. (see Tyanna line 22) |
| 13. MJ | Mhmm, and it was an inventory designed just to present some questions to get your feelings um, and your thoughts about different aspects of being a Black person. So thanks for that. Anything stand out in particular, any question? |  |
| 14. S | Um, yes wait I have to find it though, um, well I'm gonna just choose this, one it said "a Black parent should surround their children with Black art and Black books". I put neutral for that because like just cuz you Black you should just oh everything should be Black Black Black. Like, that child should know all...they, like, I don't know how to say it but... | Ideology-nationalist measure |
| 15. J | ...get to know about other things? | Jana helps Shaniyah articulate: Black parents should expose their children to art and books about non-Blacks. |
| 16. S | Yeah |  |
| 17. T | She said they not gonna know about other races if it's just Black, Black, Black... | Tyanna agrees with Shaniyah and Jana. |
| 18. S | Yeah |  |
| 19. T | Because you being racist to other things. | Tyanna believes that Blacks who do not expose themselves to non-Black art and books is being racist. |
| 20. MJ | So that question sort of made you think about it when you might not have. |  |
| 21. S | Yes |  |
| 22. T | You know I never thought of it like that. | MIBI-t primed Tyanna (see Shaniyah line 12) |
| 23. S | Yeah |  |
| 24. MJ | Anything else stand out? And Tyana and Jana you took it earlier so there's a couple of copies there if you wanna refresh your memory if anything stands out, um... |  |
| 25. T | Ya'll don't think this is um weird how you be all Black | Tyanna directs her question to Jana and Shaniyah. |
| 26. S | Yeah, that was a weird one. | All 3 girls respond to this Centrality measure by presuming a face-to-face description where their Blackness would be obvious. Tyanna them suggests that her name makes her |


|  |  | Blackness obvious. |
| :---: | :---: | :---: |
| 27. J | What? |  |
| 28. T | This one right here "when I describe myself to someone the first thing I say is I'm Black". |  |
| 29. J | No |  |
| 30. S | Yeah I don't say that. |  |
| 31. T | They probably be like... |  |
| 32. S | They know that! |  |
| 33. T | What's the problem, is there a problem? How you know I'm Black cuz my name Tyana |  |
| 34. S | (laughs) yeah |  |
| 35. T | It sound crazy right? |  |
| 36. MJ | Interesting, anything stand out for you Jana? |  |
| 37. J | Um, yeah the question that say "most people think that blacks are as smart as other races"... |  |
| 38. MJ | Say that again... |  |
| 39. J | Most people think that blacks are as smart as other races. | Public Regard measure |
| 40. MJ | Aren't as smart? |  |
| 41. J | Are. |  |
| 42. MJ | Are? |  |
| 43. J | Yeah |  |
| 44. MJ | Ok |  |
| 45. J | Yeah that stood out because I don't think so. |  |
| 46. MJ | Say a little bit more |  |
| 47. J | Oh, I don't know, I don't think that other races think that we are that capable of certain things or achieving anything. |  |
| 48. MJ | And I think that one of the reasons why I wanted you all to answer questions like is because I wanted to, I mean it's all related to mathematics, you know that, um... |  |
| 49. T | I don't think I have a Black teacher in high school. | Tyanna immediately offers that she doesn't remember having any Black teachers in high school. Neither Shaniyah nor Jana can name a class with a Black teacher but Jana says "there are some". In the next lines, all of the girls remember and describe their $8^{\text {th }}$ grade math teacher. |
| 50. S | Me either |  |


| 51. J | There are some, but I don't have one |  |
| :---: | :---: | :---: |
| 52. MJ | So there are some Black teachers in school but none of you has ever had a black math teacher |  |
| 53. S | I had one in $8^{\text {th }}$ grade that's the last time I had one |  |
| 54. T | I had Mr. Giple. |  |
| 55. S | Yeah we all had Mr. Giple. |  |
| 56. MJ | In $8^{\text {th }}$ grade in middle school? |  |
| 57. S | That's the last time I had a black math teacher |  |
| 58. T | That's crazy |  |
| 59. J | I had Mr. __ in $9^{\text {th }}$ grade |  |
| 60. S | Oh yeah, I ain't have him |  |
| $61 . \mathrm{T}$ | I ain't have him, I had Ms.... | Shaniyah remembered the teacher that both she and Tyanna had in $9^{\text {th }}$ grade - |
| 62. S | I had Ms. Torres. |  |
| 63. T | Yeah, her. |  |
| 64. MJ | So some of you have had a female teacher? |  |
| 65. T | Yeah |  |
| 66. J | Mhmm |  |
| 67. T | I have |  |
| 68. MJ | Do you think that female math teachers are common? |  |
| 69. S | They starting... |  |
| 70. T | Yeah |  |
| 71. S | I'm trying to think, I think it is... | Shaniyah and Tyanna continue to be more outspoken than Jana |
| 72. T | It's like equal |  |
| 73. MJ | Do you think it would be different, do you think your learning experience would be different if you had a female math teacher |  |
| 74. J | (shakes her head no) I had one last year, she was good, I passed. |  |
| 75. S | In a way yeah. |  |
| 76. J | I don't know... |  |
| 77. T | One thing about a male teacher he won't show you short cuts he will do the whole thing out with no short cuts, a lady teacher will. |  |
| 78. J | That is not true, it depends on the teacher you have. |  |
| 79. T | Mr. G he would do all, he never did none [short cuts] |  |
| 80. J | It's not a [male vs. female]... Mr. Fox gave us short cuts. | Jana asserts that giving "short cuts" has nothing to do with a teacher being male or |


|  |  | female. |
| :---: | :---: | :---: |
| 81. T | My math teacher don't give us short cuts. |  |
| 82. J | Mr. G gave us short cuts. | They're discussing whether their $8^{\text {th }}$ grade math teacher, a Black man. |
| 83. T | Nah, he would give us short cuts at the, at the end |  |
| 84. J | He gave me short cuts. |  |
| 85. T | And he did the long part. |  |
| 86. J | Tyana! |  |
| 87. T | He was like "oh, do it like this", not the easy way but he was like cuz "I want you to learn the long way" |  |
| 88. MJ | That's interesting. Well this is the kind of conversation that's really gonna be interesting for you all to look back at and for me. I think some of those things are gonna come up again. So what I wanna do now is, um, show you some clips again from $7^{\text {th }}$ grade, just a few minutes | Unfortunately, I did not ask Tyanna what she meant by "short cuts", and what it means that a female teacher will give "short cuts". |
| 89. J | Oh God! (laughs) |  |
| 90. MJ | Just a few minutes because you're now in what grade? |  |
| 91. S,J,T | $11^{\text {th }}$ |  |
| 92. MJ | You're all in $11^{\text {th }}$ grade, $7^{\text {th }}$ grade is quite a while back so you had experiences in $8^{\text {th }}$ grade, $9^{\text {th }}$ grade, $10^{\text {th }}$ grade and now this year so far. So just for a minute I want you to take a look at the screen - take a look at yourselves in $7^{\text {th }}$ grade. |  |
| 93. J | Eeuw! |  |
| 94. S | Look at Maria! |  |
| 95. J | Eeuw! I used to look like that? Why didn't you guys tell me? |  |
| 96. S | Look how I look! |  |
| 97. T | Oh my God! |  |
| 98. S | Remember her? (laughs) |  |
| 99. T | We had fun when we were little. |  |
| 100. MJ | That's both of you [Tyanna and Shaniyah] |  |
| 101. J | Look at your beads! |  |
| 102. S | Oh my God, I remember! |  |
| 103. J | I'm soo skinny! |  |
| 104. S | Oh my God, we were babies! |  |
| 105. T | Look at Petrice! |  |
| 106. MJ | See, that's why I'm missing Petrice cuz all of ya'll were on this video tape! |  |
| 107. MJ | What do you remember about that class? About that math class not just that particular class, going to Mr. Pedrick's math class |  |


| 108. T | It used to be fun |  |
| :---: | :---: | :---: |
| 109. S | Yeah |  |
| 110. J | We used to do the 3 point lines and stuff I forgot what they called |  |
| 111. S | Yeah I remember |  |
| 112. T | In that blue book right? |  |
| 113. J S | Yeah |  |
| 114. S | Some of them red |  |
| 115. T | Or even green, it was new colors. |  |
| 116. MJ | I'm just gonna turn the sound down and we can just let it run so you can kinda see. So it's been a long time, it's been a couple of years since that kind of math class, so I was hoping that maybe that would help you remember what kind of math you did in Mr. Pedrick's class, how you went about learning math, and how is it different? Or is it different than in $8^{\text {th }}$ grade, $9^{\text {th }}$ grade, $10^{\text {th }}$ grade and whatever math you're doing this year? | I turn down the sound on the videotape but do not turn it off. |
| 117. S | Well, for me I could say it's different now because now we don't really, we discuss what we do now but more we just pick it up and we just do it like, I don't know for ya'll... I just be doing math, I don't really, we'll have discussions but like my teacher he'll teach something and we'll know... He'll teach it for like 10 minutes and after that the whole class will get it and we just do it! |  |
| 118. T | Now I be on my own! |  |
| 119. S | Yeah, that's what I'm saying. |  |
| 120. T | When I participate it be like do your work. |  |
| 121. S | Yeah. |  |
| 122. T | In that class we discuss problems we used to do problems together I think |  |
| 123. J | Mhmmm |  |
| 124. MJ | You do problems together this year? |  |
| 125. T | Nah, in Mr. Pedrick's class. |  |
| 126. MJ | So it's very different huh? |  |
| 127. S | Yeah. |  |
| 128. MJ | So in thinking about how different it was and specifically in those years the kind of math classes you had, can you think about how you developed as a mathematics learner in your school classes? What kinds of things helped you develop or did it help you develop? |  |
| 129. T | I like when I was in groups |  |
| 130. MJ | Can you say more about that? |  |
| 131. T | Cuz I feel like in groups when you wrong the other person helps you explain how you | Clearly, Tyanna is expressing the benefits of |


|  | got that answer. Now when you wrong by yourself you're just wrong by yourself. | working together to learn math, and her <br> preference to do so. |
| :--- | :--- | :--- |
| 132. MJ | What do you think about that? Is that the same for you all? |  |
| 133. S | Sometimes it's like that. |  |
| 134. MJ | But that's interesting you have the common experience of being in Mr. Petrick's class <br> and now you've gone on to different classes. |  |
| 135. S | Like, yeah I don't know, like yeah. I just be by myself now I just be doing my own. I <br> don't really...if I'm not getting something I just ask the teacher, like I just be asking <br> the teacher and then he'll help me. And I'll just take it from there, like try to work it <br> out by myself. | Shaniyah does not sound positive as she <br> describes this. She conveys a sense of <br> resignation and longing for being able to <br> interact and "have fun" in math class as she <br> described her fantasy math class during <br> Interview Protocol 1 (6/1/09). However, she <br> does believe that working alone helps her to <br> perform better on tests (Line 137) |
| 136. MJ | And how do you think that's affect how you've developed as a math learner, and how <br> you think of yourself as a math learner? |  |
| 137. S | I think that's helping me because now like if I take a test I'll know how to solve that <br> problem and like I made it like step by step. So it'll help me, so that way I could know <br> if I did that or do that or something... |  |
| 138. T | It helped me too! |  |
| 139. MJ | How so? |  |
| 140. T | Cuz... |  |
| 141. MJ | And what's helped you specifically? |  |
| 142. T | Because usually we always working in a group. I could do it in a group but now I <br> could do it by myself. Now not, without a group, you know when the test come you <br> can't be in a group. When the test come you gotta do it by yourself, so now I know <br> how to do it by myself and I don't need a group. |  |
| 1 That's true, so um, I didn't ask you this but can each of you say what you're math |  |  |
| class is this year. What kind of math you have? |  |  |


| 150. T | I have geometry, too. |  |
| :---: | :---: | :---: |
| 151. MJ | Oh I'm sorry so say it again. So you have, Tyana what? |  |
| 152. T | Algebra 2 and Geometry. |  |
| 153. MJ | And geometry, so two periods of math? |  |
| 154. T | Nah, uh its 2 different classes for me. |  |
| 155. S | Yeah, I have um geometry a different period and then Algebra 2 a different period. |  |
| 156. MJ | And then two different classes? |  |
| 157. S | Two teachers |  |
| 158. MJ | And Jana? |  |
| 159. J | Oh I just have Algebra 2 |  |
| 160. MJ | You just have Algebra 2. Ok, in each of your individual interviews I think each of you talked actually a lot about I think your specific classes and what you did. I think I asked you things like how many were in the class, who was in the class - boys and girls and things like that. Um what I'd like to ask and if you could talk a little bit about what, if anything, do you think about mathematics and racial identity? What if anything do mathematics and racial identity have to do with each other? |  |
| 161. S | I never really thought of stuff like them two together but I think it... |  |
| 162. T | You talking about like work with a a Hispanic student? | comment |
| 163. MJ | Well um no I just wanna get and I appreciate you saying that you never thought about it together, Shaniyah |  |
| 164. J | Yeah me either... |  |
| 165. MJ | Yeah so it's a new question and it's ok if you wanna think it through or think out loud. Um, I just wanna see if you have any sense... what are you seeing on there? | The girls are commenting on something on the video. |
| 166. T | Nah, that Theo's like this (shows gesture) |  |
| 167. J | In the camera [a student is making a gesture directly into the camera] |  |
| 168. MJ | (laughs) yeah um again, one of the reasons for this study is to see if you think about mathematics and racial identity and how it's affected you um since $7^{\text {th }}$ grade, $8^{\text {th }}$ grade, $9^{\text {th }}$ grade $10^{\text {th }}$ grade and $11^{\text {th }}$ grade um and like Shaniyah said you hadn't really thought about it in those terms so um I'm trying to get a sense of what you think about it now |  |
| 169. J | Math in general or math in our grades |  |
| 170. MJ | Um math and if theres any connection to racial identity so for example the questions on the inventory were to get you thinking about how you think of yourself as a black person and then of course all the math questions you took the math survey about what you think about learning math and doing math and I'm trying to see if they're connected in any way if the way you think about yourself as a math person and the way you think about yourself as a learner of mathematics trying to see if there's any |  |


|  | connection or any relationship |  |
| :---: | :---: | :---: |
| 171. S | Um well um some connection could be like well in math well with your race you like when you're born you're automatically what you are but as of math you have to learn it it comes it doesn't just come naturally you have to learn it so like aight well as you get older you learn more and more like types of math and then as you get older also with race like you start to learn who you are as a person so I think that's one way I guess be similar like I don't know |  |
| 172. T | Oh I get it now |  |
| 173. MJ | No that's good and again sometimes when you wanna answer a question you have to think it through I mean there's no right or wrong answer so uh thanks for sort of thinking out loud |  |
| 174. S | You're welcome |  |
| 175. MJ | It's ok I like to think a lot too before I answer I try to think a lot before I |  |
| 176. T | I'm like the same it might not even make sense at one point but then it get there |  |
| 177. MJ | Um what about your identity and thinking about math in the future |  |
| 178. T | People tell me like I learned that one day I might go to the store and buy some $\qquad$ or a I'm not gonna do like how much am I gonna spend stuff like that |  |
| 179. J | That is not true |  |
| 180. T | I know that's what I be saying to people |  |
| 181. S | I know what she talking about like how they like be having discounts or they'll have sales and the percent and then like you'll I know what she saying |  |
| 182. T | Well you're gonna have to know how to do math in the future |  |
| 183. S | Well I know I'ma always be math cuz regardless of what I do rather if it be dancing or just a job you're just gonna need math cuz you're always gonna have you're gonna need to count you're just always gonna need math |  |
| 184. T | If you don't know math people could jip you out your money |  |
| 185. S | I know I'm gonna need math to take me wherever I wanna go |  |
| 186. T | You're gonna need math for taxes |  |
| 187. S | ...in life |  |
| 188. J | You said taxies? |  |
| 189. T | Taxes |  |
| 190. MJ | So that kinda leads me to the next question I was gonna ask you um what does each of you think about the role, what do each of you think about the role of math will be in your future schooling in your job and you all have one more year of high school what do you think the role of math will be? |  |
| 191. S | Money |  |


| 192. J | I wanna be a scientist so I'm gonna need math to do that |  |
| :--- | :--- | :--- |
| 193. S | Yeah and I wanna be an investment banker so that's gonna play a big part |  |
| 194. T | I'm gonna be a nurse I don't know how that's gonna be a part with that besides getting <br> checks and stuff |  |
| 195. MJ | Besides what say that again |  |
| 196. T | Besides getting checks |  |
| 197. MJ | Yeah you know it's interesting you should say that, my daughter's a nurse and she <br> does a lot of math she has to calculate the medications and all of that stuff so she might <br> get a request from a doctor to give a patient a certain dosage and she actually has to do <br> the calculations um so there's a lot of math |  |
| 198. J | You still wanna be a nurse? |  |
| 199. T | Yeah |  |
| 200. J | Oh |  |
| 201. MJ | So why you ask her that Jana (laughing) |  |
| 202. J | Cuz her face |  |
| 203. T | You wanna be a scientist? |  |
| 204. J | Yeah |  |
| 205. MJ | So what do you think I mean I think that's interesting um do you think you have a <br> sense of shying away from math for any particular reason? |  |
| 206. J | Huh? |  |
| 207. MJ | Do you shy away from math or do you is it or is math something that you wouldn't.... |  |
| 208. J | Oh I like math |  |
| 209. MJ | Yeah? |  |
| 210. J | Yeah that's my favorite subject I don't like English |  |
| 21. S | I kind of don't either |  |
| 212. T | I do |  |
| 213. J | You don't like English? |  |
| 214. S | Yeah its kinda, its boring now |  |
| 215. T | You right |  |
| 216. J | Yeah |  |
| 217. S | I don't like my English class |  |
| 218. J | Its always like that somebody say they like English they usually don't like math like <br> that's what I ask my friends and most of my friends like English instead of math and <br> I'm the opposite |  |
| 219. T | Well I like both |  |
| 220. J | But I don't like English I love math |  |


| 221. T | I like English because its all of us in there |  |
| :---: | :---: | :---: |
| 222. S | I like history |  |
| 223. J | I'm just we talking about the subject not the class |  |
| 224. MJ | Subject in general the topic |  |
| 225. S | I like history even more than math |  |
| 226. T | I like Spanish |  |
| 227. J | Yeah me too |  |
| 228. S | Spanish is aight |  |
| 229. MJ | So what kinds of things for each of you what was the most significant influence on how you think of yourself as a math learner? |  |
| 230. S | I'm sorry for me it was my $8^{\text {th }}$ grade teacher he was like... |  |
| 231. J | Mr. |  |
| 232. T | Mr. right? |  |
| 233. S | Yeah |  |
| 234. T | I said it |  |
| 235. S | He was like the best math teacher I had like... |  |
| 236. J | Yeah I always said that him and my $9^{\text {th }}$ grade algebra teacher |  |
| 237. T | Like with Mr. you always got it |  |
| 238. S | Yeah and like now I have a good Algebra 2 teacher mr. Bott I like him |  |
| 239. T | I had a good $9^{\text {th }}$ grade teacher too |  |
| 240. J | Who you had? |  |
| 241. T | I had ms. Torres she used to crack jokes and it be funny |  |
| 242. MJ | So its interesting that you can immediately say this is a teacher who really had an impact |  |
| 243. T | Like Mr. he was funny but he was serious at the same time |  |
| 244. S | Yeah that class was funny |  |
| 245. T | One of the things was $\mathrm{A}+\mathrm{b}=\mathrm{c}$ |  |
| 246. J | Yeah the algebra we learned algebra |  |
| 247. MJ | Algebra formulas yeah so since you all can think of someone or someone's in particular who really helped you have a positive attitude about math can you think a little bit more deeply and specifically about what is it that they did an how it affected you? |  |
| 248. S | I think it was just his way of teaching |  |
| 249. J | Yeah I don't know how to explain it |  |
| 250. S | When we were in that class you knew it was gonna be something funny like you could learn and like.... |  |


| 251. T | We multi task |  |
| :---: | :---: | :---: |
| 252. S | Yeah |  |
| 253. T | We used to learn and have fun |  |
| 254. MJ | Oh ok multi task so you were learning but you were having fun at the same time |  |
| 255. J | And everybody got good grades like even the people that really wouldn't understand math like I don't know it was something about him that really helped us |  |
| 256. T | He gave a chance |  |
| 257. S | Yeah |  |
| 258. MJ | So if I were to ask you what kinds of again I'm just trying to get a little bit deeper what kinds of feelings did you have when you were in those favorite classes with that favorite teacher? |  |
| 259. S | Um it was like enthusiasm |  |
| 260. T | Happy moments |  |
| 261. S | We was anxious cuz you aint like every day you would just come like what's gonna happen today whats going on today |  |
| 262. MJ | So you were curious going in |  |
| 263. J | Yeah curious |  |
| 264. MJ | You wanted to be there |  |
| 265. T | At first I just couldn't wait to go to his class |  |
| 266. S | And I'd be mad when we leave |  |
| 267. T | We had two periods |  |
| 268. MJ | Double period? |  |
| 269. S | Yeah |  |
| 270. MJ | Did you feel smart? |  |
| 271. J | I did |  |
| 272. S | I did |  |
| 273. T | I did I felt like a genius (laughing) |  |
| 274. MJ | What made you feel smart? |  |
| 275. T | Cuz you knew what you was doing |  |
| 276. S | Yeah you knew what you was doing |  |
| 277. T | If you aint know you was gonna know by the time you get out of that class I know that |  |
| 278. MJ | Ok um obviously I'm gonna have to cut this part I'm gonna have to edit. Is there anything else that you can think of um that has come to your mind over the course of this study like I said you know there was the math survey you knew in 7thgrade we were always asking you questions like how did you feel what were you thinking um and again and Mr. Pedrick actually is finishing his dissertation he's looking at his |  |


|  | video tapes of you guys in the $7^{\text {th }}$ grade as well so uh but my interest is really about your identity as mathematics learners and as young black girls and anybody curious why? No, um cuz I'm a black girl and I raised a black girl and I'm just curious um about how you think of yourselves as math learners and is there anything that is particular about being a black girl and doing mathematics and being successful in mathematics? So for example if I asked you when you think about a mathematician if I asked you to draw a picture or describe somebody who you know is good at mathematics what would that person look like? |  |
| :---: | :---: | :---: |
| 279. J | I don't know |  |
| 280. T | I don't know |  |
| 281. MJ | Just you know draw me or describe somebody who you know is good at mathematics what would that person look like? |  |
| 282. T | Mr. |  |
| 283. MJ | And describe him for the camera for the record |  |
| 284. T | A black African man |  |
| 285. J | High cheek bones |  |
| 286. T | A beard big head I think he African too |  |
| 287. MJ | Yeah I think he is from a country in Africa I don't know which one |  |
| 288. T | When he smile he like (does a gesture) he like real...I miss his class |  |
| 289. J | I know |  |
| 290. MJ | So is there anything else that you can share that you haven't said before thought about or... |  |
| 291. S | I think well before we came to high school probably people probably thought like when they think of an English teacher they think of a lady or well I don't know what they thought of a math teacher but like anyone can in high school cuz my $9^{\text {th }}$ grade year was my first year having a lady math teacher I think since like kindergarten |  |
| 292. T | Me too |  |
| 293. S | So it was kinda different for me |  |
| 294. T | Every time I had English I always think I'm gonna have a lady |  |
| 295. S | Now I don't think that |  |
| 296. T | That was in middle school |  |
| 297. S | Yeah |  |
| 298. MJ | So that's what you're saying, say more you don't really think about it so on the one hand Shaniyah you said it kinda stood out in your mind that oh I have a lady for math now which somehow was different |  |
| 299. S | Yeah it was different for me cuz I don't know I was just always used to a male math |  |


|  | teacher so I just wanted to see how she was gonna... |  |
| :---: | :---: | :---: |
| 300. T | Do it |  |
| 301. S | Yeah |  |
| 302. MJ | Does that influence you in any way? |  |
| 303. S | Honestly no |  |
| 304. MJ | Do you think about yourself? Its like ok this is a lady doing math she's a math teacher |  |
| 305. S | Yeah well I know girls are capable of doing anything but it was just like aight |  |
| 306. MJ | It was nice to actually have it there |  |
| 307. S | Yeah and she wasn't black either she was... |  |
| 308. T | Hispanic |  |
| 309. S | Yeah Hispanic so it was like yea...but it didn’t influence me because I failed her class and something about how she talked she was a good teacher but she didn't hit it off for me |  |
| 310. MJ | Mhmmm so just the fact of her being a woman didn't necessarily make it a good. |  |
| 311. S | No I think she I don't know how like I think she talked too fast or maybe it was just me I don't know |  |
| 312. MJ | So it sounds like you're saying even though she was a woman that it's still something about the actual teaching that has to be better than that that has to be more than that |  |
| 313. S | Yeah it was just something about how she talked I guess |  |
| 314. MJ | Jana, are you going to say something about being influenced as a math learner? |  |
| 315. J | I don't know what to say I just like math like I don't know |  |
| 316. T | It's easy for you? |  |
| 317. J | Yeah it's easy I'm really good in math |  |
| 318. MJ | Now let me ask you is there anything you want to ask each other, around math learning math identity racial identity any questions? You don't necessarily have to answer them but is there something that you might be curious amongst yourselves or that you think you should be interested in |  |
| 319. T | I have a question, if ya'll go to math class right everybody get in groups they all get in groups but a black group |  |
| 320. J | It depends who's in the class I don't know |  |
| 321. S | Nah I don't think like that |  |
| 322. J | I don't think like that either |  |
| 323. MJ | That's an interesting question Tyana can you say that again? What was the question? |  |
| 324. T | Like would you get in an all black group, like I don't know me if everyone get in groups I would be in an all black group I didn't plan for it |  |
| 325. J | It depends who's in who my friends are or who I'm next to or who I wanna be with |  |


|  | that day I don't know cuz in my math in my algebra 2 class I sit with a black girl and a <br> Spanish boy so... |  |
| :--- | :--- | :--- |
| 326. T | Me I cant like in a group I can't work unless my friend there like you gonna get in a <br> group with someone you aint know like you be sitting there like if I'm with somebody <br> I don't know cuz you don't know what they're gonna say |  |
| 327. S | Yeah sometimes it don't happen purposely but sometimes I don't be like wanting I <br> don't know it depends cuz I know I don't be wanting to use people but I know if I go <br> with a certain culture or whatever like if I go with a Hispanic group I know they get <br> their work done so I go with them but |  |
| 328. T | They crack jokes and stuff |  |
| 329. S | I just be getting my work done that's it I get my work done then I move back to my <br> seat |  |
| 330. T | So you use them |  |
| 331. S | Nah its just you wanna get your work done |  |
| 332. T | Yeah aight they be helping you out? They crack jokes a lot |  |
| 333. MJ | That's a great question so theres something going on its not just a matter of working in <br> groups its who you're working with or who makes up the group? |  |
| 334. T | Like if I pick my group I know we gonna do good cuz we like we all friends we not <br> gonna let each other fail we not gonna do that and like and like say one of the persons <br> don't do work we still like she did something if it was somebody else group nah she <br> aint do nothing they don't tell you in a minute like somebody like that and you aint do <br> nothing but your friend back you up somebody else well she aint do nothing because I <br> don't know and you get a bad grade cuz you had a headache |  |
| 334. MJ | What do you think about what happens in a group with all girls? |  |
| 335T | I don't think nothing I think we still get our work done |  |
| 336. MJ | Is there any preference do you think it has any influence on the way you work? |  |
| 337. S | Sometimes we stall we'll like we'll talk about |  |
| 338. T | You talk bout girl things |  |
| 339. S | Yeah its not always like that cuz you can be with a boy and a boy will distract you too |  |
| 340. J | Yeah I'd rather be in a group with girls I don't know why I mean it don't matter but I <br> don't know its just with me it depends on the people |  |
| 341. T | I cant work with a boy I like neither |  |
| 342. S | You will definitely not get any work done |  |
| 343. T | Try to be cute but not get my work done |  |
| 344. S | You won't get your work done |  |
| 345. MJ | You won't get your work done when? |  |


| 346. T | If I'm in a group with a boy I like |  |
| :--- | :--- | :--- |
| 347. MJ | So that's a distraction |  |
| 348. T | Yeah say you're doing a math problem you don't want him to feel like he dumb oh <br> you got that answer oh I got the same answer knowing that he wrong and you right |  |
| 349. MJ | So it sounds like there are times when you would deliberately sort of not answer |  |
| 350. T | I wouldn't |  |
| 351. MJ | Because you don't want to make him feel... |  |
| 352. T | Stupid |  |
| 353. MJ | What happens if you think that could be a reverse feeling like do you think... |  |
| 354. T | He be doing it to me? He probably do but it will probably be a lot of flirting a lot of <br> blushing ya'll aint getting nothing done |  |
| 355. MJ | So clearly there are things that can be distractions in math class no matter what |  |
| 356. T | Basically |  |
| 357. MJ | Great I might help you, ask you to help me to come up with some more questions for <br> future studies. Jana or Shaniyah you have any ideas any questions you wanna ask or <br> pose just in general or question that you think I should be interested in |  |
| 358. J | Tyana how you feel about math? |  |
| 359. T | I feel good about it how you feel about math? |  |
| 360. J | How you feel about math Shaniyah? |  |
| 361. S | nodding her head) I feel math is important and you should that's what it is it's <br> important yeah I like math wait senior year what we learn calculus? |  |
| 362. J | if you want you can take pre calculus but it's really you take three years of math but <br> you don't have to take pre calculus unless you want to and I'm not |  |
| 363. MJ | So you're thinking in your head the next year so what are your choices? |  |
| 364. J | Pre calculus |  |
| 365. T | So you're taking another one too? |  |
| 366. MJ | Um you don't have to have 4 years of math? |  |
| 367. J | (shakes head no) its 3 years math |  |
| 368. MJ | 3 years math |  |
| 369. T | And what is it for English? |  |
| 370. J | Four years |  |
| 371. MJ | Yeah I think English is 4 years so given that you have a choice how many of you <br> young ladies are going to take math next year? |  |
| 372. S | I think I might do it |  |
| 373. T | I think I might try it yeah ima try it cuz I might need itfor college |  |
| 374. S | Yeah I think I'ma try it cuz |  |


| 375. T | But if I do a make up class I aint gonna try it |  |
| :--- | :--- | :--- |
| 376. S | Yeah I think I'ma try it |  |
| 377. T | It depends on like if I need an extra class or not |  |
| 378. MJ | Ok um alright you've given me a lot to think about and I'm gonna stay in touch <br> actually after this because I'm gonna be writing it up and I told your mom that I'd <br> make sure that you see everything that I'm writing you know a lot of it is gonna be <br> what I think about what you said um so I'm gonna be looking at video tape and <br> looking at transcripts when somebody types all of this up and looking for specific <br> things... |  |
| 379. T | Somebody gonna type all of this up? |  |
| 380. MJ | Huh? |  |
| 381. T | Somebody gonna type this stuff up? |  |
| 382. MJ | Yeah somebody takes the video tape and types it all up so I can look at it on paper they <br> call it a transcript so I gotta look at the transcript and there are certain words or certain <br> ideas that I'm gonna link together |  |
| 383. T | I have a question, what do they do with the video like you show them to other people? |  |
| 384. MJ | No remember the paper you signed and the paper you had your mom sign the video is <br> just for me and the research team at Rutgers it doesn't go anywhere outside |  |
| 385. T | What is the research? |  |
| 386. MJ | Well remember back in $7^{\text {th }}$ grade that was a big research project at Rutgers and Mr. <br> Pedrick was part of it and that's why we came to your class to videotape so people are <br> like I think 6 people who are using part of those videotapes to look at different things <br> so for example Mr. Pedrick is looking at how he interacted with you all he's looking at <br> all the videotape. Another person is looking at um the other focus students the two <br> boys who were the two boys I think Brian and... |  |
| 387. T | Kevin? |  |
| 388. MJ | Kevin uh might've been who? _ I don't think | Was it a rashawn? |


| 390. MJ | Maybe it was Rashawn right so people I think another person is looking at how <br> students respond when they get incorrect answers like every one has certain specific <br> questions so we go back to the videotape and look at it and talk about it so that's why I <br> knew there were 4 focus students I knew you two would be the focus students so I just <br> decided to focus on the girls of the class I'm interested in how the girls think about <br> math and how they think about themselves as math learners so those are my questions. <br> So thank you very much ladies smile one time you look gorgeous |
| :--- | :--- |

APENDIX G: Cell phone $\log$

| Name | Date | Time | Text Message |
| :--- | :--- | :--- | :--- |
| [Researcher] To Tyanae | May 19, 2009 | $8: 06 \mathrm{pm}$ | Hi Tyanae! Pls call ms. Jones @ cell201-394-9120 or home 753- <br> 2371 about 45min interview on Thur or Fri. thnx |
|  |  |  | saw u but u went around the corner! bring Samiiyah with u if u see <br> her |
| To Tyanae | May 21, 2009 | $3: 10 \mathrm{pm}$ | cool, didn't mean 2 rush u, i was early |
|  |  |  | K |
| To Tyanae |  | $3: 19 \mathrm{pm}$ |  |
| To Tyanae |  | $3: 23 \mathrm{pm}$ | me 2 at the main entrance |
| To Tyanae |  | $4: 52 \mathrm{pm}$ | i forgot 2 give u ur money! wait a minute |
| To Tyanae | May 22, 2009 | $10: 21 \mathrm{am}$ | hi good morning! i just woke up and im eating now. |
| From Tyanae |  | $10: 25 \mathrm{am}$ | good morning. Library us open - when can u b there? |
| To Tyanae |  | $10: 27 \mathrm{am}$ | yes, c u then $\odot$ |
| Tmissing/deleted message from <br> Tyanae] |  | $11: 30 \mathrm{am}$ | me 2 there in 10 |
| To Tyanae |  | $11: 55 \mathrm{am}$ | no crossing out is ok, np |
| To Tyanae |  |  |  |
| To Tyanae |  |  |  |


| To Tyana | May 27, 2009 | 7:02pm | Hi, it's Miss Jones : © Can I meet $u$ at the library on Friday after school at the library 2 interview u? |
| :---: | :---: | :---: | :---: |
| To Shaniyah |  | 7:19pm | Hi Samiiyah, it's Miss Jones! Can I meet $u$ at the library on Friday after school 2 interview u? |
| From Shaniyah |  | 7:20pm | ok sure |
| To Shaniyah |  | $7: 23 \mathrm{pm}$ | cool! please bring the signed permission paper with $u$. is 3:30 good? |
| From Shaniyah |  | 7:29pm | yes that's fine |
| To Shaniyah |  | $7: 31 \mathrm{pm}$ | great, c u then. thanx © |
| From Shaniyah |  | 7:43pm | yur welcum \& \& okay |
| To Tyana |  | 9:48pm | Hi from Miss Jones again! I'm meeting Shaniyah @ library on Friday $3: 30$. can $u$ come $4: 30$ ? (or will $u$ have a hot date!) btw did $u$ give letter 2 Erica? |
| To Erica |  | 9:53pm | Hi Erica, it's Miss Jones from Rutgers/Mr. Pedrick's $7^{\text {th }}$ grade class (Tyana gave me ur \#) I would like 2 interview u again - girls from the class $r$ meeting me at the library after school $4 \$ 20 . \mathrm{ru}$ interested? |
| From Erica |  | 9:58pm | Um okaii when? |
| To Erica |  | 10:03pm | we could do it Friday at library 4:30 (after Samiiyah) if u have signed permission slip. did Tyana gave $u$ the letter? |
| From Erica |  | 10:04pm | Okaii fridaii is gud and yes i have it ill let my mom sign it b4 fridaii |
| To Erica |  | 10:05pm | great! thanx \& c u then - |
| From Erica |  | 10:06pm | Ok Ms.jones! |
| From Erica | May 29, 2009 | 8:47am | He um i just wanted to kno if ur still want me to cum for the interview |
| To Erica |  | 8:51am | Good morning \& happy friday! yes please, meet $u$ at library 4:30 we shuld b dun b4 5:30 ok? |
| From Erica |  | 8:52am | Um okay den! |
| To Erica |  | 8:54am | we can do it next week if u need 2 (gotta hot date?) |
| From Erica |  | 8:55am | Um no its okaii no date i just wanted to make sure $u$ was still cummin |
| To Erica |  | 8:57am | yes I'll b there. thanx © |
| From Erica |  | 8:57am | Okaii.ur welcome |
| To Shaniyah |  | $3: 21 \mathrm{pm}$ | i'm stuck in traffic i shuld b there in 20 mins if u can wait I'm s |


|  |  |  | meeting Patrice at 4:30 |
| :---: | :---: | :---: | :---: |
| From Shaniyah |  | 3:30pm | so yu want me tu wait? |
| To Shaniyah |  | $3: 31 \mathrm{pm}$ | yes please there in 10 mins |
|  |  | $3: 32 \mathrm{pm}$ | ok |
| To Erica |  | 3:52pm | Patrice, me \& Shaniyah just found our library closes at 5! please can we reschedule 4 mondaymright after school? |
| From Erica |  | 3:53pm | ok |
| To Erica |  | $3: 54 \mathrm{pm}$ | mii bad, thanx \& have a good weekend $)^{\text {() }}$ |
| From Erica |  | 3:56pm | It okaii |
| From Erica | June 1, 2009 | 8:02am | Can i change my dte caz Friday is not good for me wat about tomorrow?? |
| To Erica |  | 8:05am | 2morrow is just fine. see u 3:00 at library? |
| From Erica |  | 8:08am | ok |
| To Erica |  | 8:09am | thnx. see u 2morrow \& have a great day () |
| To Shaniyah |  | 3:02pm | hi Shaniyah, i'm in room 4 in library |
| From Shaniyah |  | 3:05pm | ok |
| To Shaniyah |  | 3:06pm | make that room7! |
| From Shaniyah |  | $3: 11 \mathrm{pm}$ | ok well im here |
|  |  |  |  |
| From Erica | June 2, 2009 | 2:05pm | Um we still on for da interview |
| To Erica |  | 2:07pm | yeah I'll b at the library at 3:00 downstairs in a study room. text me when u get 2 library, ok? |
| From Erica |  | 2:08pm | ok |
| From Erica |  | $3: 11 \mathrm{pm}$ | Iam bout to be outside da library |
| To Erica |  | 3:12pm | ok, just cum down the stairs \& u'll c me! |
| From Erica |  | $3: 13 \mathrm{pm}$ | ok |
| To Erica |  | $4: 33 \mathrm{pm}$ | thnx so much 4 the interview. let me know if $u$ have nick/name $u$ want me 2 use, ok © |
| From Erica |  | 4:34pm | Ok and ur welcome |
| To Tyana | June 3, 2009 | 4:39pm | Hi, it's miss jones! can i do ur interview 2morrow after school at the library? |
| From Tyana |  | 4:58pm | how about Monday because 2 morrow and Friday I babysit intill 7 |
| To Tyana |  | 9:33pm | monday is great. at the library after school I'll b there at 3:00. |


|  |
| :--- |
| I'd planned for Tyana's interview at the library on Monday June $8^{\text {th }}$, and had arrived before our meeting time of 3:00pm. Although it was a hot day I enjoyed |
| sitting in my car as I watched the students all around me coming from the direction of the high school and walking towards the small business area and |
| downtown area beyond. When I saw Tyana walking with several other young ladies I got out of the car and called to her. She called out to me as she came over |
| "Hi, Ms. Jones!" I greeted her and expressed my appreciation that she had arrived. To my dismay she said that she didn't feel like doing the interview - it was so |
| hot and she just wanted to do other things. I told her that I hoped to go ahead with the interview as scheduled. I also wanted her to "want to do it" so that she |
| would engage in the interview process fully so I told her that I would accept her decision to reschedule. She agreed to be ready, willing and able to do it the next |
| day. She casually stated that she needed some money and asked me if she could have some. I offered to give her part of the money that she would earn for the |
| interview, gave her $\$ 20.00$ and reminded her that [it] was most of what I would owe her for the interview. She acknowledged that she understood and assured me |
| that she would meet at the library on the following day at the same time. |
| On Tuesday June 9 9 I id not find Tyana to conduct the interview as agreed. I was concerned after leaving a voice message on her cell phone with no response |
| but left several days later for a 6 week residential dissertation fellowship at Washington State University. I was disappointed that I was unable to collect this |
| interview from a focus girl. |

There are some gaps in the text message logs below. Some messages were accidentally deleted or lost when the researcher's cell phone got wet.

## December 29, 2009

## 7:54pm

Tyana
Happy Holidays Ms. Jones! no, im not on vacation though. I'm at home.

## 7:56pm

Tyana
Who dis

## 7:59pm

Tyana
Who are youu
8:00pm
Tyana
What is your name
8:07pm
Tyana
Tyana don't have her phone rite now
March 10, 2010
3:56pm
From: Mr. P.

- -2063 ms. Jones. Tyana says hello! She lost your number. She's attached on this message.

Peace---xxx

June 18, 2010
3:13pm
Tyana
sorry im so late. i was sleeping lol. but school is over now, just incase you want to interview me earlier.
3:20pm
Tyana
okay no problem, so is it Monday \& Tuesday?
3:30pm
okay, sure
$4: 12 \mathrm{pm}$
yes it is
4:14pm
you too $=$ )
June 21, 2010
10:35pm

Tyana
ms Jones did you get my other msg?
[missing text]
10:38pm
Tyana
oh i just wanted to make sure of the interview...tmrrw at 3pm right?
[missing text]
$10: 43 \mathrm{pm}$
Tyana
yess, i was just checking lol, see you there*

## June 22, 2010

$1: 56 \mathrm{pm}$
Tyana
Hi, ms Jones how long is the interview today?, i just want to know beacuse i have practice \& i want to tell my coach I'll be a little late.
[missing text]
2:02pm
Tyana
okay thnx, tht'll be fine
2:26pm
Tyana
if you want, you can still come at 3
[missing text]

## 2:35pm

okay

## September 12, 2010

1:32pm
Hi Tyana! It's Ms. Jones. How ru? Mr. Pedrick said this is ur number? I would still like to interview $u$ and Tyanae after school this week. Is that possible?
Tyana
2:57pm
yea what time
3:13pm
Interview 1 on Tuesday and Interview 2 on Wednesday, at the library after school? $\$ 25$ for each one.
Tyana
3:25pm
okay i be there uu think afta uu culd give me a ridee hme or no

3:27pm
Of course, np. Thanx and see u Tuesday!
From: Tyana
3:28pm
kk

## November 4, 2010

11:29am
Hi ladies! It's Ms. Jones trying to get your last interview as a group - Tyana Tyanae Shaniyah Erica and Pamela! Could u do it sometime 2 morrow since there's no school...

11:44am
Tyana
Okay, ill call Shaniyah and Erica now
11:46am
OK cool, thanks
7:59pm

Tyana
what time do you want us to be there tomorrow?
8:49pm
Is 1:00 OK? Tyana never answered me, just you Shaniyah and Erica?

## November 5, 2010

1:35am
Tyana
how long is the mtng gonna be apprxmtly?
1:42am
About 1hour. Pettrice Shaniyah will fill out survey first.
1:43am
Tyana
okay. ill txt thm in the morning $\&$ tell thm the time.
1:46am
OK thanks!

## 2:47am

Tyana
no prob, \& its at 1 pm right?
1:48am
Yes at library

## 1:50am

Tyana
okay, ill see you thn *:)

1:53am
OK sleep tight :)
$1: 55 \mathrm{am}$

Tyana
ok, gn *
9:27am
To Tyana
Good morning, tyana's phone is full so she hasn't gotten any text messages about 2day and I can't leave a voicemail either :( Any chance of reaching her on facebook?

11:23am
Tyana
no luck, she has plans to go to Somerville
11:39am
Person-to-person conversation
I called Tyana's cell phone to speak to her - text messaging would no longer suffice to communicate and to express my own feelings. I wanted to tell Tyana how much I appreciated her leadership I had been excited and was looking forward to conducting this group interview within hours. to capture and I was also very disappointed that one of my focus students was not available.

11:48am
Thank you so much for your help - my mistake 4 not scheduling this earlier. Let me know whichever day you all decide on next week. Enjoy your weekend :)

## 11:52pm

Tyana
its okay, they're okay with it. \& we'll talk about rescheduling.
12:08pm
Good I'm lucky you're such nice young ladies! See you next week :)

## November 8, 2010

To Tyana and Tyana
11:12am
Happy Monday! I hope you had a good weekend and having a good school day. Let me know when you ladies have decided on an interview day. Thanks, Ms. Jones :)

## November 10, 2010

8:02am
To Tyana and Tyana

Good morning ladies, Happy Wednesday :) Can u ask if everyone can do the interview 2 morrow or Friday?
8:49am
Tyana
yes, im available tmrw. ill check with the girls to see they are too
9:25am
Great, thanks. I'm ready when $u$ all are. BTW do $u$ remdmber Pamela Perry? If anyone sees her around ask her 2 come too :)
3:01pm
Tyana
Okay, but Pamela doesn't go to our school
3:19pm
Terrific! Can't wait 2 see $u$ all and hear what u have 2 say -2 morrow at library after school. I'll be there at 3:oo :)

## November 11, 2010

7:58am
Have a good day and see $u$ this afternoon :)
Tyana
10:01am
Okay :)
Tyana
2:50pm
is it okay for it to be at $3: 30$ ?
2:55pm
OK everyone can be at the library at3:30? I'll pick u up there, we have to have the meeting at my house cause the library is closed.
Tyana
2:56pm
okay

## CURRICULUM VITAE

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May 2012 Ed.D. Mathematics Education
Graduate School of Education, Rutgers University
New Brunswick, New Jersey
Dissertation: Case Stories of Mathematical and Racial Identity Among Black Girls in a Small Urban School District

## Publications \& Presentations

2011 Examining the IMPACT of UDL in Special Education Mathematics Instruction. National Council of Teachers of Mathematics (NCTM) Regional Conference, Atlantic City, NJ.

2009 Arias, C., Devlin, C., Jones, J., \& Pedrick, L. (February). Multiple Perspectives on Affect in Urban Mathematics. Association of Mathematics Teacher Educators Thirteenth Annual Conference, Orlando, FL.

2008 Alston, A., Brett, P., Goldin, G., Jones, J., Pedrick, L., \& Seeve, E. (July). The Interplay of Social Interactions, Affect, and Mathematical Thinking in Urban Students' Problem Solving. In Figueras. O., Cortina, J.L., Alatorre, S., Rojano, T., \& Sepulveda, A. (Eds.), Proceedings of the Joint Meeting of the Psychology of Mathematics Education 32 and the North American Chapter of the International Group for the Psychology of Mathematics Education XXX. Vol. 2. Mexico: Cinvestav-UMSNH. (pp. 33-40).

2008 Alston, A., Chin, F., Goldin, G., Jones, J., Lin, K., Rossman, C. \& Schachner, E. (March). Check This Out: Students' Engagement in Investigating Mathematical Ideas. Presented at the 2008 annual meeting of the American Educational Research Association, New York, NY.

2007 Alston, A., Goldin, G., Jones, J., McCulloch, A., Rossman, C., \& Schmeelk, S. (October). The Complexity of Affect in an Urban Mathematics Classroom. In T. Lamberg \& L. R. Wiest (Eds.), Proceedings of the $29^{\text {th }}$ annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Stateline (Lake Tahoe), NV. (pp. 326-333).
2007 Jones, J. (June). New Middle School Mathematics Teacher's Notebook. Harcourt Achieve. (under contract)

2007 Jones, J. \& O’Connor, K. (June). Notebook for Mathematics Coaches. Harcourt Achieve. (under contract)

2006 Alston, A., Jones, J., O’Connor, K., \& Pedrick, L. (November). An Analysis of Practice: Teachers Evolving as Researchers. Poster presentation at the proceedings of the $28^{\text {th }}$ annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Merida, Mexico.


[^0]:    ${ }^{1}$ The researcher capitalizes "White" in parallel with the capitalization of "Black"

[^1]:    ${ }^{2}$ The parent consent form appears as Appendix A

