Racialized Narratives of Female Students of Color:

Learning Mathematics in a Neoliberal Context

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Abstract

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There is a growing body of scholarship in mathematics education that has attended to the salience of race in mathematics teaching and learning. However, in the context of secondary classrooms with equity-oriented instruction, we know little about race and processes of racialization, and even less from the perspectives of students of color and in their own words about their identities and experiences. The purpose of this qualitative study was to better understand the ways in which the mathematical experiences of female students of color are racialized and shaped by neoliberalism, even in the context of a classroom that reflected equity-oriented instruction and was organized to support students' academic identities and mathematics learning. I drew on sociocultural theory of learning and critical race theory to center and privilege the racialized narratives of six female students of color who were enrolled in an AP Statistics classroom and characterized by high-quality implementation of Complex Instruction. Focal qualitative data included interviews with focal students, an interview with the teacher, and six months of classroom observations.

Findings indicate that within the focal classroom, like other Complex Instruction classrooms, students' academic identities and learning opportunities appeared to be supported. However, I found that even with high-quality implementation of Complex Instruction by a race conscious teacher, this AP statistics classroom continued to be a site in which racialized discourse persisted regarding how students are positioned as doers of mathematics in relation to how they racially identify or are identified by others. At the same time, focal students' discourses regarding mathematics teaching and learning often supported, but at times proved to be resisting, prevailing race-neutral and meritocratic ideologies. More generally, whether they followed or resisted dominant discourses, students' narratives were always racialized and were often meritocratic.

The study confirms the findings of other scholars that mathematics learning contexts are racialized spaces and race matters in how teachers and students relate to one another, to how teachers teach mathematics and to how students learn. In addition, this study highlights the importance of attending to the impact of neoliberalism on mathematics teaching and learning in relation to race. Implications include that teachers, whether or not they are purveyors of Complex Instruction, and more broadly equity-driving teaching initiatives, must take into consideration not only that their students are subject to, but also that their classrooms are not immune to, processes of racialization and the larger neoliberal context in which they are situated. This means that teacher educators and professional development leaders need to support teachers to inquire into the salience of race, racism and neoliberalism for mathematics teaching and learning, and to engage with students in conversations around race and racism, including about assumptions regarding ability.

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Chapter One: Situating the Identities of Students of Color within the Context of their Mathematics Classroom and Neoliberalism

> I think it's important [for teachers to] involve current events that you have your students stay on top of what's going on in the world because it's important that they know this stuff. [M]aybe this idea that they heard in class, this real- life topic will encourage something else. Maybe they'll write a book about it or maybe start a movement around it. You never know what you could inspire by just helping kids know what's going on.
>
> – Leilani,[1] Student Interview

As female students of color, we must constantly navigate the schooling / mathematics learning contexts in which we find ourselves, while also navigating and negotiating our identities, racially, academically and whatever else impacts our sense of self. The classroom in which we are situated, along with the classroom teacher – as Leilani suggests above – play an important role in our lives, selves, as well as decisions or actions. Not only is the classroom teacher and the methods of instruction valuable to our learning, but it influences what we know about larger social contexts, as well as how we see ourselves with respect to others and within these social contexts. Through a socio-cultural-critical-race lens, this dissertation contributes to centering, privileging and making sense of the experiences and emerging identities of female students of color. The site of this research, the AP Statistics classroom, is particularly significant in that it was taught by a White female teacher who is race conscious, and who employed instructional practices, known as Complex Instruction (Cohen, 1994). Briefly, Complex

[1] All names are pseudonyms to protect participants' anonymity.

Instruction is an equity-driven curriculum which has been shown to support students' development of conceptual understanding in mathematics and support students to develop productive mathematical identities at the same time (Boaler & Staples, 2008; Jilk, 2011). As I will show, on the one hand this context was supportive of students and their sense of selves; yet, processes of racialization were present and persisted through students' racialized narratives about their identities and experiences learning in this class.

Through this study, we will come to better center experiences of female students of color and understand the role of their racial identities in their learning mathematics and interacting with their classroom teacher and peers. Furthermore, we can look to students' racialized narratives around their identities and experiences to better understand the political climate in which their identities are emerging: an increasingly neoliberal context that perpetuates ideas of colorblindness, meritocracy and individual responsibility.

This research is in response to a call for centering the experiences of female students of color, in order to explore and understand the emergence and negotiation of their racial identities whilst learning mathematics. Additionally, emerging out of my own experiences as a student of color in a STEM field, I've looked to research over the years to help me make sense of my own intersectional identity. While much of the recently emerging work around the experiences of students of color in higher mathematics – which is often specific to African American and/or male identifying students – is important, I have had trouble locating my own Iranian female identity within it. My early experiences of making sense of my racial and cultural identity vis-à-vis my peers, my teachers and the curriculum with which I interacted with, fell short. I mean to say that for each of us there are multitudes of identities at play. This means that while some of the more commonly articulated works outside of the White upper-class male and

heteronormative norm of research – like work that takes on a Black female identity, for example – is important to draw upon, it does not fully encompass my embodied self. No one racial identification will do this, yet a look across a multitude of identities "of color" might help.

This work starts here – by looking across a multitude of racial and gendered[2] identities, this study aims to explore the emerging and negotiated mathematics identities of female students of color in an AP Statistics classroom with a race-conscious White female teacher who employs Complex Instruction. Additionally, this study aims to situate students' racialized narratives in relation to the neoliberal context that they are located.

The remainder of this chapter is organized into three parts that lay the foundation for my research. First, I will discuss the research problem that motivated this research, providing a review of the specific and recent literature from which this study builds and is extending. Next, I will describe the context in which this research takes place, to articulate the nested levels within which this study takes place. After this, I will discuss the overall purpose of this study along with the specific research questions that drive this work. This chapter will end with a brief overview of what is to come in each upcoming chapter of this dissertation.

Problem Statement

From Achievement to Opportunity Gap: A Shift in Mathematics Education Research.

Mathematics education research that features students of color has shifted in important ways over the past few decades. Traditionally, "race-comparative" (McLoyd, 1991)

[2] Initially I did not approach this study with a gendered lens, so when self-selected participants happened to be by and large female identifying and of color, interview protocols and tools of analysis did not allow me to take up a gendered analysis. As I will discuss in Chapter Seven, future work will address this intersection of race and gender more thoroughly and explicitly.

approaches were used where the academic performance of students of color (and in particular Black students) was compared to other racial groups (Lubienski, 2002; Secada, 1992; Strutchens & Silver, 2000; Tate, 1997), and most commonly White students (Gutiérrez, 2008; Ladson-Billings, 2006; Perry, 2003). Race comparative approaches to the achievement gap are problematic for many reasons, three of which I discuss here. First, comparing racial minority students to White students continues to privilege the experience of White students as the norm to which others are compared (Gutiérrez, 2008; Ladson-Billings, 2000). Second, in general while mathematics achievement in the United States has improved in recent years, it continues to be poor amongst all groups including Whites; in other words, White students are not performing at a standard to which one should want other groups to aspire. Third, comparing minority students to White students mistakenly assumes that all groups of students have the same access to the same kinds of mathematical learning opportunities. It is this last point that has led to re-articulating the achievement gap discussion in terms of the more accurately described opportunity gap. In other words, more recently, mathematics education researchers have argued for understanding disparities between students of color in relation to their White peers in terms of disparities in opportunities to learn mathematics (Delpit, 2012; Flores, 2007; Martin, 2009; Nasir et al, 2013; Philips, 2011).

From this perspective, opportunities to learn mathematics are not created equally. In fact, many scholars agree that there are vast inequities in the distribution of opportunities to learn quality mathematics in this country (Darling-Hammond, 2010; Delpit, 1995; Ferguson, 2003; Flores, 2007; Kozol, 1991; Moses & Cobb, 2001; Oakes, 1990; Schoenfeld, 2002; Weinstein, Gregory, & Strambler, 2004). For example, performance disparities can be attributed to access to less qualified teachers who lack content and pedagogical knowledge (Darling-Hammonds &

Sykes, 2003), uneven allocation of school resources (for example, depending on the average income and thus property taxes of the area), school policy and classroom instruction (Apple, 1995; Darling-Hammond, 1997; Oakes, 1990; Oakes et al., 2004; Secada, 1992; Tate, 1997), as well as present day segregation tactics such as tracking and inconsistent funding/resources which lead to different opportunities for learning (Flores, 2007; Ladson-Billings & Tate, 1995).

The work that mathematics education scholars (e.g., Gutiérrez, Jackson, Martin, Spencer), as well as scholars of education more generally (e.g., Darling-Hammond, Flores, Milner, Nasir, Oakes), have done to shift discourse regarding the performance of students of color from an achievement issue where the problem is located within students, to an issue of inequitable opportunities, access and supports has been very valuable. At the same time, though, as Martin (2009) has articulated, mathematics education researchers have been somewhat reticent to characterize the experiences of students of color in our mathematics classroom as racialized. However, in recent years, more mathematics education research has reflected this view. This study is intended to expose – through the words of students of color – some ways in which the process of racialization is inherent to learning mathematics and interacting with others in mathematics class.

Longstanding inequities in mathematics education have made it important for scholars to theorize around race and racialization in mathematics, and to respond to instances of institutional racism (Martin, 2009; Philips, 2011). Institutional racism, as I further discuss below, helps to maintain hierarchies of race within mathematics education and continues to legitimize the way in which many students of color are positioned and devalued (Martin, 2009) both inside and outside of classrooms. In this section I will outline various gaps that my study aims to address. Specifically, I will show here that within an equity-oriented context of

mathematics instruction, we know little about the experiences and identities of students of color as racialized. The work that has centered race has not necessarily understood identities of students of color as racialized *with respect to particular forms of instruction* – especially ambitious and equity-oriented instruction much like Complex Instruction. Additionally, this work has tended to focus on students from only one racial group – often Black or Latinx – with exceptions (McGee (2016) looks at Black and Latinx; while Esmonde et al. (2009) and Shah (2016) look at various racial groups. My study looks across various racial groups and identities.

Equity-Oriented Mathematics Instruction. There is general consensus in the mathematics education research community that a universal goal is "mathematical proficiency" (Lampert, Beasley, Ghousseini, Kazemi, & Franke, 2010). Mathematical proficiency includes adaptive reasoning, strategic competence, procedural fluency, and conceptual understanding of mathematical concepts and ideas (Kilpatrick et al., 2001; Lampert, 2001; Newman & Associates, 1996). Mathematics educators have referred to the set of instructional practices that help achieve those goals as *ambitious mathematics teaching* (Lampert et al., 2010; Lampert & Graziani, 2009). In ambitious teaching, students are supported to participate substantially in rigorous mathematical activity. Teachers teach in response to what students are doing as they engage in tasks centered around rich, conceptually oriented problem solving scenarios. Despite the progress the field has made in identifying forms of practice that support students to develop rich understandings of mathematics, we have not consistently centered or fully come to understand students' racialized identities in the mathematics learning context. Even policy documents, such as the *Principles to Action* (NCTM, 2014), explicitly name equity as a goal in school mathematics, and signal the importance of attending to identities, but as Martin (2015) critiques,

these documents are not about how to support students of color, since race is not explicitly mentioned or even implicitly hinted at throughout the entire document.

Gutiérrez (2012b) expressed serious shortcomings to wanting students to gain access to, and achieve in dominant mathematics. Here she outlines some of the potential dangers in giving non-dominant students' access to dominant forms of mathematics.

> For most women, the working class, and people of color, a focus on dominant mathematics means that engaging in school mathematics largely requires becoming someone else. And while all learning ultimately assumes we will grow, some students are offered a greater opportunity to maintain parts of their cultural identity while growing in, and contributing to, the field of mathematics. (p. 30)

Students who are not from dominant groups – read as "of color", female, Muslim, working class, etc. – are often expected to leave parts of themselves and their experiences at the door in order to engage with and succeed in mathematics learning that is not in line with their lives and identities. In contrast, having opportunities to engage in authentically real-life mathematics where we are allowed and encouraged to draw upon our own personal and cultural preferences and ways of knowing can help affirm the identities of students of color and others from non-dominant groups. This is connected to what Martin (2015) was saying when he highlighted that even the most celebrated and respected documents in mathematics education – the *Principles to Action* (NCTM, 2014) – assumes a "mathematics for all rhetoric" (Martin, 2003) of equity.

We know more recently that equitable mathematics teaching needs to be responsive to students and their cultures, as well as affirming to students' identities both academically and socially (Gay, 2000; Ladson-Billings, 2014; Deplit, 2012; Gutiérrez, 2013; Gutérrez et al., 2011). A prominent example of ambitious equity-oriented instruction is Complex Instruction (Cohen,

1994). This stance towards instruction has also been shown to support both students' sense of self and their opportunities to engage in and succeed with ambitious high-quality curriculum (Boaler & Staples, 2008; Cohen, 1994; Cohen & Lotan, 1997; Cohen et al., 1999; Jilk, 2011). As an example, in an effort to understand more about equitable and successful teaching practices, Boaler and Staples (2008) conducted a longitudinal study of three high schools which offered a range of curricular programs. One of the three high schools, Railside, which had an ethnically, linguistically, and economically diverse student body, employed Complex Instruction. Through a focus on teaching and learning interactions within Railside's classrooms, Boaler and Staples found that, more than at the other two high schools, students at Railside learned and progressed better with mathematics and enjoyed learning mathematics more. While the work of Boaler and Staples (2008) suggests that Complex Instruction supports students' mathematical identities as well as their opportunities to learn and succeed in mathematics, there is no focus on the racialized identities and experiences of students of color. In my study, I will show that even in the context of a Complex Instruction classroom, with a supportive teacher who is conscious of race and her students' identities, race and processes of racialization are salient.

An important aspect to affirming students' identities – especially in the context of an equity-driven mathematics classroom – is putting students and their sense of selves back at the center of learning. While this recognition of equitable mathematics instruction – such as through Complex Instruction – has been important, we know little about how students' experience and identities undergo and fit within the context of racialized discourses, and we know little from the perspective of various students of color and in their own words.

Centering and Situating the Identities and Experiences of Students of Color.

Recent developments in mathematics education draw attention to two different but equally

important foci. The first has to do with centering race and racial equity, through Critical Race Theory, while the second has to do with centering and attending to students' experiences and identities, especially in relation to race.

In mathematics education, there has been growing attention to the use of Critical Race Theory (CRT) as a way to center race and racialized identities, as well as respond to dominant narratives around power and privilege. CRT is a powerful "critical equity lens" (Gutstein & Peterson, 2005, p. 95) that when employed in qualitative educational research can help to expose oppression that students of color feel, and give us tools to potentially eradicate that oppression (Ladson-Billings & Tate, 1995; Martin, 2012). Gutstein and Peterson (2005) suggest employing CRT, which they consider to be a "critical equity lens", helps make sense of racial minority students' experiences and interactions with mathematics curriculum, their peers and their teachers. "Even when scholars do not make equity their research focus, they can gain more understanding by examining work through a 'critical equity lens', because equity concerns exist in any educational endeavor, whether or not they are made explicit" (p. 95). In other words, Gutstein and Peterson suggested that part of raising awareness around issues of equity as a mathematics education researcher has to do with employing an equity lens, much like CRT.

CRT, in the field of mathematics education can help us to respond to dominant narratives around students of color in mathematics as well as race and power within spaces of mathematics learning, through privileging the experiences and identities of students of color. Recent mathematics education research –often through a lens of CRT – attends to the racialized experiences of students of color by centering counter-narratives about their experiences and participation in mathematics (Berry, 2008; Corey & Bower, 2005; Gutiérrez, 2000; Jackson,

2009; Johnson, 2009; Martin, 2000, 2006, 2012; McGee, 2009; Moody, 2001; Nasir, 2002; Nasir et al., 2013; Shah, 2016; Spencer, 2009; Stinson, 2008). Exploring experiences amongst students of color in mathematics can "reveal how and why some students maintain positive mathematics identities despite external constructions of their abilities" (Martin, 2012, p. 53). Counter-narratives about success and resilience amongst students of color can help "reauthor their identities in positive and productive ways, and engage in learning settings more deeply" (Nasir et al., 2013, p. 288). This in turn can help us all to reject the negative racial narratives that often dictate our experiences and lives.

Studies focused on the identities and experiences of students of color, consider where students' identities are located and the racialized contexts in which they are situated. Most notable is a framework that Martin (2000) developed to understand the identities of students of color at a multitude of levels. His framework includes various levels that are useful to attend to in making sense of students' racialized identities in mathematics classrooms. As will be further discussed in Chapter Two, Martin (2000) suggested that students' identities take place at varying levels or contexts, starting from the *intrapersonal* level, to the *school* then *community* levels, and then finally to the *sociohistorical* level. Martin's framework has informed the important work of other scholars (e.g., Berry, Gutiérrez, McGee, Nasir, Shah, Stinson, Zavala). As an example, Nasir (2002) draws on the work of sociocultural theorists such a Wenger (1998) and Saxe (1999), as well as Martin (2000) to uncover how knowledge production and race/culture are intertwined for students of color who are learning mathematics.

Most the work around race and identities in mathematics education, while tremendously important, looks specifically at African American and male identifying students (Berry, 2008; Corey & Bower, 2005; Martin, 2000, 2006, 2012; McGee & Martin, 2011; Nasir et al., 2013;

Spencer, 2009; Stinson, 2006, 2008). Together, this body of work has looked at the racial constructions and narratives of African American or Black males in mathematics, and has shown that these racial narratives have consequences not only for the learning of students, but also for their identities as doers of mathematics. Similarly, studies centering Latinx student identities (Gutstein, 2003, 2005; Gutiérrez et al., 2011; Jilk, 2010; Oppland-Cordell, 2014; Zavala, 2015), shows how students negotiate their mathematics learning experience. Amidst this recent work that focuses on the experiences, learning, and identity development of students of color, there is still minimal work that focuses on perceptions of students' experiences *as racialized*, and *from the perspective of students of color belonging to varying racial categories* (Esmonde, Brodie, Dookie, & Takeuchi, 2009; Shah, 2016). These studies together illustrate the importance of using lenses that highlight processes of racialization, like CRT, in tandem with sociocultural theories of learning, so that we can understand both that learning and identities are located and negotiated within social and cultural contexts, and that these contexts are always racialized.

Mathematics education research needs to center race and processes of racialization within the racialized contexts in which learning takes place and identities are formed and negotiated. At the same time, knowing about the racialized experiences of students, from a diversity of racialized student of color perspectives can be advantageous in understanding identity and racial discourse in mathematics learning and across racial lines. In my study, I am centering students' voices – across various "of color" racial identities – to hear about how students of color perceive themselves, how they perceive being viewed by others, and how they are actually viewed by others. In this way, I will show that the complexity of understanding

students' racial and academic identities has to do with hearing from them about their experiences, as embedded in the contexts of learning in which they are situated.

Research Context

My study is in response to the above mentioned gaps in research. Specifically, in my study, I will show that despite the high-quality implementation of Complex Instruction and a race conscious teacher, racialized discourses persist. This will be shown through centering students of color and their racialized narratives about their identities and experience learning mathematics within their classroom. At the same time, in my study, I center race to look closely at racialized perspectives of students of color, within and across racial groups and in relation to their peers and their classroom teacher. With the exception of Shah (2016), other studies that have centered the racialized narratives of students of color, about their identities and experiences looked within one particular racial group, often either Latinx or African American. Additionally worth noting, with the exception of Esmonde et al. (2009), studies that have centered students of color and their identities have not been explored in a classroom that is explicitly equity-oriented (e.g., a Complex Instruction classroom).

As I will discuss in my findings chapters, in particular Chapter Five, students' narrative were not only racialized but they also hinted at meritocratic discourses that operate at the sociohistorical level. To make sense of the students' narratives, I found I needed to introduce yet another lens with which to understand what emerged from students' racialized narratives: neoliberal and meritocratic ideologies. Few scholars that have taken the space to theorize around the increasingly neoliberal context in which these students' mathematics learning experiences take place and identities take shape (Lipman, 2012; Martin, 2013). As Wilson (2007) suggests, in his discussion connecting institutional racism and neoliberalism: "The goal [of neoliberalism]

is a new politics, a new social order that promises justice not by fighting against the injustice of larger structural and institutional forces, but against the unjust ways of governing oneself. (p. 98) This means that meritocratic discourse, which thrives through internalized neoliberal and colorblind ideologies, mask the oppressive structures and institutions in which people of color are situated. This is turn, encourages oppressed people to blame themselves for their situation and their struggles, since those who are privileged and in positions of power must have achieved this through merit.

In addition to looking critically at a Complex Instruction classroom with a central focus on race and racialized narratives, my study seeks to explore students' racialized experiences and identities in the context of learning mathematics, amidst the larger neoliberal context within which our classrooms and education systems are situated.

Research Questions

Centered on the racialized experiences of female students of color within their AP Statistics classroom, my research adds to the important work described above. Specifically, I am looking at the implications of race and racialization on female students of color learning mathematics, with a race conscious AP Statistics teacher who employs Complex Instruction to teach with a social justice stance. With the intent of countering the impact of the racism experienced by students of color in the U.S., I intend to focus on students of color's own words around their experiences and emerging identities while learning mathematics.

Specifically, through a theoretical framework combining sociocultural theories of learning and identity with CRT, this study asks:

(1) According to female students of color, how does their racial/ethnic identity play a role in their learning of mathematics? How do female students of color view themselves in relation to other racial groups, in their mathematics classroom?

(2) What racialized narratives exist within a Complex Instruction classroom with a race conscious White female teacher?

(3) How do students' racialized narratives regarding learning mathematics reflect and/or run counter to dominant neoliberal, colorblind ideologies?

Taking these questions in consideration together, this study looks at the identities and experiences of female students of color learning mathematics, particularly looking across a multitude of "of color" identities. These identities are looked at closely in the context of one AP statistics classroom, through Complex Instruction, with a White female teacher who is race conscious, and within the greater neoliberal sociohistorical context in which these students and their classroom is situated.

Organization of Upcoming Chapters

In Chapter Two, I elaborate on my theoretical underpinnings, based on a combination of Sociocultural Theory of Identity and Critical Race Theory, to identify and place race and power as central foci to all learning contexts. To do this I will more deeply articulate and explain Martin's (2000) levels of identity, to better locate the focal students of this study within the many nested contexts in which they are situated. From there, in Chapter Three, I outline my methods, and illustrate the connections to the theoretical lenses and concepts that undergird this work. Next, in Chapter Four I introduce the focal students and look closely at the intrapersonal level of their identities and experiences learning mathematics. From there, in Chapter Five I look more closely at the classroom level where focal students' interactions with their peers are analyzed

within the context of their AP Statistics classroom taught by a White race conscious teacher. In Chapter Six, I zoom out to better understand the socio-historical neoliberal context in which these students' classroom and intrapersonal experiences are situated. Finally, in Chapter Seven, I bring together the intrapersonal, classroom and socio-historic levels of students' identities and experiences. In this way, I discuss the racialized nature of students' narratives about how they see themselves and their learning of mathematics, in relation to their classroom and in turn within the neoliberal context in which they and their classroom is situated. I also identify areas for future research and implications of the findings for teacher educators, professional development providers, and teachers.

Chapter Two: Theorizing Student Identity as a Racialized Process within Mathematics Classrooms, within a Neoliberal Context

> Socioculturists must cross the conceptual bridge and more fully integrate race, racism, and power as foci. Intersections already exist; the journey is not long but arduous in an era when tensions mount around race and racism, when conventional power dynamics are being challenged on many fronts, and the U.S. population is becoming increasingly non-white. Will such a contentious but warranted turn in the sociocultural tradition occur? Only time will tell. (Parsons, 2016, p. 41)

My work is partly in response to Dr. Eileen R. Carlton Parsons's urge for academics to cross the "conceptual bridge." The bridge in question connects sociocultural theories of learning and identity to critical race theories, while taking account of the neoliberal context in which we are located. Sociocultural theories of learning have helped researchers to treat learning as embedded within a social, cultural, and historical context (Cobb & Bowers, 1999; Cole & Engeström, 1993; Gibson, 1986; Goodwin, 1981; Gutiérrez, K. 2002; Kirshner & Whitson, 1997; Lave & Wenger, 1991; Rogoff, 1990; Saxe, 1991; Vygotsky, 1978). They have also supported researchers to privilege one's identity or sense of self in relation to accounts of learning (Gee, 2000; Wenger, 1998). However, sociocultural theories of learning do not explicitly begin with the underlying assumption that race and power are endemic in learning situations (Esmonde & Booker, 2016). Recognizing that race has been inadequately conceptualized in mathematics education, scholars like Aguirre, Berry, Esmonde, Gutiérrez, Gutstein, Leyva, Martin, McGee, Nasir, Philips, Shah, Stinson, Weissglass, and Zavala strive to push scholarship around equity in mathematics education further than sociocultural theories of learning have taken us before. These scholars work to understand all contexts of learning as

racialized spaces in which power and privilege are at play, creating varied experiences for students that are marginalized in a multitude of ways. As I will describe below, these works that cross this conceptual bridge are significant to my own research.

At the same time, few scholars have described the ways in which mathematics education is driven by the global market and neoliberal discourses (Apple, 1992, 2006; Atweh & Clarkson, 2001; Atweh et al, 2008; Ernest 2009; Gutstein, 2008, 2009; Martin, 2013), making looking at racism and neoliberal discourse together even more rare (Martin, 2013). Harvey (2005) defines neoliberalism as follows:

> Neoliberalism is in the first instance a theory of political economic practices that proposes that human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong private property rights, free markets, and free trade. (p. 2)

In simple terms, neoliberalism is an ideology where individuals – who hold the least power – are held responsible for the actions and decisions of the institution or corporation in which they are situated, absolving the institution of responsibility and thus allowing it to maintain its power. For neoliberalism to flourish, one must believe in a "post-racial" society (Allen, 2006), one in which race and racism are no longer issues, and people have mostly adopted a colorblind ideology (Bonilla-Silva, 2006). In the current post-civil-rights, White supremacist context in which we are situated, a color-blind ideology "denounces the use of race to explain persistent […] imbalances of power while at the same time diverting attention from the daily maintenance of racialized social mechanisms" such as tracking and meritocratic thinking (Allen, 2006, p. 11). Through a colorblind ideology, racism is only seen as overt and generally of the past, such that after the end of Jim Crow, the United States became "fundamentally fair" (Allen, 2006, p. 11).

At the same time, in a neoliberal context presumed to be post-racial, the unfair accumulation of social capital by White people is seen as earned and fair (Bell, 1992; Bonilla-Silva, 2001; Tatum, 2003).

In this study, I recognize the immediate need for centering and privileging the voices and experiences of female students of color, to understand how these students negotiate and navigate their identities whilst learning mathematics in a neoliberal context. The purpose of this chapter is to articulate the lenses I use in my study, namely sociocultural theory and critical race theory within a neoliberal society.

Learning as Situated and Connected to Identity

Early sociocultural theorists in education, demonstrated that thinking, development and learning depend greatly on the social and cultural contexts in which they take place (Cobb & Bowers, 1999; Cole & Engeström, 1993; Gibson, 1986; Goodwin, 1981; Gutiérrez, K. 2002; Kirshner & Whitson, 1997; Lave & Wenger, 1991, 1998; Rogoff, 1990; Rogoff, 1994; Rogoff & Lave, 1984; Saxe, 1991; Vygotsky, 1978). Specifically, as Lave and Wenger (1991) showed through ethnographic studies involving learning in various professional contexts, learning is "situated," or takes place within, a social context. This means that the contexts in which students are located have everything to do with what they are learning, who they are becoming and how they see themselves.

Specific to mathematics learning, Lave (1988) investigated the idea of situated learning by contrasting two mathematics learning environments. Specifically, she looked across the contexts of shopping and testing – both of which required similar mathematics knowledge – and found that adult learners did not see these two situations as mathematically similar and thus employed very different mathematics procedures in each situation. Boaler's (1998) work built

upon Lave's work showing the way in which mathematics learning was situated differently within two different in-school learning environments. Boaler's work, and others, illustrated that one cannot separate how students learn mathematics in particular contexts from how they relate to mathematics and others, and see themselves and feel they are seen by others (Boaler, 1998; Lave, 1988; Martin, 2000, 2012; Schoenfeld, 2002). Said in another way, learning mathematics is both social and cultural, involving both the activity one is engaging in/with and the sense of self that one is taking on within that context (Nasir et al., 2013; Rogoff, Paradise, Arauz, & Angelillo, 2003).

Identity – "being recognized as a certain 'kind of person,' in a given context" (Gee, 2000, p. 99) – is a useful construct for exploring students' experiences with mathematics learning. Hall (1990) expressed identity as a never-to-be-complete product of socio-cultural histories. This means that identities depend on our individual and cultural/collective experiences, and our identities continue to develop and redevelop as we move through space and time. Wenger (1998) too described identity as a fluid process, inseparable from one's experience of/with/when learning. Learning and identity are deeply interconnected, or as Wenger (1998) defines it, the process of learning involves active participation within a social context and whilst constructing one's identity in relation to this context. "Such participation shapes not only what we do, but also who we are and how we interpret what we do" (p. 4). Through his framework of identity, Wenger (1998) establishes that an individual's construction of identity – through participation and/or non-participation over time – is related to how they position themselves, how others position them, and the broader social and historical context in which learning takes place. In this way, because participation varies across contexts, then how one identifies also varies across

contexts – depending, for example, on what one is learning, where one is learning it and with whom one is learning.

"The strength of the sociocultural approach is to consider identity as practice—activity- or community-based—constantly constructed and reconstructed in interaction" (Esmonde et al., 2009, p. 21). Yet the same time, various social locations or identities – based on race, class, gender, etc. – interact, inform and affect one's situated identity and learning experience. Until recently, mainstream sociocultural theory has touted a colorblind perspective, ignoring the imminent role of race and racism within all contexts in which learning is situated (Esmonde & Booker, 2016; Gutiérrez & Rogoff, 2003; Lee, 2007; Nasir & Saxe, 2003; Nasir & Hand, 2006).

In the context of mathematics learning, many scholars have begun to take a sociocultural perspective to focus on the identity-related experiences of students of color (Esmonde et al, 2009; Leyva, 2016; Nasir et al, 2013; Oppland-Cordell & Martin, 2015; McGee, 2016; Shah, 2016; Stinson, 2008; Zavala, 2014). As Nasir (2002) suggests, studies drawing upon sociocultural theories of learning and centering racialized identities help us understand the experiences of students of color as well as ways of supporting and improving experiences so that students of color can feel and be successful with learning mathematics. In fact, by and large, these scholars showed that processes of learning and the learner's identity as interconnected, identifying the mathematics classroom (nested within larger contexts) as a site both for learning mathematics and for identifying (or not identifying) with mathematics content and/or others (the teacher and peers) within that context. At the same time much of this recent work has also started from the assumption that all learning context – including mathematics classrooms – are racialized spaces, an idea to be explored in the next section of this chapter.

Viewing Classrooms as Racialized Contexts

Because theoretical perspectives common to the field of education have traditionally posed challenges to talking about race (Ladson-Billings & Tate, 1995), qualitative educational research in the last 20 years or so has begun to employ Critical Race Theory (CRT). In doing so, scholars have been able to center race and the process of racialization, thereby exposing oppression that students of color experience, and even potentially eradicating that oppression (Ladson-Billings & Tate, 1995; Martin, 2012). Allen (2006) reminds us that "CRT methodology seeks to construct knowledge of the workings of White supremacy by juxtaposing the resistance narratives of people of color against the dominant, hegemonic narrative of Whites" (p. 11). In other words, CRT helps scholars recognize, center, privilege and legitimize counter-narratives that speak to the lived-experiences of students of color in their own words (Delgado & Stefancic, 1995; Solórzano & Yosso, 2001), while calling out and analyzing the function of race and racism both in students' lives, in their classrooms, and in the educational system as a whole (Tate, 1997).

In mathematics, CRT has been used by scholars to examine the complexities of the experiences of students of color and to provide a framework for counter-narratives where stories of resilience and success are (re)-centered and shared (Berry, 2008; Corey & Bower, 2005; Esmonde et al., 2009; Gutiérrez, 2000; Leyva, 2016; Martin, 2012; McGee, 2009; Nasir et al., 2013; Shah, 2012; Stinson, 2008; Zavala, 2014). A few of these studies employed both CRT and sociocultural theory together (Esmonde et al., 2009, Leyva, 2016; Zavala, 2014). A large number of these studies focus squarely on African American male students (Berry, 2008; Corey & Bower, 2005; Martin, 2012; McGee, 2009; Nasir et al., 2013; Stinson, 2008). For example, Berry (2008) used CRT, along with the methodology of phenomenology, to surface and analyze

the experiences of eight African American male students that were successful in mathematics. In centering these experiences – which were counter to dominant narratives about African American males and mathematics – Berry (2008) showed many factors to which one could attribute these students' success. These factors included students' (mathematical and academic) identities, support systems in place for these students, and if/how students' abilities were recognized and acknowledged by teachers. Similarly, drawing in part on CRT, Stinson (2008) highlighted the counterstories of four successful African American male mathematics students. In doing so, he showed how these students understood, experienced, negotiated and navigated dominant discourses around African American males and mathematics. In all these studies, centering the narratives of students of color by way of CRT allowed scholars to uncover and make sense of students' experiences in mathematics and how these students made sense of and navigated their identities, vis-à-vis learning mathematics. This work has allowed scholars to show ways in which students of color who have been successful in mathematics – for example through resisting, persisting, and carry positive identities, often in opposition to the dominant racial narratives about their racial/ethnic identities (eg. Berry, 2008; Martin, 2012; Martin & McGee, 2011; Stinson, 2008). Let's look now to the context in which these racialized identities and experiences are situated.

Context Matters: Neoliberal Discourses Shape Students' Racialized Experiences

> Mathematics educators have begun to more clearly understand that the solution of the problems of curriculum and teaching requires a clearer focus not only on subject matter but on the institutional environment and on the structure of unequal resources in schools. But these institutions and resources, and the people who must cope with them, are

themselves situated in a larger set of structural relationships involving economic, political, and cultural power (Apple, 1992, p. 427).

In the past, scholars have examined how structural forces, school-level institutional practices, and students' responses to these structures and practices contribute to social reproduction (Anyon, 1980; Bourdieu & Passeron, 1990; Bowles & Gintis, 1976; Fordham & Ogbu, 1986; Oakes, 1990; Roscigno, 1999; Rosenthal & Jacobson, 1969). These scholars have shown that "social class, forms of labor, and structures of political and economic power were [and still are] fundamental in perpetuating not only educational but other social inequalities" (Anyon, 1994, p. 115).

Apple (1992) discusses above the important of recognizing the larger institutional context in which one is located. Specifically, "[w]ithout a more thorough grasp of the connections between schooling and these larger power relations, mathematics educators may not have the intellectual resources necessary to make the changes they so clearly urge" (p. 429). Thus, much like with Martin's (2000) levels of identity that I will discuss below, if we are concerned with students and their identities and experiences, we cannot look only at the intrapersonal or classroom context, we have to think more closely about the power relations within the sociohistorical context these students are situated within.

Harvey's (2005) brief history of neoliberalism explains that neoliberalism has been operating as the defining social paradigm for decades, supporting capitalist ideals through the promotion of free markets and individual self-interest. "Neoliberals champion privatization of social goods and retrenchment of government from provision of housing, health care, and education on the premise that competitive markets are more effective and efficient" (Lipman, 2012, p. 7). For decades, scholars have remarked this same observation: that the social context

in which educational institutions are situated, have been and continue to be increasingly neoliberal in nature (Anyon, 1980, 1994; Apple, 1982; Bowles & Gintis, 1976, 2001; Giroux, 1981, 1983; Macdonald, 1981; Young & Whitty, 1977). By this, scholars mean that our social context is one that supports the myth of meritocracy, and encourages the belief that we live in a just and post-racial era. Thus, along with being racialized in nature, the social context in which our schools and classrooms are situated have been and are becoming increasingly impacted by neoliberal discourses. At the same time, institutional racism has been pivotal to the neoliberal agenda (Wilson, 2007). It is important to understand that for neoliberalism to prevail, we must believe we live in a colorblind and thus fair even keel post-racial society -- one where people are given what they've rightfully worked for and earned. As Lipman (2012) describes, ideologically, racism has long been "the subtext for insistence on 'personal responsibility' and ending 'dependency' on the state" (Katz, as cited in Lipman, 2012, p. 9). It is through the construction of the "lazy" and thus undeserving poor person of color, that governments are given just cause to eliminate social programs and continue to disenfranchise all poor people of color. In this way, "Whiteness persists as what is worth knowing and as an identification worth performing" (Schick, 2008, p. 101), and white hegemony is maintained as White people continuing to benefit from white supremacy and the myth of post-racial, colorblind ideologies (Allen, 2006). In other words, as Wilson (2007), remarks, "Neoliberal discourse suppresses racism and economic inequality as causal factors in social justice issues. It claims not only the 'end of history' but also the 'end of racism'" (p. 98).

CRT was originally developed in the field of law and was initially used to critically examine society with respect to the intersection of race, law and power (Crenshaw et al, 1995; Gordon, 1999; Yosso, 2003). Traditionally, two main foci in CRT have been property rights, as

well as institutional and structural racism. Structural racism is said to occur "when an organization's rules, procedures, and practices carried out by members of the dominant group have a negative impact on members of the subordinate group" (Snipes, 1997, p.23). Therefore, we can define racism as "structural, determining, and predictable, not an aberration or irregular event," where much like struggles around class, ethnicity, gender, etc. "racism is really about white supremacy", meaning it is "mediated through, and reproduced by, a white supremacist totality" (Allen, 2006, p. 11). Scholars have used the analytical lens provided by CRT to help understand structural and institutional racism as related to power structures within institutions (Crenshaw, 1995; Ladson-Billings, 1998; Yosso, 2003). Given the ever-increasing privatization of our educational institutions though the global market-driven trends of neoliberalism (Harvey, 2005), institutional racism is one was in which neoliberal discourse is internalized so that individuals are taking responsibility for the oppression structures and policies in which they are situated. In other words, as Wilson (2007) says, "in the era of neoliberalism, human beings are made accountable for their predicaments or circumstances according to the workings of the market as opposed to finding faults in larger structural and institutional forces like racism and economic inequality" (p. 97). Just as the larger sociohistorical and community contexts in which they are located, our schools and educational systems are social and cultural contexts in which institutional racism thrives. At the same time, CRT can help expose and respond to institutional racism, because it "challenges the ways in which notions such as […] meritocracy, and color-blindness are used to construct white supremacy" (Allen, 2006, p. 11).

Mathematics education – just as the larger educational contexts in which it is situated – has been equally affected by neoliberal ideologies, with students and teachers alike feeling the pressures of taking full responsibility for what is a product of the systems in which they are

located and have very little control over (Lipman, 2012; Martin, 2013). Lipman reminds us that "neoliberalism is not just "out there" as a set of policies and explicit ideologies; it has generated a new common sense about social institutions and social relations. It has reshaped identities—who we are as academics, teachers, students, parents, school administrators" (p. 7). Within this inequitable and increasingly neoliberal context, students' identities are shaped as their racialized experiences take place. Through centering students' voices and experiences around their identity and mathematics learning, we can learn if and to what extent students are internalizing neoliberal discourses. CRT helps me to start from the assumption that all spaces are racialized. At the same time, CRT helps uncover and expose normalized discourses around ideologies of whiteness and neoliberalism. These discourses need to be uncovered and exposed because they are often internalized and invisible, ensuring that people of color blame themselves – rather than the flawed and oppressive structures in which they are located – for not succeeding in school, or in society as a whole. As Wilson (2007) says, within neoliberal ideology, "power operates internally, not externally, by inducing people to aim for ''self-improvement.'' This means that individuals "are made accountable for their predicaments or circumstances […] as opposed to finding faults in larger structural and institutional forces like racism and economic inequality" (p. 97). CRT can help locate the power within the institution and its society, and help name and expose it as racialized and neoliberal.

In summary, CRT is a tool that traditionally has been used for looking closely at – and exposing – the location of power within (often racist and neoliberal) structures and institutions. I use CRT in this study to help me center students of color and begin with this assumption that mathematics learning contexts are racialized. At the same time, by centering students and attending to Martin's levels of identity as I will next discuss, CRT helps me to situate students

within both the racialized classroom context and the racialized and neoliberal sociohistorical context.

Martin's (2000) Multilevel Framework for Capturing Students' Racialized Identities

Deeply rooted in sociocultural theories of learning, and squarely attending to race, Martin's (2000) work –specific to Black/African American and middle grades students – has been seminal in helping scholars consider the construct of students' identities as a tool for centering their experiences and hearing about how they make sense of themselves, while and in relation to, doing mathematics (Cobb et al, 2009; Nasir et al, 2008; Varelas, et al., 2013). Martin's (2000) work was pioneering because of the connections he makes between students' mathematics and racial identities and students' experiences learning/doing mathematics. Specifically, Martin (2000) considers two concepts, both of which take place in the context of the racialized nature of mathematics learning and participation, as part of his proposed framework around identities: "mathematics socialization" and "mathematics identity." Mathematics socialization "refers to the experiences that individuals and groups have within a variety of mathematical contexts, including schools, homes, and communities, and that legitimize or inhibit meaningful participation in mathematics", while mathematics identity "refers to the dispositions and deeply held beliefs that individuals develop about their ability to participate and perform effectively in mathematical contexts" (Martin, 2012, pp. 57-58).

Martin (2000) describes levels of investigation that are important to attend to in making sense of students' racialized identities: (1) the sociohistorical level, (2) the community level, (3) the school level, and (4) the intrapersonal level. The *sociohistorical level* has to do with barriers to Black students' meaningful and successful participation in mathematics due to historically discriminatory policies and practices. The *community level* looks at "how the historical legacy of

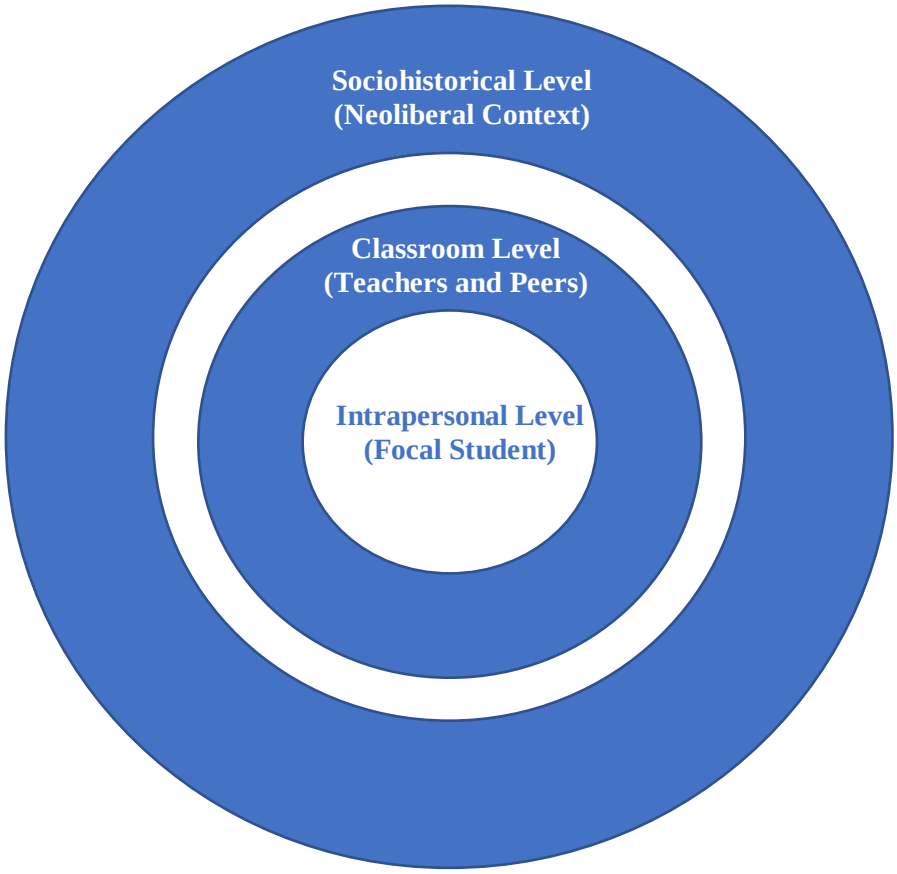
these practices is brought to life in the narratives of African American parents and community members - narratives characterized by repeated references to beliefs about differential treatment in mathematics related contexts" (Martin, 2000, p. 30-31). The *school level* has to do with teachers' norms in the classroom and students' resistance, while the *intrapersonal level* focuses on if/how students identify with the mathematics they know and do in the classroom.

Few studies centering students' identities and drawing on Martin's (2000) framework, have looked across a multitude of levels (Jackson, 2009; Spencer, 2009) like my study does. Specifically, Jackson (2009) investigated how two African American students' identities developed over the course of the school year in the context of their fifth grade classroom. In her study, grounded in sociocultural theories of learning, Jackson showed the relationship between how these students were socially constructed within their classroom and the kinds of mathematics learning they were engaged in/with. Furthermore, she found that the racialized school context in which students' identities were constructed legitimized the views held by others and the teaching approach employed by the classroom teacher. Similarly, Spencer (2009) sought to understand sixth grade African American students' experiences learning mathematics along with these students' development of their identities. Spencer too was able to make connections between how teachers viewed students, and how students viewed themselves, as mathematics learners, all within what she marked as a racialized context.

In Figure 2 I have included a visual representation of the levels of inquiry that Martin (2000) suggests considering when looking closely at the identities of students of color. In this section, in reference to my study, I will outline and discuss three of the four levels that Martin (2000) proposed: the intrapersonal level, the classroom level, and the sociohistorical level. The

level I will not be attending to is the community level, as I have not collected sufficient data to look here.

Figure 2
Contexts of Students' Identities. Adapted from Martin's (2000) Levels of Identity Framework



Intrapersonal Level: Students' Racialized Identities. At the intrapersonal level, Martin (2000) suggested that one takes into consideration if and how students identify with the mathematics that they are learning. Scholars have looked at this level in order to explore how students come to realize what it means to do mathematics as it is done in their particular classroom context and whether or not and to what extent they come to personally identify with that particular way of doing mathematics (Cobb et al., 2009; Gresalfi & Cobb, 2006; Nasir et al.,

2008). Additionally, the interpersonal level can help explore the relationship between one's identity and one's participation in learning mathematics, vis-a-vis others' conceptions (Jackson, 2009; Martin, 2000; Nasir, Atukpawu, O'Connor, Wishnia, & Tsang, 2009; Nyamekye, 2010; Spencer, 2009).

In my study, at intrapersonal level, I am concerned too with how students view themselves in relation to others and in relation to learning mathematics. In following with the work of scholars who have explicitly ensured that identities – racial and otherwise – are central to their work (Aguirre, 2009; Berry, 2008; Esmonde et al, 2009; Gutiérrez, 2010; Gutstein, 2006; Leyva, 2016; Martin, 2009; McGee, 2015; Nasir et al, 2013; Philips, 2015; Zavala, 2014), the intrapersonal level will be centered and privileged throughout my entire study. This is because, in my study, I have chosen to look across varying racialized identities and privilege students' voices about their experiences and identities. In Chapter Four, the intrapersonal level and students' views about how they see themselves, is looked at in relation to the classroom level and how students are seen with respect to, and by, their peers and their classroom teacher. In Chapter Five, students' racial identities are explored in relation to their experiences learning mathematics, all of which is nested within the sociohistorical context in which they and their experiences are situated.

Classroom Level: Complex Instruction with a Race Conscious Teacher. Martin's (2000) articulation of the School Level has to do with teachers' classroom norms and if/how students identify with or resisting aspects of their classroom. For this reason, I have referred to this as the classroom level, rather than the school level. In my study, as we will see in Chapter Four, students' identities and experiences are situated in a Complex Instruction AP Statistics classroom. Complex Instruction classrooms are considered to be supportive of student learning

and students' identities, through norms like through cooperative learning and group accountability. It is through situating students' identities, at the intrapersonal level, within this classroom level that we can understand how students experience their Complex Instruction classroom and race conscious teacher and what this means for their emerging sense of selves while learning mathematics.

Sociohistorical Level: Neoliberalism in a Presumed-to-be-Post-Racial Society. The last level that is relevant to this study is the sociohistorical context. According to Martin (2000), specific to Black students, the sociohistorical level has to do with barriers to students' meaningful and successful participation in mathematics due to historical and present day social policies and practices. Recall from above that we can consider identity as every-changing and negotiated, while being embedded in a social and historical history (Gee, 2000; Hall, 1992; Schoenfeld, 2002; Wenger, 1998).

At the same time, classroom experiences and the classroom context/level are situated in larger institutional and sociohistorical contexts that are inevitably affected by race and the process of racialization (Delpit, 1992). By racialization I am referring to the sociohistorical processes through which race is constructed and continues to be imposed (Murji & Solomos, 2005; Razack, 2002; Smith, 2012). All people are racialized, including White people. Historically, and especially through white-settler colonialism, White people have had the socio-political and economic power to name and categorize people of color and Indigenous peoples, in turn categorizing themselves as White, unmarked or race-less – the norm to which "others" were and are compared (Nazemi, 2011). This means that across contexts, constructions of race and processes of racialization affect all people and their varied experiences in different ways.

I take the perspective that one's sense of self is fluid and ever-changing, being shaped and negotiated over time and through space, while strongly embedded and related to one's past histories and experiences, an idea that Martin's (2000) sociohistorical level helps me to articulate. However, at the same time, I want to explicitly attend to issues of power that shape the context in which learning and identity are at play. As Lipman (2012) suggests, neoliberal ideologies and discourses in society and thus in our schools heavily shape our ever-changing sense of selves in relation to our learning experiences. In my study, the sociohistorical level is relevant in that, as we see in Chapter Five, students' narratives around how they view themselves vis-à-vis learning and succeeding with mathematics follow both neoliberal and colorblind racialized discourses. This is unsurprising when we situate these students' identities within the larger neoliberal context that encourages people of color to believe that their struggles are their own, and white privilege is earned through merit rather than through the system of white supremacy that works to maintain white hegemony.

Martin's (2000) work around mathematics socialization and mathematics identity, along with studies drawing on and expanding on his work, help articulate the poignant connection between identity development and one's experiences participating in learning mathematics. More generally, these studies suggest that students' identities are strongly related with how students are positioned (by themselves and others) within the context of their experiences participating in mathematics learning (Boaler, 2002; Boaler & Greeno, 2000). In this way, we cannot separate one's racial identity in the context of the mathematics classroom from one's racialized experiences learning mathematics. In my study, I aim to center the intrapersonal level, while also drawing on the classroom (rather than school) and sociohistorical levels.

To summarize, in my study, in making sense of the sociohistorical context of students' learning and identities, it became important to turn to neoliberal discourse as yet another lens. At the same time, students' racialized narratives appeared to fall in line with meritocratic and colorblind discourses, encouraging me to situate their stories not only within their classroom context (Chapter Four), but within the neoliberal sociohistorical context they are located (Chapter Five). In my study, I look to explicitly connect students' racialized learning experiences to their racial identities (at the intrapersonal level), while considering these negotiations to be situated within the larger neoliberal context (sociohistorical level) that imposes discourses of meritocracy and colorblind ideologies. In other words, I argue that in order to attend to power relations, we need to pay explicit attention to what students' racialized narratives mean in light of the colorblind, neoliberal sociohistorical context in which they are situated. Put simply, context matters for understanding where power is situated and who it is held by.

Concluding Remarks: Setting the Stage for What Follows

We know that one's identities evolve through one's participation, position and status within academic and cultural contexts, but we know little about how students' experiences play out in relation to "the market-driven goals of globalization that mathematics education increasingly is said to serve" (Martin, 2013, p. 319). Through centering the voices and experiences of female students of color who are learning mathematics, it is important for me to attend the multitude of identities at play and how these levels of identity inform one another. This means that while I want to center students' racialized identities, as well as students' academic identities both as doers of mathematics and within the context of learning mathematics, I will be situating these intrapersonal and classroom/school level of identities within the larger

sociohistorical context in which they are located. The work of Lipman (2012) and Martin (2013) is relevant in this regard because it helps me to acknowledges and accommodate the complexities of emerging and ever-changing identities at multiple levels, within an ever-increasing neoliberal society.

As previously discussed, a sociocultural perspective of learning and its relation to identity means that learning is both social and cultural, involving the activity one is engaging in/with and the sense of self that one is taking on within that context (Nasir et al., 2013; Rogoff, Paradise, Arauz, & Angelillo, 2003; Saxe, 2003). At the same time given my use of critical race studies as part of my theoretical framework, I am taking on the assumption that, in addition to being social and cultural, all learning contexts are racialized. The experiences of female students of color, when centered and privileged through critical race studies, can help us to understand the ways in which racial identity affects one's experience participating in mathematics learning. In this way, student identity – which takes place in the context of interacting with the teacher, peers and the mathematics curriculum – has to do with an ongoing negotiation between how one sees oneself and perceives being seen by others - both racially and academically. All of this – one's identities and experiences learning mathematics within the sociocultural and racialized context of learning – is further situated within a neoliberal context where individuals are to blame for the struggles and hardships imposed upon them. In summary, sociocultural theories linking learning and identity help us to consider situate students' identities and learning within a neoliberal context. Sociocultural theory along with CRT helps us to view all spaces and learning contexts as racialized, as well as affirm and examine the presence of power and race, to uncover the neoliberal discourses of individual responsibility and meritocracy that are internalized by students as they describe their experiences and emerging identities while learning mathematics.

Chapter Three: Research Design

In the previous chapter, I asserted theoretically that all mathematics learning spaces are racialized and that race and racial identity impact the learning and relationships that students form with one another and their teacher. Furthermore, I argued that the intrapersonal and classroom contexts in which students' experiences and identities are taking place are further situated within a sociohistorical context of neoliberalism. In this chapter, I lay out the methods I employed to answer my research questions, whilst drawing connections to the critical race and sociocultural lenses I've adopted for this study.

This chapter begins with a discussion on what it means for me to take the standpoint of female students of color, centering their narratives as a starting point from which to understand their experiences in mathematics vis-à-vis their emerging identities – both mathematically and racially. Beginning here helps me set the stage for methodological choices in this study. Next, I describe the setting and participants of this study, followed by descriptions of data collection methods and how I analyzed these data. This chapter ends with situating my position as researcher in this study, and the limitations of this study.

Ways of Knowing, Standpoint Theory as a Starting Point

Taking a sociocultural perspective of identity along with adopting a critical race lens means understanding that power and social location impact knowledge production. For this reason, many scholars suggest that taking the standpoint of those who are less in positions of privilege – not White, not heterosexual, not gender conforming, and so on – can lead to understanding oppression because of having an experience of it (Collins, 2000; Essed, 1990; Harraway, 1988). This is often referred to as feminist standpoint theory. However, drawing on a Marxist understanding of class struggles and mobilization, Bannerji (1995) warns us that:

> Since political subjectivities are articulated within a given political and ideological environment, and self-identities are fraught with contradictory possibilities... then there is no guarantee that there is only one form of politics of identity which will emerge, or that it will avoid the formulation of 'identity and community versus structures and class'. Victims and subjects of capital do not automatically become socialists. Misery does not automatically produce communism, and desire for change born of suffering does not spontaneously know 'what is to be done?' to end oppression. (p. 35)

Hence experiencing racism, as a person of color, does not make one automatically anti-racist. In fact, as Allen (2006) remarks that "since white supremacy is a hegemonic system, meaning it is perpetuated in part through complicity of those it oppresses", sometimes "people of color conform to white supremacy" (p. 11). Therefore, while it is important to hear them, we cannot assume that the perspectives of people of color will neatly or always necessarily juxtapose and expose white[3] hegemony.

We must remember that within schools there are many social locations – one of them being that of female students of color – and in turn many different perspectives or ways of knowing. Taking the standpoint of female students of color means starting with their narratives as an entry point from which to understand how these students experience the social structure of their mathematics classroom and learning. This perspective is a partial view, but it is a view that I am choosing to center and privilege in my research, to uncover the experiences

[3] To be consistent, I chose to capitalize the word "White" in instances where it marks one's racial identity – For example: "Ms. Williams is a White female teacher". In other instances, where it is used as a noun or adjective, for example, I will not capitalize it. For example: "Neoliberalism and Institutional racism support white supremacy and white hegemony by leaving whiteness as unmarked."

of female students of color and understand some ways in which their emerging identities – both social and mathematical – are shaped.

Research Questions

Because of my interest in hearing from female students of color about their racial identities and how these play a role in their experiences learning mathematics, conducting a qualitative study is appropriate. According to Merriam (2009), "Qualitative researchers are interested in understanding the meanings people have constructed, that it, how they make sense of their world and the experiences they have in the world" (p. 6). Informed by grounded theory (Glaser and Strauss, 1967), and some aspects of case studies (Miles & Huberman, 1994; Yin, 2003), this qualitative study (Rousseau et al, 1999; Yin, 1994) seeks to better understand the experiences of female students of color in relation to their emerging academic and racial identities in one AP statistics classroom. Thus, it is through looking at and across the counter-narratives, or cases, of female students of colors that I find the means to privilege the students' experiences and make sense of and give meaning to their stories. Specifically, this study asks:

(1) According to female students of color, how does their racial/ethnic identity play a role in their learning of mathematics? How do female students of color view themselves in relation to other racial groups, in their mathematics classroom?

(2) What racialized narratives exist within a Complex Instruction classroom with a race conscious White female teacher?

(3) How do students' racialized narratives regarding learning mathematics reflect and/or run counter to dominant neoliberal, colorblind ideologies?

Research Setting and Participants

School Setting and Selection. Selection of this school (and the specific classroom, as I describe below) was facilitated by contacts made with high schools through my work as a mathematics instructional coach in the Secondary Teacher Education Program at the University of Washington. I conducted research during the 2015-2016 school year at Champlain High School, a high school located in a working-class, inner-city, urban area of the Pacific Northwest of the United States. Champlain was first established in the 1920s, and is situated in an area of the city that was heavily industrialized during the World War II era. More recently, Champlain has become a STEM Option school, meaning it has an explicit focus on science, technology, engineering and mathematics. In fact, Champlain's classes are split into two academies or streams, the school of Life Sciences and the school of Engineering and Design. Champlain's mathematics program, in particular, has strong collaborations with neighboring colleges and universities.

Champlain High School's enrollment and population has remained steady of recent years at about 900 students and 60 teachers. Class sizes are in general smaller than the state average with about 20 students per classroom. Demographics of the student population, as can be seen in Table 1 below, indicate that about 70% of the student body is either Black/African American or Asian/Pacific Islander, while White students are in the minority. At the time of data collection, 75% of students at Champlain were classified as being eligible for Free or Reduced Lunch. Student state test performance at Champlain is above the district average, meaning that in general students at this high school out-perform their peers on both reading and mathematics assessments.

Table 1
Demographic Information of Champlain High School

	Black or African American	Latinx	Asian or Pacific Islander	White	Other or Mixed Race	FRL
Champlain High School n=900	40%	15%	30%	5%	5%	75%
AP Statistics (n=32)	55%	8%	25%	1%	11%	80%

Note. Data taken from public records and rounded to preserve anonymity, n=number of students.

In selecting a school, I sought a racially diverse setting where much of the student population is not White. My assumption and motivation here is that, as some scholars have found, it tends to be more difficult to ignore difference and adopt color-blind or a neutral stance towards race when faced with racial difference (Bonilla-Silva & Embrick, 2006; Lopez, 2010). In this case, at Champlain 95% of the student population is non-White, while much of its teaching staff is White and female. Given the nationwide trend of U.S. urban schools having an increasingly large number of students of color, yet the majority of the teaching force continues to be predominantly White and female, Champlain High School felt typical of an urban US high school.

Organization of Mathematics Teaching at Champlain. Within their eight-period schedule, students at Champlain receive 80 minutes of mathematics instruction daily. Instruction for Geometry and Algebra students includes a lab support class in addition to their regular mathematics class, which provides students with both extra mathematics instruction time and practice time. Mathematics teachers at Champlain are expected to collaborate, at least weekly, with planning lessons, aligning curriculum, analyzing student work and implementing and evaluating common assessments.

At Champlain, for the last eight years, there has been a commitment across all content areas – and especially in mathematics – to implement a rigorous high quality mathematics curriculum and instruction, through an approach called Complex Instruction (Cohen, 1994; Cohen, et al., 1999; Cohen & Lotan, 1997). I elaborate on the principles of Complex Instruction in Chapter Four. In brief, one important point about Complex Instruction is that instruction is organized around rich and complex, group-worthy mathematical tasks. These tasks need to be conceptual in nature, problem-solving oriented, and open-ended (Cohen & Lotan, 1997). Secondly, group work is encouraged in Complex Instruction. Students are expected to work together to make meaning of concepts and big ideas, rather than one student dominating the conversation or task. Students are held accountable for the learning of every student in the group, both through the teacher's insistence that all questions are group questions (rather than individual questions) and through assessments such as group quizzes that require students to support and work with one another (Cohen, et al., 1999).

Despite the promising context of Complex Instruction, disparities - with respect to achievement, experiences and even discipline - between students of color and White students persist at Champlain High School, much like the larger social context in which this classroom and school are situated. In fact, at Champlain High School, mathematics classes appear segregated by students' racial identities, with an over-representation of Asian and White students occupying the most upper level of mathematics classes, like Advanced Placement (AP) Calculus, a trend some scholars have expressed to be the norm in this country (Delpit, 1992; Flores, 2007; Oakes, 2005). At the same time, the focal classroom had an over-representation of racial groups that tend to be excluded from higher-track courses. Specifically, as I explore in the Chapter

Five, unlike AP Calculus (which is predominantly full of White and East Asian students), AP Statistics at Champlain has a large number of African American and Pacific Islander students.

Focal Classroom Selection: Ms. Williams and her Complex Instruction AP Statistics Classroom. I focused data collection on one AP Statistics classroom at Champlain High School. I chose Ms. Williams, and she agreed to make one of her two AP Statistics classrooms available for this study. During the 2015-2016 year, Ms. Williams was teaching Advanced Placement (AP) Statistics, Pre-Calculus, and Collection of Evidence – a course that was mostly Algebra 1 content for students that did not pass their state exam. At the time of data collection, Ms. Williams had over 15 years of experience teaching middle and high school mathematics. She was the most experienced teacher at Champlain, and was the head of the mathematics department.

I first came to know Ms. Williams about a year before my data collection through her and her school's partnership with the Secondary Teacher Education Program at my University. I observed and learned quickly that, unlike any other teacher I had met, Ms. Williams' attention to her students and their identities – both academically and racially – was something unique and worth understanding more closely. This in addition to the AP Statistics classroom in which this study takes place – which, as previously discussed, is unlike any other upper level classroom I have seen – made for a phenomenon I wished to further explore. I was pleased that Ms. Williams wanted to work with me and agreed to be part of this study.

I deliberately chose to select a classroom taught, much like the teaching force in the state and country, by a White and female identifying teacher. In the United States, White middle class female teachers make up the majority of the teaching force (Howard, 1999; Nieto, 2004). At the same time, increasingly the majority of students are of color. As made apparent

in Table 1 above, in this classroom, there were two White (male) students, and the remaining students identified as Black/African American, Pacific Islander/Asian, or Mixed Race – which was fairly representative of Champlain's racial composition. In urban areas where there is a high concentration of students of color, students are even more likely to be taught by a White female teacher (Delpit, 1995; Grenfell & James, 1998; Nasir et al., 2008; Stiff & Harvey, 1988; Weinstein, 1985; Zevenbergen, 2003). This is especially true for this classroom and school, making the question of racial mismatch of teacher and students a relevant and important context in which to explore the experiences of students of color.

At the same time, in many classroom contexts, where there are one or a few students of color, interactions between the teacher and that one student is likely very different than if there are a significant number of students of color. As it tends to be easier to ignore race when there are few/no people of color visibly present (Schick, 2002), teachers of mostly White students and one or few students of color might not have had to think about race and the processes and roles of racialization in the classroom. In this case, Ms. Williams is a teacher who thinks carefully and deeply about her racial identity and how this plays a role in her relating and interacting with students of color. We will see more about this below when I describe Ms. Williams as one of my participants.

As some scholars have suggested, an advanced mathematics course can be a useful site for exploring the experiences of students of color in mathematics, especially since normally these students are not found in advanced classrooms (Bol & Berry, 2008; Viadero, 2000). At the same time, access and success in AP classes is often linked to pursuing post-secondary education (Viadero, 2000) and "a strong mathematics background in mathematics has been linked to success in higher education (Bol & Berry, 2008, p. 33). In other words, upper level classrooms

with an over-representation of students of color who have historically been underserved in mathematics are useful sites to explore. Thus, this unique context of a AP mathematics classroom having an over-representation of traditionally underrepresented and underserved racial groups makes Ms. William's AP Statistics classroom a special case worth exploring.

Ms. Williams' Orientations towards Teaching Mathematics. Pedagogically Ms. Williams' AP Statistics classroom, much like her other classrooms and the greater Champlain High School context, followed the many principles of Complex Instruction (Cohen & Lotan, 1997). In this AP classroom, like Complex Instruction classrooms in general, students were familiar with the structures and expectations in place. Since this approach is typical across the entire mathematics department, students spent years working in groups, supporting one another and/or asking for support from one another, as well as asking the teacher group questions and turning in group quizzes for assessments. Additionally, because this is an AP classroom, students were given the opportunity to write the AP College Board exam in May, prior to which the mathematics content was selected and presented in preparation for the exam. After the AP exam was administered in May, students spent the remainder of the school year working on a group project that involved doing statistical data analysis around a topic of their choice for which they collected data. While this is not within the scope of this dissertation, this activity, within a Complex Instruction framework, was both culturally responsive and relevant to the lives of these students.

Ms. Williams described to me her trajectory from mathematics degree to her teaching credential – which she completed at a well-known and extremely well-regarded liberal arts college in the State. In her experience, she found much of her post-secondary mathematics experience as disconnected from her students and the high school mathematics classroom. In

fact, she said: “I had a hard time seeing the connection I’d be able to make with my students with those courses I was taking.” Prior to working at Champlain, Ms. Williams expressed to me, in an informal conversation, that she did not feel supported to teach for social justice and support all students’ varying needs. Prior to settling at Champlain High School 6 years prior to our interviewing, Ms. Williams jumped around from school to school, across three different states.

Ms. Williams’ choice to work at Champlain High School was driven by her interest in supporting students of color through Complex Instruction. In fact, at Champlain, and through CI, Ms. Williams recognized a “community of teachers who really cared about what is best for students” (Field Notes, December 8, 2015). Through informal conversation with Ms. Williams, I learned that at Champlain High School, thanks to a strong collaboration with a nearby University, Ms. Williams began to learn about Complex Instruction. She eventually was coached by an expert in CI, a notable and well-published scholar. As I will show in Chapter Five, Ms. Williams spends a considerable amount of her time thinking about race and her racial identity. As a White female teacher, she is aware and explicit about her position amongst her students who are mostly of color.

Student of Color Participants. Over the course of the six months (December 2015 to June 2016) that I collected my data, I recruited student participants by announcing in front of Ms. Williams’ class on a few occasions that I wished to speak to any student in the class to help me better understand their experiences learning mathematics. Additionally, while sitting with students during group-work, once I has built rapport I would ask students if they were interested in speaking with me one-on-one about their experiences.

Because it is not appropriate or accurate to guess the racial or ethnic identity of others, I interviewed all students that showed interest in participating, regardless of how they chose to

identify racially or ethnically. Of the 32 students in Ms. Williams' AP Statistics class, eight self-selected students agreed to participate in an interview. Of the eight students who participated in my study, two identified as male, and one identified as White. I did not select for gender, so it is happenstance that the majority identified as female.

For the purpose of this dissertation, I have centered my analysis on (for the most part) the six students who identified as female and of color. Namely, as shown alphabetically in Table 2, the focal participants for this study were Carlin, Gena, Jane, Leilani, Lia, and Mya, and. All participants were 18 years of age and seniors at the time of the interview. In terms of racial identity, they were representative of the classroom of 32 students that they were selected from. See Table 1 above for a reminder of the classroom racial composition. The focal students in this study were asked to self-identify in their interviews, and thus chose different ethno-racial identifiers, sometimes citing the country they or their parents were born in and other times giving themselves a traditional race-label such as "Black" or "White." I have captured this language in Table 2, along with the date of each student interview. I will introduce each focal student in more detail in the upcoming chapter, and discuss further their racial identities.

Table 2
Student participants' self-identifications

Name	**Date of Interview**	**Gender self-identification**	**Racial self-identification**
Carlin	May 24, 2016	Female	Multiracial
Gena	May 24, 2016	Female	Asian
Jane	December 15, 2015	Female	South Asian, Cambodian
Leilani	May 31, 2016	Female	Black, African American
Lia	May 19, 2016	Female	Mixed
Mya	February 9, 2016	Female	Mixed Race

Data Sources

This study focused on the perspective and experiences of six female-identifying students of color, especially their mathematics and racial identities and how these identities were negotiated over six months of classes spanning December 2015 to after right after the AP College board exam was administered in June 2016. The six months allowed me to focus primarily on students' experiences, attending at times to interactions within groups and with their teacher, in conjunction with student interviews that I conducted.

In particular, this study draws upon three data sources: semi-structured interviews with students, semi-structured interviews with the teacher, and field notes that captured informal conversations with teachers as well as some classroom observations. Specifically, over the course of six months, I conducted 30-minute individual semi-structured interviews with each student, and two 60-minute individual semi-structured interviews with the classroom teacher. Finally, field notes captured some classroom observations and student group-work, along with informal conversation with Ms. Williams and the AP Calculus teacher, Ms. Billings. What follows in this section is more detail on each of these forms of data.

Student Interviews. I conducted and audio-recorded semi-structured (Merriam, 2009) interviews with each of the six focal female student of color participants. Interviews lasted on average 30-minutes, with an actual range of 20 to 60 minutes because of the fluid and conversational structure of the interviews. I chose to conduct semi-structured interviews because I had some questions prepared that I wanted to ask about – see Appendix A-3 for the interview protocol – and I did not know if I would get a chance to follow up with any of the student participants (Bernard, 1988). At the same time, I audio-recorded these semi-structured interviews so that I could spend the time in the moment focusing on what I needed to ask and

building rapport with the student participants, rather than being occupied with taking notes and deciding what to ask (Bernard, 1988).

In the interview, I asked questions about how long the student has been at Champlain, what community s/he lives in (with respect to the community in which the school is located), who she lives with at home, what her grades in mathematics are like in general and currently, and what she expects of herself vis-à-vis what her teacher and family expects of her, in order to succeed in mathematics. I also asked students directly about how they identify racially, if/how they feel this affects their learning and their interactions with their classroom teacher and their peers. In addition, I asked how they feel they are viewed by their mathematics teacher, how she feels about relationships (both in a whole class setting and one-on-one) with her teacher, how she views herself as a mathematics learner (Does she feel successful in mathematics? If yes, to what does she attribute this success?), and if/how she views her teacher as supporting her and offering her rich learning opportunities.

It was important for me to ask students directly about race and their interactions with respect to their racial identity. While race and racialized experiences are salient to the lives of students, they are seldom talked about or seen explicitly (Pollock, 2004). For this reason, it was important for me to have students recount memories of interacting with peers or their teacher that might be more subtly recounted as racialized, and to ask them directly about race and if it matters in their learning and interactions. Overall, as one might expect, often when students were asked directly about race they had very little to say. Yet, at the same time varying experiences – both subtle and otherwise – along racial lines were recounted elsewhere in their interview. Because talking about race is not commonplace or easy, I made every attempt to build and maintain good rapport with my student participants. If they seemed to be contradicting their own words

(saying that race doesn't affect their interactions but describing an interaction that appears to clearly be charged with racial tensions, for example) I respectfully did not probe students about this. This means that I kept to my research goal of letting students speak freely and for themselves in their interviews. Making connections between what these female students of color were saying and what might be implied from their stories is the work of my analysis. All student interviews were later transcribed and analyzed in the manner described below.

Teacher Interview. One[4] 60-minute semi-structured audio-recorded interview (Merriam, 2009) with Ms. Williams took place. I chose to do a semi-structured interview because I had specific questions I wanted to ask – see Appendix A-1 for the interview protocol – yet I wanted the freedom to change the trajectory of the interview in the moment depending on how the conversation went (Bernard, 1988). It was necessary for this study that I learn about how the teacher participant identifies racially, whether she feels connected to her students and able to relate to them, how she views her students of color, as well as how she views and enacts equitable teaching. In addition, I asked questions that got at how long Ms. Williams had been teaching (math), what curriculum she employed, where she did her teacher training certification, and what she felt was necessary to be a good teacher.

This teacher interview was useful in comparing to how students reported being viewed by their teacher. In addition to teachers' views having implications for instructional choices and students' achievement, teachers' views can affect how students view themselves and construct

[4] A second interview took place with Ms. Williams, which employed stimulated recall where we watched a segment of her classroom together while she narrated through her decisions while I asked questions. I have not included descriptions of this interview because the segment did not involve a focal student and thus I did not use data from this interview in my analysis.

their identities – both racially and academically (Martin, 2000; Varelas et al., 2013) – hence we need to hear from teachers while centering what we know from students' perspectives. This and all other interviews were transcribed.

Classroom Observations. I observed whole class periods as well as portions of class periods where students were working in groups, on a bi-weekly basis, for a total of 23 hours, between December 2015 and June of 2016. Towards the end of this time-period, after the AP Statistics exam was administered, students were working on a final project where they selected topics that they felt were interesting and relevant to their lives and collected and analyzed data around these topics using the statistical methods they'd learned all year.

During classroom observation, I tracked how much class time was allocated to various instructional structures, such as whole class discussions and group work time (Boaler & Staples, 2008). This helped me better organize my data into various phases of a mathematics classroom lesson which assisted my analysis – especially in attesting that this classroom closely followed the methods and norms of Complex Instruction. Specifically, the focal point of my thick descriptions during observations were two-fold. First, they were around the types of tasks and the norms in place around group work, as well as evidence that this was a Complex Instruction classroom and that Ms. Williams was a race conscious teacher. Second, they were about how students interacted with the classroom teacher and with other students, in order to find evidence in support of Ms. Williams being a race conscious teacher, and evidence around how students were seeing themselves in relation to other racial groups while they were learning mathematics.

In order to assist my analysis, whenever possible, I attempted to focus on student participants in my classroom observations. This was especially true for instances of group-work, so that I could capture students talking to one another. In this way, I worked to keep students'

interviews and narratives at the center of my analysis. However, given that interviewed students were self-selected and the seating arrangements are often changed, it wasn't always possible to capture all student participants in the classroom observations.

Immediately following all interviews and observations, I completed descriptive field notes (Merriam, 2009). I noted technical observations such as if I had trouble collecting data or had to make considerations moving forward with scheduling, as well as analytic observations where I wrote about connections I was making to things I'd read or seen or heard elsewhere. These field notes were particularly important for classroom observations and informal conversations outside of the scheduled interviews.

Additionally, during classroom observations, I wrote thick descriptions (Geertz, 1994) of the teaching and learning taking place as part of my field notes. All my observations were documented through notetaking. While in the classroom, as often as I could manage, I jotted down parts of conversations, quoting the exact wording wherever possible. I attempted to capture as much as possible of what was going on in the whole class and within the group I was sitting with. During initial observations, my note-taking was less consistent, because I was working to build rapport with the students in the class, especially as I was recruiting for interviews whenever I could. Towards the end of my observations (in May and June) students knew me well and I could more easily sit back and take notes, since they were used to having me in their classroom. Every time I was in the classroom, I would spend the time immediately afterwards typing out my notes and trying to make note of connections between what I heard students and their teacher say in their interviews vis-à-vis what I heard in the classroom.

Methods of Analysis

The analysis in this study was organized with focal female student of color participants at the center. This means that data sources such as the teacher interviews, informal conversations and classroom observations were meant to be triangulated with the themes that emerged in student interviews about students' experiences and identities. At the end of this section, in Table 3, I have included sample analysis questions I asked myself throughout the process of analysis, in relation to answering my research questions.

As discussed earlier, this study employs qualitative interview study methodology (Miles & Huberman, 1994; Yin, 2003). By centering students' experiences and voices, I was able to privilege their narrative and experiences – a process that is important to conducting critical race research. While I created analytic memos for each student (described below), in the findings chapters, I attend to patterns that cut across (or did not cut across) the group of focal female students of color. The point of drawing upon students' own words through themes that span across all six student participants was not to outline contradictions in students' sense-making around race and racial identity. Instead, I attempted to capture and honor the complexities and supposed contradictions that come with talking about one's racialized experience. As Pollock (2004) describes, in schools and classrooms it is not easy to talk definitively about race and one's racial identity, even if it is something that one spends time thinking about (as a race conscious person, for example).

Prior to formal analyses, I consulted my transcribed interviews, along with my field notes of classroom observations, to memo about themes worthy of noting – especially in relation to my focal female students of color participants. It was useful before beginning the formal analyses to "wallow" (Knapp) in the student interview data and then engage in memo writing. Memos

began as writing like I was in conversation with the data, asking questions and engaging with the text. Eventually memos allowed me to make explicit connections between (cross-case analysis) and across (triangulating) data sources.

Phase One: Analysis of the Student Interview Data. Initially, I engaged in an iterative process of open coding (Charmaz, 2006; Glaser & Strauss, 1967; Miles and Huberman, 1994) to identify categories within and across all female student of color participants' interviews. These categories can be seen as "baskets into which segments of text are placed" (Marshall & Rossman, 2006, p. 159). Analysis questions – such those described in Table 3 below – helped me decide on categories. These categories or baskets were determined both across interviews, and within each student's interview around themes related to their racial identity. For example, during my analysis of student interview data, I asked myself questions like "Does the students discussion about enjoyment and success in mathematics make (explicit or implicit) mention about race?" Also, while I asked each student *if* they feel their racial identity plays a role in their mathematics learning and their interactions with peers and their classroom teachers, in my analysis I took the theoretical stance that race matters, and all spaces are racialized. Therefore, even if students responded that their racial identity does not matter for their learning, it was important in my analysis that I looked at students' stories in entirety since they might have implied the importance of race elsewhere in the transcript.

Themes emerging out of student interviews were then arranged in analytic memos for each student participant. The creation of analytic memos helped organize emerging categories with each student interview and across all student interviews. After I engaged in open coding of each interview and had drafted analytic memos for each student, I engaged in a hypothesis-testing inductive process (Lim, 2008) examining first one interview with a student. From there,

I drew on the process of doing a cross-case analysis (Yin, 2003) to test what I'd find in one initial interview across the five other interviews.

For example, Gena was the only student who explicitly expressed that her racial identity plays a role in her learning mathematics in Ms. Williams' class. However, through iteratively going through each of the interviews, I began to notice that all focal students felt this way, they had just expressed it in varying terms some being more implicit than others. There were also noticeable differences amongst student participants. Specifically, while all students I interviewed found the mathematics curriculum and the instructional choices made by their teacher to be relevant to their identities and learning, participants expressed different ways in which racial narratives impacted their participation.

Phase Two: Analyses of the Classroom and Sociohistorical Level. Martin's (2000) levels of inquiry into students' identities helped me connect students' narratives within various contexts or levels in which they are situated. At this stage, I compared and contrasted the themes that emerged out of students' interviews with the teacher interview and classroom observation data (Coffey & Atkinson, 1996). In this analysis, I was able to situate students' identities as nested within their classroom context.

As part of this phase, it was necessary for me to find and mark evidence of Ms. Williams' classroom being a Complex Instruction classroom. Having identified the tenets of Complex Instruction in the literature (Cohen, 1994; Cohen et al., 1999), I then coded my field notes of classroom observations for those tenets (e.g., group-worthy tasks, group work and group norms, and student status). I then turned to the student interview data to identify when students described aspects of Classroom Instruction, and how it mattered (or not) for their sense of self in the classroom. For example, when students spoke about working in groups or

described a moment that counted as their teacher assigning competence, I coded this. Similarly, I analyzed the interview with Ms. Williams to code for her descriptions of her enactment of aspects of Complex Instruction (e.g., the kinds of open-ended group-worthy tasks that she would regularly enact with students).

In Ms. Williams' interview, how she felt about students and if/how she feels she is able to relate to students was analyzed as supportive or discrepant evidence for what I'd identified in my student memos. I revisited the teacher's interview – along with student memos – to analyze how Ms. Williams viewed her students of color in comparison with students' self-perceptions around how they are viewed by Ms. Williams. In analyzing Ms. Williams' interview I found evidence in support of what student participants were saying in their interviews.

It was also important to look to classroom observation data to see if there was evidence of how students interacted with other students and/or with Ms. Williams that might support or contradict students' feelings about their racial/ethnic identity playing a role in their learning. I expected that my field notes for classroom observation data could help support and justify – or contradict – what students said about whether or not their identity affects their learning of mathematics and how. In particular, through content logs and field notes of classroom observations, I annotated instances around how Ms. Williams moved about the classroom and what students in particular she paid attention to and when. I looked for evidence that might support or contradict ideas captured in student memos.

As with interviews, in the classroom I noted any explicit mention of race or racial identity, often marked by the use of racial labels such as "Asian" or "Black" or "White". However, while race is a prevalent part of the student experience, like other scholars found, race and processes of racialization operated in subtle and implicit ways (Lewis, 2003; Nasir &

Shah, 2011; Pollock, 2004; Schaffer & Skinner, 2009; Van Ausdale & Feagin, 2001), making it difficult to see within my classroom observations.

Initial findings suggested that focal students were engaging in neoliberal discourse. Specifically, I found that students were taking full responsibility for their mathematics learning, with little to no mention of external factors that might affect their learning and success with mathematics. In order to make sense of this I returned to literature that might explain these emerging meritocratic ideologies. It is here that I found the literature on the ways in which neoliberalism and institutional racism work together to encourage people of color to take full responsibility for the very circumstances that were structurally orchestrated through injustices concealed as merit and colorblindness disguised an assumption of post-racial justice.

Table 3
Research Analysis Questions and Data Sources Overview

Research Questions	**Data Sources**	**Analysis Questions**
According to female students of color, how does their racial/ethnic identity play a role in their learning of mathematics? How do female students of color view themselves in relation to other racial groups, in their mathematics classroom?	-Student Interviews -Classroom Observation	-How does this student identify racially? What kind of language does she use to identify racially? -How does the student's narrative about her identity relate to learning mathematics? -Is there evidence of narratives that resist colorblind ideologies (i.e. counter-narratives that insist on the importance of race)? -How does what the students says about enjoyment and success in mathematics, relate to the student's racial identification? -Does the students discussion about enjoyment and success in mathematics make (explicit or implicit) mention about race? -How does the language the student uses to talk about her racial category relate to the language she uses about learning mathematics? -How does the students' discussion about interacting with the teacher and the peers relate to her racial identity playing a role in learning mathematics? -How does the way in which the student identifies racially relate to how she is seen by others/peers within and outside of her racial category? -Did this student mention any stereotypes or assumptions? -Are any of the mentioned stereotypes or assumptions about the racial category in which this student identifies? Are they about other

		groups? Are they about themselves in relation to their or another racial category? -Is there any evidence of how students are interacting with other students or the teacher that might support or contradict what students are saying in interviews?
What racialized narratives exist within a Complex Instruction classroom with a race conscious White female teacher?	-Student Interviews -Teacher Interview -Classroom Observation	-What is some evidence to support that this AP Statistics classroom is in fact a Complex Instruction classroom? -What is the evidence to support that the kinds of tasks in the classroom are group-worthy (as per CI)? -What is the evidence to support that norms in the classroom are indicative of CI? -How does this teacher identify? How does her identity relate to how she relates to students of color? -How does the teachers' descriptions about students and about her classroom offer evidence to suggest that she is a race conscious teacher? -How does what the student says about the teacher relate to the teacher being race conscious and trying to relate to students of color? -In observation, is there any noticeable trend to how Ms. Williams moves about the classroom? Does she spend more time with certain students? If so, are these students noticeably of the same racial or gendered identification as her? -In observation, is there any noticeable trend – based on race and gender – in which students dominate group-work and group discussion?
How do students' racialized narratives regarding learning mathematics reflect and/or run counter to dominant neoliberal, colorblind ideologies?	-Student Interviews	-Does the students discussion about enjoyment and success in mathematics make (explicit or implicit) mention about race? -Is there evidence of counter-narratives (i.e. that go against the colorblind ideology, meritocratic discourse)? -How does the language the student uses to talk about her racial category relate to the language she uses about learning mathematics? -How does the student know s/he is doing well in math? How does s/he know s/he "get's it"? -When the student isn't doing as expected in math (based on what they expect, in terms of grades for example) why does she think that is? -What does the student blame (or say is the cause) for not doing as she expected in mathematics? -How does the student's response about not doing well in mathematics relate to colorblind and neoliberal discourse? -How does the student's response about not doing as expected in mathematics related to things that are in her control? (meritocratic or about systems in which she is located?)

Researcher Identity and Positionality

In this study, and in general, I continue to struggle with my identity and positionality as a female researcher of color. In the past, I have found it helpful to look to what other scholars have done in this regard, and to position myself within my research as transparently and explicitly as possible. Specifically, I look to other academics for examples of how one can situate oneself in one's research, through narrative inquiry (Bell, 2003; Bourdieu, 1979; hooks, 1990; Razack, 1998) or auto-ethnography (Church, 1995; Fine, 1992; Campbell & Gregor, 2002; Naples, 2003). Together these many approaches inform how I approach and situate myself in my research. As an Iranian female who graduated as a mathematics major and researches the experiences of historically under-represented peoples in education and educational institutions, I brought a particular understanding of my positionality to the collection and interpretation of this data. My subjectivity encourages me to develop nuances and complex understandings of mathematics, mathematics learning, and educational institutions more broadly, as socially exclusionary spaces, experiences and processes. My woman of color identity allowed me to partially relate to some of the feelings raised by these female student of color participants. Specifically, worrying that assumptions and judgements made about me and how I learn and what my capabilities are, based solely on the color of my skin, and other markers of identity such as (in my case) my name. Additionally, having the sense that to succeed academically in mathematics, white ways of learning and knowing are subconsciously privileged and centered. This means that sometimes without realizing it I am participating in futile attempts of performing whiteness as best and closely as possible. The implication being that I am partially or fully

supressing my racial and ethnic identity, whilst engaging in color-blind and meritocratic ontological assumptions about learning and success.

Identification with female students of color as a female of color who also participated in AP mathematics allowed an intersubjective stance that helped me build positive rapport (Glesne & Peshkin, 1992; Lincoln & Guba, 2007) with all my participants. At the same time because of my involvement with Champlain high school as a mathematics instructional coach, I approached the school, classroom and participants with a strong familiarity of their learning environment and an ongoing visibility to student participants during teacher candidate observations and debriefs with teacher candidates and mentor teachers. This allowed me to use "my multiple identities as an interaction quality" (Berry, 2008, p. 472) which helped my connection with both student participants and the classroom teacher so that they felt they could freely share and reflect on their experiences.

At the same time, while I have a partial understanding of the experiences of the female student of color participants in my study, I acknowledge my privilege and varying social distance from the students I interviewed. This is in part due to the nature of research were there is an undeniable power dynamic between researcher and participants. On the flip side, this positionality allows me to connect to the students in my study differently than if I were a high school student myself or their classroom teacher for example. This outsider perspective also allows me to dig deeper into what students are saying about their racial identities in order to find implicit and subtle meanings around how their racial identities are playing a role in their experiences in the mathematics classroom.

Limitations of Design

Through the lens of CRT, this study centers race by explicitly starting with the voices and experiences of students of color, privileging experiences around race and racialization over other multitudes of experiences. Unfortunately, experiences around class, linguistic status, gender, while extremely relevant and interconnected with the lives of these students and their identities, are not equally privileged and centered. The main reason I chose not to include linguistic minorities in my study is that, while ELL and/or immigrant status often intersects with student of color status, it is not feasible for me to become sufficiently expert in those fields in order to do them justice.

Through students' self-selection, the majority of my participants were female identifying. However, initially I did not intend to squarely focus on gender in my study. For this reason, I did not ask the questions or attune my gaze in my observations the way I would have needed to in order to do gendered analysis.

Given the broader category of "of color", it is not my intention to insist upon a single or unified experience of all female students of color. I understand that within and across groups – on the basis of race, gender, religion, sexual orientation, etc. – there are vast variations in the way people choose to identify and in the experiences they are afforded. Similar studies have centered the experiences of Latinx students (Gutstein, 2003, 2006; Gutiérrez et al., 2011; McGee, 2016; Zavala, 2014) and /or Black (often male) students (Berry, 2008; Corey & Bower, 2005; Martin, 2012; McGee, 2009; McGee, 2016; Nasir et al., 2013; Stinson, 2008). I believe that looking across a range of racial identities could help make sense of shared racialized experiences. In turn, this can inform teachers and teacher educators in how they can support all

students to succeed and feel successful with mathematics while upholding their identities, racial and otherwise.

The nature of recruiting students for interviews, along with the timing of data collection made observations limited and at times disconnected from focal students. This means that while students were observed in class doing group work, it was rare for me to have observational data that involved the focal students of my study. At the same time because interviews went until May 2016, there were few opportunities after interviews to continue to observe focal students in the classroom interacting with one another and other peers. Students' accounts of classroom experiences, as told through their interviews, tended to be prioritized of this reason. Additionally, the intention of centering student voice in this study also helped to favor student interview data and thus students' own words, over my observations and my interpretations of what I saw.

Chapter Four: Students' (Intrapersonal) Identities and Experiences vis-à-vis Mathematics Learning

The goal of this study is to privilege and center the narratives of female students of color in order to understand how mathematics learning spaces are racialized and how race affects these students' sense of selves and learning experiences. In this chapter, I inquire into students' racialized identities and experiences, in order to understand how they see themselves, how they believe they are seen by others and how they feel about, and identify with, learning mathematics.

This chapter begins with an introduction to the six focal female students of color of this study, through a discussion of their family make-up, their family's expectations around mathematics learning, and their own orientations towards teaching mathematics. Student introductions also include their advice for future mathematics teachers and how they feel they are viewed by Ms. Williams. It is through students' discussion about advice to teachers – and particularly White teachers – that we begin to uncover students' racialized narratives about mathematics learning. Having introduced the students I then provide an analysis of the language they use to self-identity racially. I then provide an analysis of discussions with students around if/how they can be themselves in mathematics class, to begin to understand if and how each student felt her identity is affirmed in the context of her AP Statistics classroom.

It is worth reminding the reader that this study looks across a variety of racial identities and centers the narratives of female students of color. Remarking on trends and themes across various racial standpoints is not meant to paint a picture that we all have one single unified experience as women of color, but instead it is to build a racial narrative that encompasses a varying degree of shared experience based on our racial (and gendered and classed) social locations. While race was the prompted social identity of this study, gender and class both

emerged as other social locations from which these students' narratives were told. This reveals that students' discussion around race and racial identities are complex and complicated, nuancing traditional race labels and race talk.

Getting to Know the Focal Students

Carlin. Carlin wants to be "known as multiracial,"[5] because she does not want to be labeled nor does she want to be divided into just one racial category – Black and White – both of which she identifies with. At the same time, Carlin described how she is often seen by her peers as White, a situation that comes with assumptions about her identity and abilities, which, as I detail in Chapter Five, poses negative consequences for her and her learning.

At home, in the same neighborhood as Champlain High School, Carlin lives with her mother, her father and her younger sister. According to Carlin, her parents want her to "learn and understand" mathematics and to "ask questions […] and don't give up until you are absolutely stuck." Carlin feels a responsibility being the older sibling at home. She believes that she needs to work to be a good role model to her little sister:

> [My little sister] is going to end up learning from what I did, so I have to guide her to be better and wiser than what I was. [M]y brother – he's older than me – I'm in the middle, but he's on my dad's side, so he's half, and umm he was not great in high school and he never really helped me so I feel like I have to help my sister.

In describing the characteristics of the greatest mathematics teacher she ever had, Carlin emphasized the importance of meeting students where they're at. Specifically, she said that her

[5] All quotes, unless otherwise specified are from interviews with students. The dates of each student interview can be found in Table 2 in Chapter Three.

favorite teacher "explained things to your knowledge. Like she understood what kids get and how they kind of figure things out and so she made it more personal for them and she made it easier to understand." Good teaching, according to Carlin, has everything to do with knowing what students know and how they learn, and making personal connections with them so that they know you care and you want them to understand.

In providing future mathematics teachers with advice on teaching, Carlin further emphasized the importance of being patient with students, especially when they are trying to explain their thinking.

> It's hard [for students to] explain things to teachers, because teachers already know it and so when you're trying to explain something you don't know and it's hard for them to understand how to explain it. Be patient with how [students] are trying to explain it, because, like with me, I have a like fast thinking process so when I do speak it's kind of slowed cuz I have to think about what I really want to say when it's confusing because I have a whole bunch of thoughts in my head. So I would just have to say be patient when [students] are trying to explain something.

For Carlin, she thinks about a lot of things all at once and so when it comes to verbally explaining her process in mathematics, she has to go slow and organize her thoughts. For this reason, as Carlin describes above, it is important for teachers to be patient with students. As we will see later with Carlin, she speaks at great lengths about the importance of being compassionate and patient with students.

When Carlin and I spoke about specific advice she might have for White teachers that are concerned about relating to students of color, she further emphasized the importance of connecting with students, by finding ways to relate to them.

> Kind of making it like, making broad relations, connections, kind of like just basic human things, because some people they grow up in different backgrounds and stuff but everybody kinda still has a little struggle and just connecting to those and being relatable to everybody, would make it better and them liking the teacher better, just being relatable. Not as just a White woman, but like as a person who grew up and is experiencing life.

As we will see in Chapter Five, when recounting an incident where Ms. Williams took the time to connect with Carlin by telling her a relatable story, Carlin felt that it's important for teachers to find ways to connect with their students regardless of their racial identity. For Carlin good teaching was all about: "Connecting to students with emotions and different feelings instead of just the obvious out appearance, but like getting more like inside and understanding where they're coming from."

Carlin felt that she is well-viewed by Ms. Williams. She assumed that Ms. Williams "would think that I was helpful to my classmates, and reliable, to help, and then open to doing things. Like if I need to move groups to help somebody I feel like she would know that I would be okay with that." As we learn more about Carlin through her personal narratives in the upcoming findings chapters, we will see that despite how she feels she is viewed by Ms. Williams and her positive experiences with learning mathematics, her peers view her in ways that reflect racialized assumptions about her abilities in mathematics.

Gena. Gena identifies as Asian, and specifically Filipino. As I will further discuss below, Gena has had many experiences of being seen linguistically, racially, ethnically, and culturally other than how she identifies.

At home, in the same neighborhood as Champlain High School, Gena lives with her two brothers, her mom and her step-dad. According to Gena, her step-dad expects her to get As in mathematics as well as all of her classes, whereas her mom is not as concerned with grades.

In describing the characteristics of the greatest mathematics teacher she ever had, Gena emphasized how he worked to boost students' confidence. Here, Gena describes her favorite teacher's use of confidence awards as a way to acknowledge students helping one another and asking questions when they need help.

> He would do these awards, like confidence awards that are like 'great awards'. They're basically like awards that say you like asked people or you help somebody and he like saw it and it was kinda like a confidence booster. Like you know it and you like actually teach someone else and you're like helping them or if you didn't know it and you like asked somebody for help and he like saw it.

In addition, Gena felt it was important for teachers to offer help, and provide extra practice problems for students. Here, Gena credits Ms. C – Ms. Williams' student teacher – for being an understanding teacher and being helpful when she didn't understand something.

> [Ms. C]'s like understanding cuz there are times when like this year is really hard cuz like I was like I didn't really understand it and all like I wouldn't understand the book cuz the book is like hecka hard to read. How am I supposed to like understand? I'm like I don't have a calculator at home, like one of the calculators we have at school. I don't have one at home and they're hecka expensive. They're like $100 each and then I would ask [Ms. C] and she's like "oh it's easy just go like this and this." And I'm like why didn't it say that in the book? I would have knew that… I would have knew that already and uh, she's kinda cool, she's really like chill and like understanding.

For Gena, it was important that Ms. C was willing to help out and offer alternative explanations when she was stuck in math. When I asked her what advice she would give to future teachers, Gena explained: "Give more examples!" For Gena, she felt that when teachers only provided one example, it was difficult to feel self-sufficient in solving various different kinds of problems.

When Gena and I spoke about the prevalence of White female teachers in the area, she told me that currently all of her teachers are White, and that has been the case for her over the years. I asked Gena what kinds of advice she would give White teacher who are worried about relating to students of color, and she said that teachers need to understand students and the lives that they bring into the classroom with them. Gena describes here the importance of understanding students' situations and taking the time to sit with students and help them with their problems, mathematics and otherwise.

> I think it's that you have to understand where [students] are coming at. Like you can say that they been to the same situation [as you], but yet some people, like some kids take the situation from home and they bring it to school, you know? And then how do you deal with a student that has problems from home and brings it to school and is having more problems from school? It's kind of like one big problem. So, I think […] you have to kind of like, if you see the problem, sit down with your student, to understand and like trying to find the, like I'm not saying the biggest help but like some help. Like help in general, to help them.

For Gena, she saw students' home lives and school lives as connected, meaning that it is important to take the time to notice what students bring to school from home and offer to help students with their problems. Gena further described that students of color need to give their teachers a chance to understand and help them, even if they're White.

> [S]ome students don't want to like talk to their teachers cuz it's like oh they're White, they don't understand. And I'm just like it's not like they don't understand, like you don't give them the chance to. [T]eachers, don't want to [deal with students] cuz they act like they act out in class. Well maybe there's something that makes them want to act out. And then, it's kind of like, you gotta like, figure out whatever, like what's going to hurt you if you don't ask and what's going to hurt them if you ask.

Gena feels that students need to be okay with reaching out to teachers for help, just as teachers need to take the time to reach out to students and offer help. She feels like some students of color make the assumption that a White teacher won't understand them, but that's not necessarily true.

Gena's concern about teachers had more to do with substitute teachers than the teachers at Champlain. "I think, besides from the teachers, I think a lot of the subs are kind of racist here," she said. Gena recounted an experience this year where a substitute teacher called her the "N word" and spoke to the whole class disrespectfully.

> There are some subs that we've had here that like called like some of like the kids, and then like this one, this one woman called me the "N word", I'm not even like, like I'm full Filipino and she called me the N word and I'm like what? And she was like "yeah, you heard me" and she was like talking to all of us like that.

Gena was surprised to have a substitute teacher call her the "N word", especially since she is Filipino. For her, she didn't understand how someone would choose a profession like teaching when they clearly don't care about the students. "[T]here are some subs that like they don't care about you and it's kind of like 'why are you here then?'" When I asked Gena what happened when Ms. Williams came back, she told me that the students complained to their teacher and the substitute teacher was not going to be allowed to return, which doesn't undo being treated and

spoken to in that way. More generally, Gena explained here what happens when a substitute teacher is awful to the students, like this situation described above.

> [The teacher] will like tell the principal and then they'll never like hire them again… and then like it still like stays in our mind that they called us that. They did that to us.

The incident still happened and doesn't go away. The students at Champlain will always remember being treated and talked to so disrespectfully. Additionally, that substitute teacher could also continue to go to other schools in the area that are just as racially diverse as Champlain.

Gena felt that Ms. Williams saw her as quiet, hard-working and often picking up the slack during group-work.

> I think [Ms. Williams] would say I'm quiet, I'm quiet and probably like hardworking. I do try my hardest like the majority of projects I do by myself. I do most of the work, cuz you kinda have to like figure out cuz there's people in your group that they're not gonna do the work and you can't like do anything about it so you're gonna have to like pick up the work. You know you can't be like 'oh F*** it' you have to be like, you have to just deal with it. It's gonna happen, you can't say it's not gonna happen, it happens all the time, so you're gonna have to like pick up the slack and you can't really like say anything about it.

Gena felt that Ms. Williams recognized her hard work – especially during group-work. For Gena, it was important to keep quiet and pick up the slack when some group members weren't carrying their load. Feeling that Ms. Williams was aware of her efforts, Gena felt confident that she was well-viewed by Ms. Williams as a math learner.

Jane. Jane identifies as Cambodian, South Asian. She lives at home, in the same neighborhood as Champlain, with her mom, dad, younger brother and grandma. At home, Jane's family has high expectations for her to succeed in mathematics and in school in general. At the time of our interview, Jane's mom was completing her master's degree, and her dad had his high school diploma. Here Jane describes that she aims to meet both her parents' expectations, her grandma's expectation and even has high expectations of herself as well.

> In math, well my mom is receiving her masters this summer, and my dad is a high school graduate, so they kind of balance out. My mom is the one that really wants me to succeed and my dad's like just try your best, whatever you get is whatever. So, I kind of have a balance of both and I try to meet their needs in between. But for myself, I feel like I just need to try my best, like sleepless nights are okay as long as I'm successful in the future. Just try hard. [And my grandma] just wants me to succeed in school and just try my best.

It was important to Jane to meet her family's expectations and succeed in school. Jane, much like we saw with Carlin, feels a responsibility for setting a good example for her younger brother. In Chapter Six, I will discuss more about Jane's family and her greatest motivations for doing well in school in order to attain a better career and life than what her parents had to suffer through.

For Jane, the attributes of a good mathematics teacher – much like what Gena described – were being understanding of students' lives especially when planning lesson and assigning homework to students. Here Jane describes what made the best teachers she's had so great.

> Well they are really understanding of the students' lives and their schedules so they plan their lessons around what the students will be able to handle. I've had teachers that give

> loads of homework and all that stuff, but with Ms. Williams and [my favorite middle school teacher], they gave us time to work on homework and get help that we needed instead of just handing it to you and giving us a due date.

A teacher that considers students' schedules outside of class and school, and offers students time to start homework and get help when they need it, is what's best in Jane's opinion. Building a relationship with students is important to Jane, as she describes here. For Jane, it is important that teachers are invested in their students rather than coming in just to teach them and then leaving their work without thinking about the students whose lives you touch.

> I feel like there should be a relationship, like instead of just coming here to teach the students and having them go off, you should just if you care about your students you should have a really good relationship that will carry on to the work ethic that they have and the environment and all that good stuff.

When it comes to giving future teachers specific advice for teaching mathematics, Jane felt that taking the time to connect with students and recognizing that students learn differently is what's most important. This is what Jane describes below, along with what she saw in her favorite teachers do – being understanding of students' lives and schedules.

> To be a good teacher, I feel you should connect with your students and understand that sometimes if one student understands something, another might not. That everyone learns differently. That everyone has their own stories and schedules and to be understanding is the best thing you could be as a teacher.

When it comes to White teachers relating to students of color, Jane felt that one's racial identity wasn't relevant to how connecting with others. "It's not really that hard to connect to with other people of different races, as long as you see them as human. I mean it's not like they're different

aliens from different planets." Jane felt that connecting with others is easy to do, as long as you can see others as human. Here she recollects that even when she's had teachers from a similar background to her, she didn't necessarily connect with them.

> Yeah, I don't think it matters. Cuz, I've had teachers who are from the same background that I didn't connect with as much as other teachers who weren't. It's all about the teacher itself, not the race, that doesn't have anything to do with it I don't think. Ms. W is very passionate about racial equality and sexual equality, and ageism and all that stuff.

Jane described above that that it's more about the teacher and the efforts they make to connect with students, much like Ms. Williams who, according to Jane, is passionate about racial equity amongst other things. Jane recalled that even when she's had teachers from the same background as her, it wasn't necessarily the case that she connected better with them.

Jane felt well-regarded by Ms. Williams, saying that "I think she loves me. (Laughs). She's a really really amazing teacher, I dunno. I don't think she has anything against me. I don't think she's biased in any way, which is pretty cool." Specific to mathematics learning, Jane hoped that Ms. Williams viewed her as a hard-working and committed student, since she has been making a big effort. "Hopefully she sees me as a dedicated math learner, because I'm really trying my best this year," Jane said.

Jane, like four other focal students (i.e., all except for Leilani), adopted a colorblind ideology when suggesting that a good teacher treats all students the same, is not biased, and that race has no impact on if/how a teacher relates to students. The implications of this type of thinking will be further explored in Chapter Five.

Leilani. Leilani described that she identifies as African American or Black. At the time of our discussion, she had just been the recipient of prestigious literary award, which allowed her

to publish a book of her poetry about some experiences of being Black. Additionally, a reputable author from the area wrote a prelude and review for her published book. The day of our interview was the same day she had brought in copies of her newly published book for purchase. Ms. Williams was the first one to buy her book and express excitement about Leilani's accomplishments.

At home, in the same neighborhood as Champlain, Leilani lives with her mother, father, older sister and younger sister. She has another older sister that does not live at home. Leilani explained to me that she is not good at math, so her family expects her to try really hard to compensate for lacking an innate ability.

> [My parents expect me] to study really hard because math is not my strong suit, like I'm not really good, it's not my area of expertise. Uh my dad is really good at math, um but he just encourages me to study real hard and just keep practicing and I'll get better. [My dad] expects me to be like as good as him sometimes, but my mom she's also not good at math, so she understands like what I go through, but they're both understanding, like my dad's understanding too.

While Leilani begins to say that math is not her "expertise," she goes on to suggest that as long as she "keeps practicing" she will improve in mathematics. In contrasting mathematics and writing, Leilani feels like her and her mom are not good at math, but that her dad is good at math. Leilani contrasts writing and math, implying that excelling at one subject excludes the other, when she explains to me why math isn't her "strong suit." "I dunno, I just, I'm more into writing. So writing is more my thing, math it just never, I dunno it just never connected to me the way other subjects have."

Leilani said that Ms. Williams is the best math teacher she has ever had. When I asked her to elaborate on why, she said it was because she makes mathematics relatable by involving real-life scenarios. Here Leilani says more about this.

> [Ms. Williams] involves real-life scenarios, like the one we're doing right now, where we're having to [administer] a survey based on [a topic in our lives that] we want to [look at more closely using statistical methods]. When we watched a movie that was about um, it was about a vegan, like vegan diets. And um when we watched like John Oliver's segment … on wage gaps… she involves real life topics, and relates them to the math we do. So, I think she's the best teacher I've ever had.

For Leilani, being a good mathematics teacher means involving real-life topics and relating them to mathematics. I asked Leilani if she had any teacher do this prior to Ms. Williams, and she said no – making Ms. Williams stand out as the best teacher Leilani has ever had.

As an attestation to Ms. Williams' commitment to teaching in a manner that engages and supports students' identities, as I will further discuss in Chapter Five, Leilani describes here that Ms. Williams takes the time to connect with students that identify differently than her.

> I feel that [Ms. Williams] always like encourages us. She used to do, like talk about like racial stereotypes among people, and she's always like talks to me about that because she knows I'm really into like writing about like racial topics.

Leilani's anecdote about Ms. Williams suggests that Ms. Williams was a race conscious teacher, as I will further discuss in Chapter Five. Additionally, Leilani's story shows that Ms. Williams knows some about how Leilani identifies and things that she finds important. In regard to Leilani's recently published book of poems, she told me during our interview: "[T]oday, when I gave her my [poetry] book and [Ms. Williams] was so happy about it and she was like so ready

to buy it. I think that was so nice, that she's always genuinely happy for the success of her students". In this case Ms. Williams took the time to talk about "racial topics" with Leilani and purchase her book to support her efforts, knowing that she is interested in talking about race due to how she identifies and what she tends to write about. In Chapter Five, along with describing her consciousness around race, I will look more closely at Ms. Williams' orientations towards teaching mathematics, showing further that her race consciousness is a driving force in her pedagogical choices.

Leilani's advice to future teachers reflected what she liked about Ms. Williams' teaching. Here Leilani describes the far-reaching impact of keeping students up-to-date with current events.

> [Teachers should] involve real life topics in your classrooms because current events, it's very important, that umm, especially in an age where we're so into social media and technology, sometimes we get so distracted by certain things like that. I think it's important that you involve current events that you have your students stay on top of what's going on in the world because it's important that they know this stuff. And … maybe this idea that they heard in class, this real-life topic will encourage something else, maybe they'll write a book about it or maybe start a movement around it, you never know what you could inspire by just helping kids know what's going on.

As Leilani describes above, and as I shared in Chapter One, keeping students informed about the world they are situated in can help not only students' learning and experiences in the classroom, but it can also inspire students to act on injustices outside of the classroom. In Leilani's experience, she has experienced taking topics that she has discussed with Ms. Williams and turning these into poetry.

For White teachers in particular, Leilani is the only focal student that advised that teachers should think carefully about race and their racial prejudices, in relation to test scores and disciplinary measures. Leilani recalled that, as part of recent labor disputes and a recent strike in the school district, teachers had been asking for more professional development around talking about race and dealing with racial issues in their classrooms and schools. Just as she appreciated Ms. Williams' attention to racial justice, Leilani describes here that by being aware of trends (around suspension and test scores, for example) vis-à-vis students' racial identities, teachers can work to make sure to improve the condition of their classrooms for all students.

> Well I know now they're doing those um, um they're doing, like it's part of their strike, they wanted to have [professional development] classes that were taught around how to deal with races and they talk about like suspension rates and all that and I know that they have classes around that. I think that's a start because I think it's very important to analyze the disproportion of suspension, disproportion of um maybe test scores, and just see how you can do better in that.

Leilani suggests above that White teachers need to work to become aware of racial stereotypes that they hold – perhaps through examining test scores and suspension rates. Along with taking the time to become acquainted with racially disproportionate test scores and rates of suspension, Leilani felt that new, White teachers need to examine their own prejudices in order to work towards eradicating them. Here Leilani refers to the "Asians are good at math" stereotype as an example of an assumption that teachers may unknowingly act upon, to the detriment of their students.

> So I think that's a start and also I think that you have to acknowledge that um there [are] certain stereotypes that you have in your mind about who's going to do better in certain

> things and you have to kinda eliminate those. Because like I said about the Asians in math, you feel like already like "oh they're gonna do good in math" and then you're like the black kids they're not going to do as well then this is something that's already going to be established in you and it's going to cause you to do, maybe treat them differently, even though that you don't see that you're treating them differently. You don't um, you don't know that you're treating them differently, but it doesn't matter because kids see it so I think it's important for you to acknowledge what stereotypes you already have and to eliminate them.

In Leilani's opinion, a teacher might not even know that they are making assumptions about students based on their race, let alone that these assumptions are posing serious consequences for student learning. According to Leilani, becoming aware of stereotypes will help teachers to make sure they aren't acting on them and to eventually work to eliminate them.

In her own schooling experience Leilani noticed a difference between having a White classroom teacher versus a Black one. Here Leilani describes that sometimes she noticed that White teachers were anticipating that there would be disciplinary issues with Black students.

> Some of the classrooms with like White teachers, they were more, I guess on edge, cuz like I said they already had stereotypes so they were on edge about like how you would act. Like they think you're going to act out and like they're going to have to call the security on you and stuff like that. Like suspension rates for Black students is, so that's like in their head. So they're thinking 'Oh I'm going to have to call the security today,' so there were certain teachers that I had that were like that so definitely, um, and there were certain teachers that I had that weren't like that so I think it really depends on the person.

Leilani re-iterates above that having stereotypes in your head about students makes you act and react to them based on the assumptions you have about them. In the case above, some White teachers that Leilani has encountered assumed that because the suspension rate is highest for Black students, they would have a disciplinary issue just based on there being Black students in the class. Leilani suggested that teachers could work to find alternative ways to discipline a student rather than suspending them. Here she suggests that teachers take the time to find out what's going on with a student when the student acts out, rather than moving straight to disciplinary action.

> I think they need to find out alternative ways. You can't just be like, when something happens, I'm going to suspend them, you have to find other ways to kind of discipline kids like maybe you have them do, what's it called, yard work or um… find out what's going on with them. Like a lot of people are reactionary, so I just think that there needs to be other ways that you discipline children.

Leilani is suggesting above that teachers consider consequences other than suspension when a student acts out. In Leilani's opinion, finding the root cause of a student's issues, and finding ways to be less reactionary without suspension as the go-to response, would be a good thing for teachers – and especially White teachers – to do.

Leilani's advice to white teachers stands out from all the focal students in that she is the only one to make explicit mention of race and the consequences of racialized assumptions for student learning. In Chapter Five, I will investigate more into Leilani's views regarding the consequences of deeply held racialized assumptions around who can and can't do mathematics. As we will see, Leilani's awareness of racial assumptions, and resistant to dominant narratives

around who can and cannot do math, is a unique example of a counter-narrative. In other words, Leilani was the only focal student to explicitly express this view.

Leilani, much like the other focal students, felt well-viewed by Ms. Williams. Here she describes what she thinks Ms. Williams would say about her if asked.

> [Ms. Williams] would say that I'm, probably, um I'm very open I think and she'd probably say that I'm, I like to discuss topics around race cuz I do, umm sometimes I'm writing poems in class, she'd probably say that umm I'm just trying to find ways to be more vocal about certain topics, like I'm just learning my way, I'm still young, so I'm still just trying to gather information.

Leilani's passion about race and racial topics is clear through how she described being viewed by Ms. Williams above, as well as her appreciation of Ms. Williams' willingness to engage with her and all students about race-related topics. Specific to mathematics learning, Leilani felt that Ms. Williams sees her as a hard-worker, despite her struggles in mathematics. "I get help when I need it and […] there are times when I'm like 'I don't want to do math' but I push forward and I get things done." Ms. Williams view of Leilani, according to Leilani is a positive one. Once again, Leilani's anecdotes are unique in that she speaks very candidly and explicitly about race. In Chapter Five, I will show more about Leilani and her counter-narratives around learning and race.

Lia. Lia identifies as Mixed, with her mom being half White and half Black and her dad being Black. At home, in the same area as Champlain High School, Lia lives with her mom, step-dad and two older siblings. Lia's family expects her to complete her work and bring home good grades, which she feels isn't an issue because math has always been her favorite subject. In fact, as she said: "[My parents expect me to] just do my work and get good grades so that I can

pass the class. I like math though, [it's] always been my favorite subject." In Lia's opinion, bringing home good grades, as is expected of her is easy to do since math is her favorite subject. Later in this chapter, this common positive correlation between grades and enjoyment in mathematics is further explored.

The attributes of a good teacher, according to Lia, are being helpful, available for extra help, and making sure students understand and have opportunities to make up missed work. Here Lia describes her favorite mathematics teacher, from middle school, who did these things.

> She was really nice, she helped a lot. She was always like walking around and making sure that we got it or if we didn't she, like, her, she was in there at lunch, she'd let us come in there and help her or if you missed something she was like good at letting you make it up.

Lia felt that a good math teacher was one that was available outside of class to help students when they were stuck and offer them opportunities to make up work they've missed. Lia's advice to future teachers fell along the same lines, as she describes here.

> I dunno. Just probably, be like available for students when they need help and like walk around instead of just sitting cuz some teachers just sit there and if you need help you have to go ask or they just don't ask for help.

Lia felt that, in addition to being helpful outside of class time, teachers need to move around the classroom and help students with their work. She remarked that some teachers just sit there, but they should move around to be ready to offer support to students. When I asked Lia about advice for White teachers in particular, who might be concerned about how to relate to students of color, she responded "Probably not be concerned," as she laughed, adding "I dunno. I think in class [all the students] pretty much all act the same." For Lia, it seemed irrelevant to have a

teacher and the students be a different race, as her response seems to imply it's not even an issue worth being concerned about. Here, Lia suggested – in stark contrast to Leilani – that White teachers need not be concerned about race because race does not matter, and all students – regardless of their race – act the same.

Mya. Mya identifies as Mixed race, and as I describe in the next section, I was not able to get more information about her specific racial identification beyond that. In the same neighborhood as Champlain, Mya lives at home with her mom, grandma and brother. Here Mya describes that her mom expects her to do her homework, get help in math when she's stuck, and do well on tests.

> [My family] expect[s] me to do my homework, and like get help from the teacher if I need it, and pretty much just study and focus and do good on tests and stuff, but that's the main important thing.

While Mya's grandma has similar expectations as her mom, Mya explains that as a parent her mom is a bit more strict with her expectations for school.

> [Even] though that's my grandma, it's like my mom still so I dunno how to explain it but like my mom's gonna be like a little bit more strict like about doing my homework and stuff, like she expects more in a way, yeah. My grandma, she expects me to do good too, like she wants me to do well and stuff, but like a parent, I feel like your parent is going to be like more strict, so like my mom is a little bit more strict than my grandmother so like, but my grandmother wants me to do good too and stuff.

At the same time, Mya has high expectations for herself. Like Carlin and Jane, Mya feels that she needs to be a good role model to her younger sibling, as she explains here.

> Umm I feel like I kind of put that pressure on myself, like it's more of like me and how I think and stuff but I've always been kind of a good role model so I just like pretty much do me and then I'm already like a good role model. (laughs)

Mya describes the pressure she puts on herself to be a good role model to her brother, at the same time remarking that for the most part, she can just be herself.

The characteristics of a good math teacher, according to Mya –very similar to what other focal students have described – include being helpful, giving students one-on-one time, and taking the time to know each and every student individually.

> [The best math teacher I've ever had] was really like yeah like helping people like she would like if you really needed help she would like give you like one on one time and like kinda like try to focus on every student and she would just like figure out what everyone would need help on and like focus on that more.

Mya recalls a scenario with her favorite mathematics teacher where much of these characteristics played out for her and others in the class. Here Mya describes a time when they had a different teacher for three months, as part of a teacher exchange program, and after falling very behind in their work, her regular teacher worked really hard to catch up class and they all did really well on the exam.

> I had one teacher in middle school who… I forgot her name but I think she was the best math teacher ever because um so we had like a teacher exchange program like so we had a teacher from India come teach us and our teacher she taught over there for like three months and we were supposed to be taking the [state exam] and she didn't teach us anything. We didn't learn anything from the Indian teacher, so my teacher came back and taught us everything we needed to know in like a couple months and we all passed

with like 4s. She did like um review sessions and stuff like on the days that we didn't have school like or like afterschool or something we would do like um go to like her class and do review sessions and she would make us like pancakes and stuff. (laughs)

Mya's teacher worked hard in and out of class, even providing students with food when holding review sessions, to catch the students up and support them to succeed on their state exam. When Mya described the advice she would give future teachers, she pointed to attributes similar to those of her favorite teacher from middle school. Here Mya suggests being helpful, and taking the time to review material based on what the students in the class need.

[D]efinitely like try to see what the class needs help on the most, like what most people in the class need help on the most, cuz that's probably what you need to review and go over the most because if most people don't understand it then that's a problem and it kinda shows how you're teaching if a lot of people don't understand it, so yeah.

Mya sees student understanding as an important indicator of how well a teacher is teaching. This is why she suggests that taking the time to find out what students need support with and offering them that support is what's going to make a good teacher.

In terms of White teachers in particular, similar to Jane and Lia, Mya suggested that a good teacher is one who treats everyone the same, and as long as a White teacher does that, then race shouldn't matter.

Umm I feel like as long as you're a good teacher and you like just to communicate with everyone and just like treat everybody the same, um the race thing probably wouldn't matter as much. Cuz a student like of color maybe like well they'll kind of look at how you treat them and like how you look at everybody else like the same, they just want to be treated basically the same and they want to get help too like if they really need help or

like if they want it. So like basically just treat everybody the same and like then you'll probably relate to everyone and race shouldn't matter as long as you're treating everybody the same.

Mya adopts a colorblind ideology above as she suggests that treating everyone the same makes it so that race doesn't matter. She feels that students of color just want to be treated the same as everyone else so if a White teacher makes sure to see all students as the same and treat them accordingly, then they will probably be able to relate to all their students and race won't be a barrier to that.

Despite her issues with attendance, Mya felt like Ms. Williams sees her as a good student. She said that "I really do try to participate so I think she thinks I'm a good student, the only thing that's probably like a bad, is my attendance." When Mya and I spoke further about her attendance, she explained that she used to miss a lot of class due to migraines.

I just am [absent]. I dunno I just have really bad attendance. Cuz for one, like before I had like really bad migraine issues and I would get them like really consistently and stuff and then too, like I only have a couple classes, so like I know it's a really bad habit but it's hard to come in.

The reason behind Mya's attendance shifted from a health issue to a choice about the usefulness of class depending on how much work she needs to get done. Here Mya tells me that if she feels she can get more work done on her own, or she's already done the work she's doing in AP Statistics, she won't go to class.

I feel like if I'm done with my work then like I don't need to come, I dunno. […] Yeah. The thing with me is that like so if I feel like I have more important work to do and if we're not really doing anything in class that day like I'll go to the library and do

> homework, [and] do schoolwork that's important that I have to turn in. [L]ike I've done that a few times cuz there's like days in class where like we don't do anything or it's early release or something and we don't do anything but like I'll take a study day like go to the library and like study on my own. Cuz I feel like I can study better if I'm alone and not like in the class cuz that's distracting and stuff, so yeah.

For the most part, Mya's absences were still about getting work done – as opposed to hanging out with classmates and just skipping class – so she felt like overall, Ms. Williams still viewed her as a good student. Besides, according to Mya, Ms. Williams likely doesn't notice Mya's absences, because she is quiet when she's in class and also she will often make an appearance in class and leave part-way.

> [Ms. Williams] probably doesn't think that I'm leaving her class a lot cuz someone was like 'Oh does Miya ever come to class?' and [Ms. Williams] was like 'yeah, I always see her' so I don't think she notices, plus I'm really quiet too when I'm there, so yeah.

Overall, despite her attendance, Mya felt well viewed by Ms. Williams. As we will see later in Chapter Six, Mya, along with her classmate Leilani, are the only focal students that express the importance of seeking out tools to help their mathematics learning outside of the classroom. Mya's feeling that time spent outside of class at the library, instead of in class, is worth it when it's more productive, is another attestation to her independence as a learner – seeking out opportunities and environments that are most conducive to her learning.

Resisting Race-Neutral Dominant Narratives. As we've seen above, all but one student (Leilani), adopted a colorblind stance towards teachers and teaching. For the most part, these students of color insisted upon the lack of importance of race and one's racial identity, for example as a White teacher trying to connect with students of color. Students suggested that

treating everyone the same is what a good math teacher does, making it so that the mismatch between students' racial identities and their teacher's racial identity is irrelevant to the teaching of mathematics. While by and large we've seen that student narratives reflect dominant ideologies around colorblindness, Leilani's narrative is resistant or counter to this – insisting upon the importance of race for how teachers teach and how they relate to their students of color. And, in fact, in the remainder of this chapter, as well as the next chapter, we will see that when it comes to talking about their racial identities, rather than talking broadly about mathematics teaching and teachers, focal students spoke in ways that suggest the importance of race and processes of racialization. In other words, while all but one student touted colorblind language when talking about race and racialization within the context of mathematics teachers and teaching, in contrast, all students described the relevance of race and racialized discourse in interactions with their peers.

Looking across Racial Identities

As illustrated above, students in this study racially identified themselves using varying identifiers. In this next section, I focus on the nature of the language students used to describe themselves racially. In doing so, I draw upon the work of Pollock (2004), who looked at students' talk about race in American schools. Specifically, through her extensive ethnographic study of Columbus High School, Pollock (2004) classified the spoken race labels or how students described racial identity, as being either "matter-of-fact" or "suppressed" all together (p. 9). "Matter of fact" refers to language such as the race-labels we are used to hearing when others are identified, such as Asian or Black. "Suppressed" refers to avoiding race-labels and suppressing talk of racial identity; for example, a student might respond to a question about how they racially identify by saying they are "from here," avoiding any mention or discussion of race

all together. While Pollock's study involved various students – both of color and White – along with other social locations in the high school context, she found that the majority of talk around race was suppressed, meaning it was rare to find explicit mention of race in talk amongst all students, regardless of their racial identities. In the rare case that someone spoke about race, the racial identifier used tended to follow matter-of-fact language, like the labels above.

Students' racial self-identification is summarized in Table 2 in Chapter Three. For the most part, in contrast to what Pollock found, matter-of-fact labels were most common when students were directly asked how they identify racially. Students responded that they identified as "South Asian, Cambodian" (Jane) and "African American" (Leilani), or "mixed" (Lia), "mixed race" (Mya), and "multiracial" (Carlin). Yet, in contrast to Pollock's work, Gena's self-identification was not matter-of-fact, by any means, as we will see here in this section. Because of the sensitive nature of asking people about their racial identity, I accepted the language that students provided and respectfully probed for further clarification when given the opportunity. For example, Lia identified as "mixed," and she expanded on this term to say: "My umm my mom is White and Black, and then my dad is Black." Yet, when I asked Mya about her racial identity, she said: "Pretty much like mixed race" and throughout our conversation it never felt appropriate or respectful to probe further to know the specifics behind her chose racial identification.

Carlin, while initially identifying in a "matter of fact" way as "multiracial," also said that she did not want to be "labeled" as one race or another. Specifically, she says: "I don't like to divide myself as just one category of things because I'm not, so I like to be… I don't want to say labeled, but 'known as' multiracial." Carlin's response is unique in that she expressed wanting to

be "known" rather than "labeled." This might be viewed as a counter-narrative – that is, she is resisting being boxed in by labels.

And, while Gena said she "guessed" she identified as "Asian," she was very clear about all the ways in which she did not identify racially, despite what others have assumed about her. Her response stood out, in the ways in which she highlighted the complexity of race and racial identity.

I wouldn't identify myself as Pacific Islander, 'cuz I'm Filipino. You, like a lot of people, think I'm like Mexican. And I'm like "No." I'm like, "I have Spanish too." But I can't even speak Spanish, so eh. I guess I identify myself as Asian, 'cuz like pacific island people think I'm Samoan. And I'm like, "No, I'm not Samoan." And they're like, "What are you? Are you like Hawaiian?" And I'm like no I'm not Hawaiian. […] Like a lot of people think I'm like Mexican, cuz like my last name is like [Latinx sounding name]. And I'm like, "No, I was born here." But then people are like, a lot of people think that I like speak Spanish because like my middle name is like [Latinx sounding name]. A lot of people on the bus, always on the bus, someone will speak mad Spanish at me. Like some random stranger that's like trying to talk to me. And then they're like, "Do you understand?" And I'm like, "No, 'cuz I'm Asian." It's kinda like the embarrassing factor, like they think you are. But like no; I'm like an Asian. And then this one time, someone thought I was viet[namese]. My girlfriend thought I was viet, like she was so sure. She was like, "You're viet," and I'm like, "No." Then she was like, "You're viet." And I'm like, "I've never been viet in my life."

What makes Gena's case unique is that not only did she describe what she *is*, she described what she *is not* but was assumed to be. She was the only participant that talked about

how she is seen by, and identified by, others at the same time as how she identifies and sees herself. While Gena identified with the matter-of-fact racial category "Asian," she described at length various racial markers – often that she had been mistaken for – with which she did not identify. These included: "Pacific Islander," "Samoan," "Mexican," "Spanish," "Hawaiian," and "Viet."

At the same time, as we see in Gena's words above, she drew upon linguistic (line 2, line 8), racial (throughout, lines 1-15), and citizenship (lines 5-7) related markers, while also even hinting at her sexual orientation (line 13), when describing how she identifies racially. For example, at lines 5-8, Gena explains that her middle and last names both mark her as Spanish-speaking, which leads to people often seeing her as Mexican – which Gena describes as frustrating. She explains an incident on the bus where someone insistently spoke to her in Spanish, eventually asking if she understood, to which she defensively responded that she's Asian so she doesn't speak Spanish (lines 8-11). Gena's response suggests that one cannot be Asian and also speak Spanish, or that being Spanish-speaking means you must be from Mexico or another Spanish-speaking country. In other words, Gena's narrative reflects a dominant assumption that Asians don't speak Spanish, racializing the Spanish language in this limited way that excludes people – like Asians – that don't look like they speak Spanish.

In terms of citizenship, Gena's response suggests that one cannot be Mexican if they are born in the US (lines 5-7), suggesting that citizenship and race are mutually inclusive, much like the way that Gena suggests Asians don't speak Spanish. Specifically, Gena is suggesting that one cannot be both Mexican and American (born) at the same time – ruling out a multitude of hyphenated racial identities. Moreover, being born in the US (line 7), but not Hawaiian (line 5), suggests a separation between Hawaii and the rest of the United States. In this way, Gena is

suggesting that one cannot be American if they are Hawaiian. Gena categorizes herself as Asian (line 3), but not Vietnamese or Samoan (or Pacific Islander, in general). This is interesting, especially given the context of advanced mathematics at Champlain High School. As I will discuss in more detail in Chapter Five, the racial make-up of AP Statistics is different from that of AP Calculus, in that historically underserved racial groups such as African Americans and Pacific Islanders are more commonly present in AP Statistics rather than AP Calculus. For Gena to identify as Asian and Filipino, yet not Pacific Islander for example, she could be understood as exerting power to occupy spaces that dominantly have not been reflective of students like her.

As previously discussed in Chapter Two, identity is an ever-changing complex notion that is made up of how we see ourselves, as well as how we are seen by others. The complexity of identity is clear in Gena's response to how she identifies racially. Gena's talk does not neatly fit within Pollock's categories of matter-of-fact or suppressed racial talk. Furthermore, through explaining her racial identity to me, Gena articulated the layers upon layers that make up who we are, in ways that might be difficult to understand and engage with.

Being Yourself in Mathematics Class

Each student participant was asked if they felt they could "be themselves" in their AP Statistics class. The motivation for this question came out of a need for understanding from students' perspectives whether they feel that their identities are affirmed in learning spaces, particularly in this case, their AP Statistics classroom. Few studies have explored if and how students feel they can "be themselves" or that their identity is affirmed within a learning context (Corey & Bower, 2005; Sullivan, 2002), while no studies have explored this in relation to racialized identities.

When asked, every student said that they did feel like they could be themselves in math class. In fact, every student expressed that there weren't any classes in which they felt they couldn't be themselves. Specifically, Carlin and Leilani both expressed that they are "the same person everywhere," implying that at home, at school, and across settings they feel they can be themselves. Similarly, Mya said she can be herself "in every class," while Jane insisted that she doesn't "feel restricted in any way" in any of her classes, suggesting that they also feel that they can be themselves, at the very least, across classrooms at their school. In the case of my focal participants, each expressed that they felt that they could be themselves in their AP Statistics class, and as we saw above, students generally felt supported by their classroom teacher. These findings together suggest that these students' learning context is one where they feel comfortable and included, knowing they are supported to learn and succeed. In the next chapter, we saw that Ms. Williams makes efforts to relate to students in her class, which is potentially a contributing factor to these students' comfort in mathematics class. That said, feeling like you can be yourself in mathematics class does not necessarily mean you enjoy mathematics or feel successful with it, ideas I explore next.

Chapter Summary

In this chapter, I introduced the focal female student of color participants, through describing their families and orientations towards mathematics teaching. Furthermore, in getting to know the students, I described what they attribute to being a good teacher, along with advice they would offer teachers – and specifically White teachers – with respect to teaching mathematics and relating to students of color. Trends amongst students' racial self-identifications was explored next, followed by a discussion around if students felt they could be themselves in mathematics class.

Throughout this chapter, I illustrated that the focal female students of color– apart from Leilani – tended to tout colorblind ideologies when talking about the qualities of a good teacher and what constitutes good mathematics teaching. This colorblind talk persisted even when focal students were offering teaching advice for White teachers. However, the students did not suppress talk of race when describing themselves. In fact, looking across students' racial self-identifications tended to reveal complex, nuanced, and non-straightforward racialized narratives around identity. And, as we will see in Chapter Five, different from their talk about teaching, most of these focal students remark that race matters for how they view themselves in relation to, and in interactions with, their peers in their AP Statistics class.

Chapter Five: The Salience of Race and Racialization in a Complex Instruction Classroom

In this chapter, I first discuss the racial composition of AP Statistics at Champlain High School, outlining that it is atypical of many upper-level mathematics classes in urban US schools, including the AP Calculus class at this school. I then inquire into students' racialized identities and experiences in the context of their Complex Instruction AP Statistics classroom with their race conscious White female teacher.

Grounded in sociological research, Complex Instruction (CI) is a teaching approach made up of pedagogical strategies aimed at increasing learning and participation for all students (Cohen & Lotan, 1997; Cohen, 1994). Through CI, teachers use cooperative group-work to teach diverse populations of students (Cohen, 1994; Cohen & Lotan, 1997). CI classrooms are organized so that small group student interaction is maximized, and issues of status are identified and addressed. Often in mathematics classrooms, students are positioned as having more or less status by their peers and teachers, through moves such as praise and body language. Being positioned as having low-status, a student can disengage with mathematics, due to being seen as less intelligent by their group-mates.

Teachers and researchers together have worked to enact and conduct research about Complex Instruction in the context of the mathematics classroom, showing that these classrooms are a productive context for student learning (Boaler & Staples, 2008; Featherstone et al., 2011; Jilk, 2010; Horn, 2007). Much of this research has found that, through Complex Instruction, teachers' assumptions around students' capabilities in mathematics have shifted from thinking Who is high level and who is low? To What does each student have to learn? What does each student have to contribute? (Horn & Little, 2010; Horn, 2007). The most notable example is that of Boaler & Staples (2008), as described in Chapter Two. Similarly, Jilk (2010), whose study

took place at Railside High, the same high school that was referenced in Boaler and Staples' (2008) study, is equally seminal. Jilk's (2010) study is the only one that I aware of that has centered race and identity in the context of a Complex Instruction classroom. Jilk used a narrative approach to focus on the mathematical identities of Latinas, and especially focused on one student, Amelia. Jilk provided evidence that Amelia (who identified as Latina, female, and "liberal"), felt that the classroom practices of Complex Instruction aligned well with her identities, and so she was supported to participate in mathematics classroom in agentic ways. On the basis of her analysis, Jilk theorized that when one feels her identity is in line with the community of practice – or classroom – in which she is situated, we display agency through our participation.

Other work related to Complex Instruction has been useful for my work. Specifically, these studies have looked in classrooms that have borrowed from the tenets of Complex Instruction, as inspiration for *some* of the teacher's pedagogical choices (e.g., Esmonde et al. 2009; Zavala, 2014). For example, Esmonde et al. (2009) investigated cooperative learning and group work within a heterogeneous urban high school mathematics classroom. They showed that as students talked about their experiences with cooperative learning during group-work, racialized and gendered narratives emerged in their stories. Similarly, Zavala (2014) studied Latinx students' narratives and identities whilst learning mathematics in a multi-lingual urban high school. She found that, while students had varying attitudes towards mathematics, they all viewed themselves as capable in mathematics, recognizing its importance for their futures. Both these studies helped articulate the role of racial, and linguistic (Zavala, 2014). or gendered (Esmonde et al., 2009) identities in learning mathematics. At the same time, both these studies

found that mathematics learning in a group-work setting shaped students' identities, academic and otherwise (Esmonde et al., 2009; Zavala, 2014).

In short, employing Complex Instruction has been shown by scholars to be tremendously beneficial for student learning as well as students' identities (Boaler, 2002; Boaler & Staples, 2008; Cohen & Lotan, 1997; Cohen et al., 1999; Jilk, 2010), yet critically examining *racialized discourse* in the context of a Complex Instruction classroom, much like this AP Statistics one, remains to be understood. While cooperative learning through CI can be beneficial to all students in the classroom, classrooms that employ Complex Instruction are not immune to processes of racialization. Therefore, while important work has looked closely at Complex Instruction classrooms as a site for supporting student learning and students' identities, this study is the first to look at students' racialized identities (apart from Jilk, 2010) and racialized and neoliberal discourses, in students' own words and in the context of an AP Statistics Complex Instruction classroom. As I will show in this chapter, students' and their teacher's discourses alike show deeply embedded assumptions around race and racialization that have consequences for how students are positioned in the mathematics classroom and see themselves in relation to others and to mathematics learning – even within the context of a Complex Instruction classroom.

In what follows, I first describe the ways in which Ms. Williams' teaching of AP Statistics reflects the principles of Complex Instruction. Then we will see evidence to support that Ms. Williams is a race conscious teacher, who makes continual efforts to relate to her students. After this, we will hear from female students of color in Ms. Williams' class about the ways in which, despite the intentions of Ms. Williams, racialized assumptions shape interactions in the classroom.

Racial Composition of Students in AP Statistics at Champlain High School

One of the first things that Ms. Williams noticed when she came to Champlain was the large number of students of color and institutional supports, such as one-on-one tutoring, that were in place. With her and the AP Calculus teacher's help, both AP Calculus and AP Statistics started being offered at this school, around the same time the school adopted a new attraction as a STEM option school. Offering AP mathematics courses at a racially diverse school such as Champlain is exceptional based on usual trends across the United States (Delpit, 1992; Flores, 2007; Oakes, 2005). At the same time, Ms. Williams remarked that her AP Statistics classroom looks different than her colleague's AP Calculus classroom. In speaking to her concern about traditionally underserved students, here Ms. Williams contrasts her AP Statistics classroom to the AP Calculus classroom at Champlain, expressing that these courses are made up of very different populations which could be sending different messages to students.

> But another thing is that socially, the messages that they're getting about where they should be or who should be there, who belongs. You know? Like even the fact that we have AP Stats and we have two sections of it now, and two sections of AP Calculus, it's so exciting to me because when I started here we had neither of those classes, now we have four. So that's really exciting. And then in the last couple years, I mean having kids in any of those classes is powerful. However, if you walk into AP Stats or you walk into AP Calc, again you will see a divide, you will see a much higher proportion of Asian, Asian decent students in Calc, and a much higher proportion of African American, East African, and still Asian American students, but even among the Asian American, like more of the pacific islanders are showing up, or you know Filipino students are showing up in my AP stats. So there's definitely a divide in the, you know, of the color

of the students in my class and so they're getting messages about what they can do and can't do.

Above Ms. Williams notes that students are getting messages about who can and cannot be successful in mathematics. A message that either comes from, or is affirmed through, the contrasting racial composition of AP Statistics versus AP Calculus.

Through informal conversation with Ms. Billings, the AP Calculus teacher at Champlain, she gave me her take on the contrast between her and Ms. Williams' AP classes. Ms. Billings, like Ms. Williams explained that across the mathematics department at Champlain, teachers are concerned about status differences between AP Statistics and AP Calculus. There is the worry that these two AP classes are turning into different streams of mathematics, with AP Statistics being considered the "easier than calc" stream (Field Notes, January 26, 2016).

One major challenge that both Ms. Williams and Ms. Billings described to me was that many students didn't see AP Statistics as an Advanced Placement class, a perception confirmed by the fact that compared to AP Calculus, few students took the AP exam for Statistics. Ms. Billings added that students look at their peers that end up taking AP Statistics instead of AP Calculus and based on students' racial identities, "low-status students" have been seen as connected to AP Statistics while "strong students" have been associated with AP Calculus. In response to this concern, teachers have been trying to send the message to students that both classes, while different, are challenging. In fact, the year I collected my data, Ms. Billings said that Champlain High mathematics teachers introduced yet another mathematics course – "Bridge to College" – with the hopes of supporting students to stay in the Calculus/Algebra mathematics stream, rather than assuming AP Statistics is an easier way out (Field Notes, January 26, 2016).

Complex Instruction in Ms. Williams' AP Statistics Classroom

In this section, I will discuss the tenets of CI, and drawing on both observational and interview data, will show how these were evident in Ms. Williams' instruction. Namely, I will outline Ms. Williams' choice of tasks, her established norms around group-work, as well as her efforts in noting and addressing status issues in the classroom. It is believed that when simultaneously enacted, these principles in CI support equitable participation and increased student learning and success (Cohen & Lotan, 1997).

Group-Worthy Tasks. CI works to engage students in "group-worthy tasks" (Cohen, 1994), which are designed to support all students to access rigorous and often culturally relevant curriculum for learning mathematics content. Group-worthy tasks require and encourage the idea of multiple abilities – an idea that I discuss further below. Tasks are open-ended and involve mathematical concepts and skills that are central to one big mathematics idea. Open-ended tasks require students to problem solve interdependently, drawing on a variety of abilities which ensures that students of varying levels of academic proficiency can make meaningful contributions to their group's learning (Cohen & Lotan, 1995).

In Ms. Williams' classroom, I observed group-worthy tasks every time I was in her classroom. During an interview, she expressed that finding meaningful open-ended tasks for AP Statistics was particularly challenging since while the textbook she had was aligned with the AP Statistics course, the tasks did not always necessarily lend themselves to collaborative work in groups. For this reason, Ms. Williams used "college board exam questions" that she felt would "work well for group-work and rich discussions." For example, on one occasion I observed students working in groups on the following task taken from a previous AP college board exam (Field notes, April 28, 2016).

Figure 1
AP College Board Exam, 2014, Question

Nine sales representatives, 6 men and 3 women, at a small company wanted to attend a national convention. There were only enough travel funds to send 3 people. The manager selected 3 people to attend and stated that the people were selected at random. The 3 people selected were women. There were concerns that no men were selected to attend the convention.

(a) Calculate the probability that randomly selecting 3 people from a group of 6 men and 3 women will result in selecting 3 women.

(b) Based on your answer to part (a), is there reason to doubt the manager's claim that the 3 people were selected at random? Explain.

(c) An alternative to calculating the exact probability is to conduct a simulation to estimate the probability. A proposed simulation process is described below.

> Each trial in the simulation consists of rolling three fair, six-sided dice, one die for each of the convention attendees. For each die, rolling a 1, 2, 3, or 4 represents selecting a man; rolling a 5 or 6 represents selecting a woman. After 1,000 trials, the number of times the dice indicate selecting 3 women is recorded.

Does the proposed process correctly simulate the random selection of 3 women from a group of 9 people consisting of 6 men and 3 women? Explain why or why not.

This task is open-ended, in that there are multiple ways to approach solving it. And, as I observed in class, it lends itself well to group-work and group conversations in class. For example, when I observed one group of students working on this task, a student began by reading the task aloud, and then each of the group members thought about it on their own for five minutes. At this point one student was really stuck in where to start so the group began chatting about their understandings and wonderings about the task, getting the student who was previously stuck on the problem engaged in a conversation. Students at this group spent at least ten minutes arguing about the task; two group members were adamant that the manager's claim was incorrect, while the other two were undecided. After much arguing, Ms. Williams came over to the group and the students asked her questions. Much like the situation below, in regards to "group questions," Ms. Williams did not answer their question and encouraged them to talk

together some more until they came to an agreement about what they wanted to ask her (Field Notes, December 15, 2016 and February 9, 2016).

When I asked if this sort of task was representative of the kinds of tasks in her classroom, Ms. Williams said that is was most of the time. She expressed that tasks always encouraged group work but sometimes they were more open-ended than at other times.

I also observed Ms. Williams engaging the students in what might be considered as "culturally relevant," open-ended tasks. For example, early in the school year, Ms. Williams gathered some information about students' racial identities and their experiences with racism. The purpose of this information was that she wanted to introduce a task about the US justice system and institutional racism, and so she wanted to know about students' experiences with racism before engaging them in a task about the criminal justice system.[6]

After the AP exam was written, Ms. Williams revisited this task about the relationship between the criminal justice system and institutional racism, as an example of a phenomenon one can use statistical methods to learn more about (Field Notes, May 19, 2016). Students were given the opportunity in groups to come up with a topic relevant to their lives that they would like to collect data and run statistical methods on. Students picked topics such as criminal record for drug use and racial identification, or food deserts based on the socio-economic status of a population in given area, and collected data through administering their own surveys and questionnaires.

[6] Unfortunately, this task pre-dates my observations in Ms. Williams' classroom. I do not have a copy of the task, and can only go off of Ms. Williams' description of the task in our interview, which I've attempted to relay here.

These tasks, like others in Ms. Williams' class, counted as group-worthy tasks both in that they were open-ended and allowed for multiple abilities. Furthermore, as illustrated above, at times Ms. Williams designed and implemented tasks that were meant to be relevant to students' lives, interests and identities – something that Ms. Williams appears to take seriously, as we will see in her attempts to remain conscious of racial identities and to relate with her students.

Organization of Group Work and Establishing Group Norms. My classroom observations indicated that, much like a typical CI classroom, Ms. Williams' AP Statistics classroom was organized such that students were working in groups as much as possible. Often at the beginning of a task, Ms. Williams would remind students about the various abilities that would be required to succeed in the given task, making it difficult for one student to dominate the group and the task. At the same time, much like in a CI classroom, during group work Ms. Williams employed instructional strategies that encouraged students to use cooperative norms and manage their own learning within their groups.

Every time I observed Ms. Williams' AP Statistics classroom, students were arranged in groups of four or five, and when Ms. Williams would go around from group-to-group, she would enforce the norm that student questions needed to be "group questions." For example, during one of my observations, each time a student called Ms. Williams over for help, she would ask a group member – usually different than the one that called her over – what their group's question was. If the student didn't know she would say, "It sounds to me like you all need to discuss this as a group and then call me over when you agree on what your group's question is" (Field Notes, February 9, 2016). In this way, students were held accountable for their own learning and for supporting their groupmates. If a student was struggling with the content, Ms. Williams would

remind the student and his/her group that they have an important learning resource – that is one another – and then come back again after they had a chance to discuss the work and support one another.

As with a typical Complex Instruction classroom, in Ms. Williams' students were expected to work together on their tasks such that they are "at the same place, at the same time" (Field Notes, December 8, 2015). What this means in Ms. Williams' classroom – as within usual CI classrooms – is that students in groups are accountable not only for their own learning but for the learning of their classmates. By being at the same place, at the same time on a task, students are ensuring that they haven't left their classmate behind; instead students are advancing together so that all of them within the group can take the time to understand and support one another to understand. Routinely, as Ms. Williams went around to engage with groups, and answer group questions, she would move one students' work to the center of the table with the idea that any given students' work would be representative of where all the students in the group were at.

Similarly, the most common assessment in Ms. Williams' class were group quizzes – another important aspect of a CI classroom – in which Ms. Williams would choose one student who must explain a solution or concept from the task that all students are working on. In this way, as with group questions, students are held accountable to, and expected to support, their own and their group's learning.

In a CI mathematics classroom, teachers are responsible for creating a classroom community that supports all students to recognize their own and their peers' intellectual strengths, encouraging students to work collaboratively to learn rigorous content (Boaler & Staples, 2008; Cohen et al., 1999). In other words, through the cooperative learning that CI fosters, "students are important learning resources for one another." In this next section, I will

focus especially on the ways in which Ms. Williams highlights and addresses issues of student status in her classroom.

Student Status: Highlighting Multiple-Abilities and Assigning Competence.

Through teachers' insistence about there being different ways to be "smart" (Cohen et al, 1999), the Complex Instruction model can disrupt typical hierarchies around intelligence and intellectual ability (Sapon-Shevin, 2004). For example, when I asked Ms. Williams about her vision of what counts as high quality mathematics instruction, she described the importance of introducing tasks in ways that students realize the varying required abilities that they and their peers can offer to their group. "It's important that each student knows for sure that they have something to offer their group. […] I might even name some of the skills I've seen in various students before they start the task, so that students know they are one another's best resource for learning" (Ms. Williams, interview). Through publicly highlighting and naming students' strengths in mathematics, Ms. Williams helps encourage the autonomy of and interdependence within each group (Cohen et al., 1999), a norm that once established is intended to lead to students feeling accountable to one another's learning.

Just as important as student accountability is recognizing varied status amongst students in a CI classroom. Drawing on expectation state theory (Berger, Cohen, & Zelditch, 1972) which describes status characteristics in group settings, CI recognizes that students come with varying (high or low) agreed-upon social ranks, which shape students' interactions, participation and learning. Status is based on perceived intelligence amongst groups and tends to mostly affect students based on their less normative and privileged identities – around race, class, gender, language, religion, etc. (Cohen & Lotan, 1997). "[S]tatus characteristics become the basis for the group's expectations for competence for its members: low expectations for low-

status students, and high expectations for high-status students" (Cohen, et al., 1999, p. 7). As a classic example of a status problem Cohen (1994) found that popular students and students who are expected to do well academically tended to dominate and influence group discussions. Research has shown that through addressing status problems, Complex Instruction can "promote equal-status interactions amongst students, creating opportunities for all students to engage with and learn from rigorous math tasks within a cooperative learning environment" (Jilk, 2010, p. 6).

I observed Ms. Williams publicly assigning competence to students seen as having low-status in the classroom. And, according to students, group work and Ms. Williams' efforts to assign competence are commonplace in the AP Statistics classroom. For example, in an interview, Jane, who identifies as Cambodian, South Asian, explained to me that "after each unit test we all get to teach each other about different things and I feel like that brings me closer to my classmates 'cuz I wouldn't be talking to some of the people that are in my class unless I was forced to, but that made it so that I get to meet new people." Furthermore, Jane told me about how through group work she gets to interact with students that normally wouldn't talk with her. "[B]ecause of the encouragement to help other kids, I get to meet new friends!", she exclaimed, saying that popular students now speak to her in the hallways because they've worked together through group-work,. Jane who was not routinely seen as a top student describes here how CI practices supported her to feel successful in Ms. Williams' class:

> Nazemi: Can you tell me about a specific time this year in Ms. Williams' class where you felt successful in math and what was it about that time that made you feel successful?
>
> Jane: So there was a unit we did on correlation and I was like really understanding the math and [Ms. Williams] encouraged me to teach others when we were doing these test corrections, because once you get a certain amount of points correct on the test

correction, you don't need to do the corrections but just help other people. And I felt like giving me the opportunity to help other people validated what I knew and what I was learning.

Nazemi: And that felt good?

Jane: Yeah.

Nazemi: How were your peers with that?

Jane: They were good. Which is why I like the concept of student-student teaching, because it helps people understand things better.

Nazemi: And that was your time to shine!

Jane: Yeah.

As Jane notes above, Ms. Williams deliberately works to increase the status of students who are struggling in mathematics compared to their peers. Specifically, Jane described here that Ms. Williams takes the time in her classroom to uphold the status of students so that they are seen as a rich learning resources to their peers. Ms. Williams worked to increase her status in her group, positioning her as a great resource for her peers and their learning.

Having a teacher recognize multiple-abilities and at the same time publicly assign competence to a student reflects the tenets of CI (Cohen et al, 1999). Assigning competence, as in this case between Ms. Williams and Jane, is about publicly naming the intellectual contributions of a student within a group, a move that is especially important when a student – like a female student of color – might have lower status in the classroom context. Research has found that through open-ended mathematics curriculum, establishment of norms around accountability and support, and "treating" status problems through "assigning competence" to

low-status students, equity can be advanced by supporting students of color to learn, succeed, and demonstrate their learning of mathematics (Boaler & Staples, 2008).

So far, we have looked at Ms. Williams' orientation towards teaching and some ways in which her AP Statistics classroom employs CI. However, it is important, at this point, to note that while noticing and addressing status issues is important, issues of power and privilege cannot always be fully addressed in the classroom context. Even if students are seen for their multiple abilities with the teacher deliberately noting and addressing unequal participation of students due to varying status in the classroom (Cohen et al., 1999), racialization is a present process and classroom contexts inevitably affect how students are perceived. Next, I describe the ways in which Ms. Williams attempts to relate to her students of color, as a teacher who is very conscious about race and her identity in relation to that of her students.

Ms. Williams as a Race Conscious White Female Teacher

As I will show in this section, Ms. Williams is a race conscious White female teacher, meaning that she takes the time to think deeply about her own racial identity and that of her students, and finds ways to affirm students' identities as racialized and as doers of mathematics.

In our interview, Ms. Williams expressed her interest in knowing how students identify racially and ethnically, so each year at the beginning of the school year students are expected to write an anonymous letter, in which they were prompted to talk about their racial/ethnic identities and their experiences with racism. Ms. Williams designed instruction to make the relationship between race and various social injustices visible. For example, she described how she designed a group-worthy task about institutional racism and the death penalty – and how this was a context, both potentially interesting and relatable for many of her students and useful for showing the power of statistical methods. Here she tells me about students' responses about

their racial identities and experiences of racism. She relayed that she was surprised at how varied their responses their levels of ease in disclosing information was – even when it was anonymously done.

> I'm very curious about students' identification and we try to get some of that out of their letter, but some of them don't open up with that. In stats, we asked a little bit later about experience of racism, because we were going to do a task about racism in the justice system and like statistics that show, like clearly show, that there is more incidents of getting the death penalty for African American male, than for White male, and also, based on not just the color of your skin, but the killer. Getting the death penalty for having killed someone, but also for who you killed. So, like to get into that task we ended up asking them about racism and what do they identify as, and so it was surprising to see what some of them identify as, and it was anonymous so it was surprising to see that some of them were very open and then others gave such vague responses.

For Ms. Williams, it was important at the start of the year to learn about her students' racial identities, especially in preparation for a task she did with students about racism in the US justice system. She found students' writing about their identities "surprising", either because of how forward students were or how vague they were. Through her extensive ethnographic study of Columbus High School, Pollock (2004) classified students' race labels or how they described racial identity, as being either "matter-of-fact" or "suppressed" all together (p. 9). Students' responses about their racial identity, in the anonymous letter they wrote to Ms. Williams, follows what Pollock (2004) found. Specifically, Ms. Williams' students' responses about their racial identities tended to be straight-forward and open (or very matter-of-fact) or vague (suppressed) all together.

Ms. Williams expressed how conscious she is about relations between her identity as a White teacher and her students' racial identities throughout our conversations. As one example, Ms. Williams describes the role she feels her racial identity plays in how she relates to students:

> Nazemi: Do you feel that your racial identity plays a role in how you relate to your students?
>
> Ms. Williams: Umm I wish that it didn't, but I'm sure that it does. […T]here's definitely like a White female expectation, there just is, I know there is. I'm not someone who tries to take on anything, honestly that tries to take on anything that's not my own personality but every once in a while when I'll be, I'll say something silly because it is just *my* silly, you know? Some kids will definitely get it and then I'll just see a look on a face that's kind of like… um sorry I'm not being clear… but it comes, like the look on a face kind of says to me that they don't see something genuine. That's so… that's so sad to me that this was my moment of really being genuine but it's still gonna register with people differently based on their identity.

Ms. Williams described here that her identity as a White teacher has a big impact on how she relates to students and how they might or might not relate to her. She expressed the worry that she might be seen as disingenuous when she makes a remark or says something humorous that could be culturally nuanced/specific and that it might be taken up differently depending on the student and how s/he identifies. At the same time in the following excerpt, we can see that Ms. Williams further describes white guilt as part of her identity that she tries to be careful about with her students.

> [O]verdoing the sympathy and guilt thing is another part I think of my identity. I think some of my students are tired of that as well. I mean like how much apology do they

want? They just, they want action they want to see things in a way that really fits everybody.

Above, Ms. Williams is implying that through apologizing to students for her racial identity it is like she is asking for sympathy for her guilt around being White, rather than taking the time to adjust to what students' needs are based on their identities. An important aspect of understanding whiteness and White teacher identity[7], according to Paley (1979, 2009), is white guilt.

A Focus on Connecting with Students, Students' and Teacher's Perspectives

I feel like she's a good teacher, I mean I think she's really understanding. I mean she'll like try to help you or like try to make sure that you're okay in the class or have a good grade

-Mya, Interview

Mya's feelings towards Ms. Williams were representative of the whole group of female students of color I spoke with. In general, when students recounted interactions with Ms. Williams, these were positive in nature and spoke to the ways in which Ms. Williams strives – through a Complex Instruction framework – to support all her students to succeed and feel successful.

Here I want to specifically highlight the narratives of Jane and of Carlin, because each of these students shared experiences that highlight Ms. Williams' efforts to connect with students, and to support them to succeed without doing the hard mathematics work for them. Here Jane

[7] A limitation of this study is that I did not engage in a full treatment of the teacher's racial identity. As I discuss in Chapter Seven, future research in mathematics education should take up issues associated with teachers' racialized identities.

tells me about a recent interaction with Ms. Williams that was encouraging and made her feel empowered to work through understanding the mathematics.

> Okay, so today we were taking group tests and me and my team we were having trouble on one problem, one specific problem, but she was like you can do it. She wasn't just telling us the answer, but she was motivating us to like use our resources and look back through old work to find the answer. And I was really frustrated today, cuz I was not understanding the answer but she kept on motivating us to use our resources and we were able to find the answer. It was like a big relief. I was frustrated because I wasn't understanding the material that was taught, but I was motivated to look back, study the book and I was able to understand.

Here Jane expressed that Ms. Williams pointed Jane's whole group in the right direction by suggesting that they look back through their resources to work through a problem they were stuck on. While at first, she felt frustrated because she wasn't understanding the math, Jane appreciated that instead of giving students the answer, Ms. Williams encouraged then to look back through their materials and figure it out on their own. Jane found this motivating and it led her and her peers to working through and understanding the mathematics.

For Carlin, Ms. Williams has been an emotionally supportive teacher, accommodating students when they need a break or when they're feeling overwhelmed in stressful scenarios, like testing for example. Here Carlin describes an experience where she really appreciated that Ms. Williams noticed her, took the moment to connect with her through sharing her own experience, and then gave her options to put her at ease and feel successful.

> Nazemi: Can you think of a recent interaction with Ms. Williams that really stands out?

Carlin: A quiz that I took and I shut down and I, I just looked at the quiz and I talked to her about it and she gave me a relatable story about how she took her AP exam and she sat there and cried and she could relate to how I was feeling during the test so she let me come in after school and take the test, or continue taking the test.

Nazemi: Wow. That's amazing. That must have made you feel a sense of relief.

Carlin: Yeah. I was, cuz I was really panicking and she told me how she was feeling and she was like, she was like you can come in after class or school to do it and I actually appreciated that a lot.

Carlin felt like Ms. Williams took the time to relate to students. When she "shut down" during the test and was "panicking", Ms. Williams noticed that Carlin was upset and came to speak with her privately. After connecting with Carlin through a personal anecdote, Ms. Williams offered to have Carlin come in later to try again more calmly to finish up the exam.

In an interview, Ms. Williams described the importance she placed on connecting with her students. Here Ms. Williams sympathizes with students, describing a tension between wanting to push students to do the mathematics, knowing that the pay-off is not always important or appealing for them.

Ms. Williams: Like a lot of our students don't know what's going to happen next, don't know if they're going to go to college or what they're gonna do after high school and they're seniors and so they're starting to I think, they're starting to feel more of a stress and the burden of that and so they just put their head down sometimes. (makes gesture of frustration). It hurts. It hurts, but at the same time I can't convincingly say 'ooh but getting these four problems down…is really important, is going to do anything to change your life.' I mean it's part of practicing a habit of mind, you know and a commitment and

dedication to what we're doing, and looking to larger picture of 'you may decide to do something in any kind of like business or you know mathematical or computer field, that would involve statistics. There are so many places that literally could involve this specific content, so keep that option open.' But just solving this problem, it's hard to be convincing that that's the make or break thing in your life when they just wanna put their head down.

Nazemi: So do you just give them a moment when they need it, and then try to get them back on track?

Ms. Williams: Yeah. Exactly. Yep. Or as long as they won't leave for like a 20-minute bathroom break, I'll ask "do you need to get a drink of water to just like refresh yourself, walk, move, and then come back and be ready to work?"

Ms. Williams describes that it's difficult to convince students that the mathematics they're doing in AP Statistics is the most important thing in their lives, because the reality is that it isn't. It appears from what Ms. Williams is saying that she tries to balance the challenge of empathizing with students and wanting to engage them in mathematics. Ms. Williams' account here is consistent with Carlin and Jane's narratives around the ways in which Ms. Williams works to relate to students, yet motivate them to work hard and succeed with mathematics. At the same time, she recognizes and empathizes with students when they might be struggling due to more pressing experiences going on in their lives outside of the classroom that affect their engagement and motivations in the classroom. As a thoughtful teacher, Ms. Williams – despite her worry about not being able to always relate to her students of color – strives to see students for who they are and how they identify and relate to them and respects them anytime the opportunity to do so arises.

In this next section I present an analysis of how some students of color feel they are positioned based on their racial identity. I will show that students' racialized narratives around assumptions around intelligence based on membership in a racial group follows issues of status as well as what Martin (2009) calls the "racial hierarchy mathematical ability". This further supports to the importance of noticing and addressing status issues in the mathematics classrooms, yet illustrates that even within an equity oriented Complex Instruction classroom, racialized narratives persist.

Amongst and Between Groups of Students: Racialized Assumptions about Intelligence in Relation to Learning Mathematics

Thus far, I have established that Ms. Williams employs Complex Instruction, is race conscious and thinks deeply about relating to her students of color. Even with the affordances of a Complex Instruction classroom and a thoughtful race conscious teacher like Ms. Williams, students' experiences in this upcoming section show that racialized discourses still run deep within and amongst their peer and racial groups. In this section, I show that focal female students of color identified racialized narratives that shape how they are perceived by others and how they perceive themselves with respect to others, in the context of Ms. Williams' AP statistics classroom.

When I asked: "Do you feel that your racial identity plays a role in learning mathematics [in Ms. Williams' AP Statistics classroom]?" all students except for one (Gena) said no. However, over the course of the interviews, all students discussed ways that were suggestive that their racial identity did indeed impact their sense of selves, their mathematics learning and their mathematics learning opportunities, in Ms. Williams' AP Statistics classroom. Based on an analysis of interviews with the students, and classroom observations wherever possible, it

appeared that the central way in which racial identity mattered for their learning and opportunities to learn was due to how they were racially seen by others, and in relation to other racial groups. This was especially true in regards to assumptions about different racial groups' intelligence in mathematics.

Gena, who identified racially as Asian, was the only student who answered "yes" to my question regarding whether she felt her racial identity impacted her learning of mathematics in Ms. Williams' class. In her response, she referenced the well-known stereotype about Asians being good at math (Cvencek et al, 2015; Nasir & Shah, 2011). She felt that because of the assumption that all Asians are good at math, during group-work she is assumed by her peers to be good at math. Specifically, she said: *"*I think it's cuz people are just like 'Asians can do math', and I'm like no, not all Asians can do math, cuz I know a lot of us don't know what the heck is going on!"

In our conversation, I asked Gena to clarify for me why people thought that Asians are good at math, to which she replied that since Asians who come to the US have already learned the math that they are expected to learn in class, they "are more smarter than the American kids. And that's why like the American kids don't understand." I cannot say with certainty from Gena's response if she herself believes the stereotype about Asians being good at math to be true. However, it is clear is that this stereotype has consequences for how Gena sees herself and how she experiences learning mathematics – particularly during group-work – in Ms. Williams' classroom, as an Asian student that struggles with mathematics. This tension between being seen as knowledgeable in mathematics because of being Asian, despite struggling in mathematics, is made evident above in my classroom observation of her working in a group.

In class, I observed Gena working with her group on their final statistics project where they were administering a survey (to their classmates at Champlain) based on a topic they were curious to explore further using statistical methods. Gena's group was made up of one Muslim female student (I'm basing this on her headscarf), one Black male Muslim student (I know this because I interviewed him), and Carlin who is mixed race (focal student in my study). Gena's group decided to explore the relationship between lack of sleep and student's race. Gena was telling me about her girlfriend (who is White identifying) that doesn't seem to understand why Gena – who has a part-time job on top of keeping up for her studies – can't seem to get enough sleep. As Gena tells me about her frustrations of keeping up with her job and school and that her girlfriend "doesn't get it" because she doesn't need to work to help her family,[8] Gena's peers in her group kept asking Gena questions about considerations they need to make for their survey. Gena seemed happy to take on a leading role in her group and use her personal experiences as a motivation behind exploring lack of sleep and race together (Field Notes, May 24, 2016), yet her positioning as a leader in the group and as knowledgeable about the topic – perhaps more experientially rather than mathematically – was noteworthy. Gena's leadership in her group suggested to me that other students likely see her as intelligent and knowing, possible because, as I observed, she was the only Asian student in her group at that time.

Leilani, who identified herself as African American, is the only other student that brought up the "Asians are good at math" stereotype, again in the context of group-work. In her case,

[8] This is another instance where class appeared to be a salient social marker for students. Gena and I had a conversation where I was suggesting that there could be factors and circumstances that, along with race, predict sleeping patterns. She seemed willing to listen to my suggestion but still seemed to see the contrast between her and her girlfriend as strictly racialized.

however, this assumption was brought up in terms of what this stereotype means for students who are not Asian, and especially students that identify as Black or African American, like her.

> I think sometimes people, you know like uh the stereotype is that Asians are really good at math, so umm when you're in a group with like all Asians and you're a Black kid sometimes you might feel like okay they're gonna think I'm not as well as them in this. Then it starts to get to your head, that you know maybe I'm not as well as them, and you know sometimes they say certain things. You'll agree with it even if you know it's not right because you're like, "Oh, they know," but sometimes you're right. So I think it's important that people just be secure with what they know and not try to feed into a stereotype or umm something that's like working against you.

Leilani's discussion of the stereotypes between Asian and Black students' contrasting mathematics abilities fits with what other scholars have found (Martin, 2009; McGee, 2016; Nasir and Shah, 2011; Shah, 2017). Specifically, it is common for students of color to talk about – and place themselves and their peers within –what Martin (2009) calls the "racial hierarchy" of mathematics. In this racial hierarchy, "students who are identified as Asian and White are placed at the top, and students identified as African American, Native American[9], and Latino are assigned to the bottom" (p. 315). Building on Martin's work which looked closely at the prevalence of racialized discourse in mathematics education (research, practice, etc.) as a whole,

[9] While Martin's (2009) racial hierarchy of mathematics refers to Native American students, an unfortunate shortcoming of much of the important work around race and racialization in mathematics education (and educational research in general) is the omission of Native American and Aboriginal Peoples. I recognize that Native American and Aboriginal Peoples have been the most underserved populations in this county's educational system. While it is not within the scope of this dissertation to attend to these populations of students, I want to be explicit that I recognized how ignored and made invisible these groups have been both historically and presently. Future research will tend to this shortcoming more carefully.

Shah (2017) interviewed various students of color in the context of their mathematics classroom. He also found that, according to students, Asian and White students were positioned at the top in terms of ability and performance in mathematics, while students who identified as Pacific Islander or Black were positioned near the bottom.

When I asked Leilani if she herself felt that the stereotype about Asians being good in math "worked against her" in the context of group work, she responded: "That's happened to me before but I kinda got over it because like I said I'm trying to get better at math, so I don't look at [Asian students] as like 'oh they know everything in math' but I just look at [Asian students] as like maybe they could, maybe they could potentially help me, but that doesn't mean that they're going to be amazing at math either." Leilani's resistance to what the "Asians are good at math" stereotype could mean for Black students is a strong example of a counter-narrative. She actively pushed against placing herself and others within the racial hierarchy of mathematics that many of the focal students reported was circulating in the classroom.

I asked Leilani for a specific example to illustrate her claim about how poorly Black students see themselves and their mathematics abilities, as compared to Asian students. In response to my query, Leilani further highlighted the negative consequences of the "Asians are good at math" stereotype for other groups of students.

> I think that I've seen people make assumptions about themselves. It's like, sometimes I'll hear, Black kids in class and they'll be like umm, they'll get really good scores on a test and then they, maybe the Asian kids got a lower score and they'll be like "Wow! I did better than the smart kid" and I'm just like wow you, you think you're not smart… like you should feel that you're smart. You shouldn't think that, that you know that you're less than them in whatever you're doing." I hear people say like "I gotta get to do

the project with the smart kids" or "I gotta sit by the smart kids" you know? So I feel like that's really degrading to, to think that uh you're not smart.

Consistent with what Shah's (2017) findings, Leilani, like many students of color, experienced the stereotype that they are not as smart as their Asian peers as "degrading" to their identities as Black learners of mathematics. However, her counter-narrative is one of resilience, of being aware of assumptions that can have consequences for her and working hard not to let them. Leilani's feelings around coping with the stereotype that Black students are not as good at mathematics relate to what we will next see with Carlin's experience.

Carlin, much like Gena and Leilani, spoke about how her racial identity played a role in learning because of assumptions about intelligence that peers made based on her perceived racial identity. Carlin identified herself as multiracial. Different from Gena and Leilani, Carlin described how she could "pass as White", pointing to how context dependent one's racialized experience can be, especially when one is White passing. Here, Carlin reveals how complicated it is to navigate her multiracial identity, especially given that both racial markers that she identifies are associated with very contrasting assumptions around intelligence (*emphasis added in italics below*).

Nazemi: Do you feel like your racial identity plays a role in your learning?

Carlin: Not so much, *but since I'm since I'm Caucasian, people, people kinda expect that I'm smarter for some reason*. And I'm like well that has nothing to do with my intelligence. It's just… kinda just a statistic. And I was like…. they.. they like… *I hang around African American, Black people a lot, and they expect me to be smarter for some reason. But I'm just me.* I'm just learning how I learn, and it's … it's weird.

Nazemi: How do you know they expect you to be smarter? Like what…

Carlin: They say it

Nazemi: They say it?

Carlin: Yeah.

Nazemi: They say it, just like straight up.

Carlin: mm hmm.

Nazemi: Like they say "you're White, you're smarter"?

Carlin: No they don't say "you're White you're smarter", it's like *when I struggle and I ask them for help, they'll be like "you're White…you should know this". I'm like well that's kinda weird. I'm also Black as well so… should I know… should I not know it because I'm Black?* Like that's weird for them to say like, so I kinda just shrug it off 'cuz I don't let that stuff bother me.

Carlin explains here that passing as White for her means that she is expected to be smarter. She describes above that when she is struggling with a mathematics concept, her peers will tell her that she should know it because she's White, to which she responds that she's also Black. This finding is consistent with Hobbs (2014) who outlined the effects on one's racial and cultural identity, when passing for White. McGee (2016), who drew upon this work, showed that while it might appear that students of color benefit from passing as White, there is also much "lost by partial or full rejection of one's racial and cultural identity" (p. 1654). She further describes that feeling pressured to limit parts of one's racial and cultural identity, is an attestation to the enduring and continued manifestation of White privilege through racism and White hegemony.

Carlin relayed to me how her racial identity impacted her learning and interactions with her peers in classrooms other than Mathematics. Here Carlin tells me about how students' perceptions of her as White played out in her History class. In fact, she related how peers

seemed to expect her to be in solidarity with a White male classmate just because she was read as White as like him.

> Nazemi: So aside from this like assumption that you are smarter, by some of your peers, are there like other sort of dynamics that you've noticed? Maybe in the class, when you're like working in groups, that might have to do with racial identity?
>
> Carlin: Kind of, cuz I appear to be White and stuff. And so when like, when they ask about like Whites and when we're learning about White history and everything in class, they kind of look at me, cuz there's not that many white people in my class, so they look at me and then I'm like 'well, I don't know what to say, cuz I wasn't a part of that' [L]ike I remember last year, there was this full White guy in class and then there was me - who's half White and half Black – and he said like a racist comment, and [other students were] like 'I bet you guys stick together' or stuff like that and I'm like 'what does that have to do with anything?' I didn't even hear the comment for it to even be connected back to me, so I was like that's weird, I don't even know this guy.
>
> Nazemi: So when that kind of thing happens, do you like try to respond by outing your racial identity of being mixed race? What do you do?
>
> Carlin: I'm just like, I just like kinda look at them like I wanna say like how dumb they sound, but then I don't say that cuz I'm more of an introvert than an outrovert, so I'll just like talk to the people that are around me, but I probably wouldn't like call them out on it.

Carlin expresses above that she feels put on the spot at times because of her perceived racial identity. Because she identifies as an introvert, she hasn't felt that she could explicitly respond to other students and their assumptions and expectations about her.

Carlin describes her frustrations towards one of her classmates in mathematics, who is a White male student (Tallahassee, whom I interviewed). Here Carlin tells me about Tallahassee and how he assumes he knows all and feels the need to be right about everything, to the point where he will even argue with Carlin's opinions about things.

> There's another boy [Tallahassee], um he's kind of the know-it-all and so when you have an opinion and it's not his opinion, he kind of like attacks you with his knowledge and stuff, and it gets frustrating because all he does it talk to you, like talk at you, he doesn't talk with you and so when I sit in a group with him all we do is argue. You can ask, you can ask anybody who has been in the group with us that all we do is argue at each other.

In fact according to Carlin, he enjoys arguing, often for the sake of getting a reaction from others.

> [Tallahassee] enjoys arguing, cuz I asked him once, I was like 'are you, are you like enjoying this?' and he was like 'I enjoy arguing' and I was like 'I don't get it' and he was all 'I like the reaction' and I was like 'I don't understand why, cuz you're getting mad too, so why are you enjoying this?' and he was like 'I don't get mad' and I thought 'of course you don't get mad.'

I did not have the opportunity to observe Tallahassee and Carlin interact with one another in class, as they had since changed groups. However, I did interview Tallahassee and I was able to observe him in a whole class setting. Tallahassee, along with the only other White male student in the class, dominated whole class discussions, and the few times I observed their small groups they dominated small group discussions as well. In my observations, he was often the first to ask a question and/or offer an answer, often arguing with students' responses in front of the class. More generally, while Carlin relayed that she is often presumed White and presumed

smart in the presence of others, when she is in the presence of this White male student she is positioned as less knowing – likely because both her mixed-race identity as well as her gendered identity is seen as inferior to a 'full White guy' (to use her language) identity.

Attempting to manage how one is seen by others is as degrading as it is futile. Carlin's stories helps us to see that while sometimes we cannot verbalize or fully make sense of why or how we are seen by others, the implications for our identities, if not spoken or understood, are deeply felt. At the same time, much like what Gena shared (e.g., she felt others assumed her to be smart in mathematics because she's Asian), Carlin shares that she is assumed to be smart because she's assumed to be White. And, much like Leilani's explanation of Black students being seen as intellectually inferior to Asian students, Carlin's anecdote describes that Black students are being seen as intellectually inferior to White students. Additionally, in contrast to Carlin's presumed Whiteness and smartness, when interacting with a White male student she is powerless due to the complexity of her identity, which is not limited to White but includes Black and female.

More generally, the students I interviewed confirmed that discourses regarding a racial hierarchy of mathematics, where Asian and White students are assumed to be at the top and Black students are assumed to be at the bottom, were alive and well in Ms. Williams' class. Regardless of Ms. Williams' stance towards students' racial identities along with her enactment of Complex Instruction practices in support of student learning, it is apparent that hierarchical racial narratives circulate and strive having deeply felt consequences for students' sense of selves.

Chapter Six: Racialized Perspectives of Students of Color: Learning Mathematics in a Neoliberal Context

> The sociopolitical turn signals the shift in theoretical perspectives that see knowledge, power, and identity as interwoven and arising from (and constituted within) social discourses. Adopting such a stance means uncovering the taken-for-granted rules and ways of operating that privilege some individuals and exclude others. Those who have taken the sociopolitical turn seek not just to better understand mathematics education in all of its social forms but to transform mathematics education in ways that privilege more socially just practices. (Gutiérrez, 2013, p. 40)

As previously discussed, in Chapter Two, this study benefits from bringing together sociocultural perspectives of learning and identity, along with critical race theory. Within this increasingly neoliberal sociohistorical context, drawing upon Gutiérrez (2013), as cited above, a sociopolitical stance can help expose knowledge, power, and identity whilst making explicit the institutional ways some people are privileged through the exclusion of others. I began this work with the assumption that all learning contexts are racialized with race and power as salient. Additionally, in this work, the identities and narratives of female students of color are worth centering and privileging to uncover the racialized and neoliberal nature of the contexts in which these students are situated.

In education, there has been a longstanding debate that education in a capitalist society largely reproduces class and serves the labor market through how it stratifies students. As seen in Chapter Two, some scholars have shown that mathematics education closely follows the market-driven goals of a neoliberal agenda (Apple, 1992, 2000; Atweh & Clarkson, 2001; Atweh et al., 2008; Ernest, 2009; Gutstein, 2008, 2009; Martin, 2013). At the same time, as previously

discussed, racism is a useful tool in moving this neoliberal agenda forward. As Apple (2006) has shown, neoliberalism has structured US educational institutions to become increasingly for-profit, in ways that tend to leave out poor people of color, while upholding unquestioned dominant (white) ways of knowledge production. Neoliberal educational agendas, such as Bush's No Child Left Behind and Obama's Race to the Top, encourage weakening the power of teacher unions, corporatizing schools, and imposing top down accountability measures that place the responsibility on individuals such as school leaders, teachers and even students (Lipman, 2012, p. 7-8). Ideologically, neoliberalism convinces individuals that they have agency and choice in how they participate in (or better yet consume) the marketplace that is in this case their school. Through this line of thinking, "[s]chooling is organized around productivity (high test scores) and preparing a globally competitive workforce, not human development and social responsibility" (Lipman, 2012, p. 13).

Mathematics has long been considered a gatekeeping subject (Martin et al, 2010; Stinson, 2004; Stone, 1998). This means that through tools such as institutional racism (Martin, 2008) and social stratification (Stanic, 1986), mathematics education has been structured to give access and privilege those already in power – namely White, heterosexual, wealthy males, leaving poor people of color in their already assumed social tier. While social class is not a focal marker of identity in this study, race and social class are intertwined facilitating the way in which power and privilege are passed on "to the children of the wealthy and whites" while "students from less affluent families and certain students of color" continue to be disadvantageously left behind (Diamond et al, 2004, p. 75). This means that students' varied educational opportunities, based on their social stratification and racialized experiences, has much to do with ever-increasing neoliberal trends in the US education system.

As Lave (1988) has shown through her discussion of functional theory, the claim that schools are just and treat all students alike, inequalities can often be framed as a question of merit (p. 8). While I discussed this theoretically in Chapter Two, in this chapter I will present an empirical analysis that illustrates how holding on to internalized neoliberal notions around individual responsibility and meritocracy can leave students of color in a difficult and powerless position. They can – often without their knowledge – blame themselves for their circumstances, feeling that more effort on their part must be needed, rather than recognizing that systemic barriers exist that limit their opportunities to learn and succeed.

The devastating effects of neoliberal and meritocratic discourse on our educational institutions – and in turn mathematics classrooms – is tremendously important to understand. There has been little work that brings together ideologies of neoliberalism and racialized discourse, and no work from the student perspective. We are faced with knowing some about teachers' curricular and pedagogical choices within an increasingly neoliberal context, yet we know very little on this subject from the perspective of students (Lipman, 2012; Martin, 2013). As teachers and teacher educators we need to know and understand more about student's realities, so that we can support students' sense of selves and mathematics learning at the same time. What if we could know from students themselves, how they view themselves and their mathematics learning in relation to their racial identities? Would we see signs of both racialized and neoliberal discourse present in what they say?

In this chapter, I seek to answer this query. Specifically, the data examined below shows that students' narratives around enjoyment and success or struggle with mathematics followed neoliberal ideologies where students took on all the responsibility for their struggles in mathematics. They rarely attributed their struggle to the teacher or the teaching, only to

themselves. Throughout this analysis, every attempt was made to explore the subtext of what students said, and in doing so, it emerged as important to connect these narratives to larger neoliberal discourses that exist in our society.

Grades and Enjoyment in Mathematics

> It is hard for any school child to enjoy a subject if they experience repeated failure, which of course is the reality for many young people in school mathematics classrooms (Boaler, 2002, p 9).

In contrasting mathematicians' enjoyment of math to the lack of enjoyment we see in school aged children, Boaler (2002) makes the case for the importance of teaching and learning problem solving skills in mathematics. In doing so, Boaler suggests enjoyment is important in part because it is connected to experiencing success in mathematics. Consistent with Boaler's argument, we will see in this section that the female students of color in my study attributed their enjoyment of mathematics to their feeling of success in mathematics – all of which was overwhelmingly connected to their grades in math.

As Oppland and Martin (2016) found, "while grades carry weight in institutional contexts, lower grades at any particular time do not fully capture disciplinary expertise" (p. 9). Even so, with my hope of de-centering grades as the marker of success in mathematics, when students and I spoke, grades often came up as related to mathematics success and enjoyment. For reference, students' usual grades in mathematics are summarized in Table 4 below, along with what they feel it takes to succeed in mathematics, and to what they attributed feeling less successful. As Table 4 shows, grades tended to range from a C to an A average in mathematics, from middle school until their senior year / the time of these conversations.

The female students of color varied as to whether they enjoyed learning mathematics. Jane was the only student participant that expressly did not enjoy learning mathematics, saying: "Math has always been my hardest subject. You know I've always, compared to my grades, I've always felt I always fell behind in math and it's a little bit harder for me to grasp the information." As someone who enjoys learning mathematics, Lia said that math has always been her favorite subject, and so she enjoys learning math because all she has to do is "do my work and get good grades so that I can pass the class," again implying that higher grades is an indicator of enjoyment of mathematics. This relationship between high grades or success and enjoyment of learning mathematics is unsurprising, as it has been shown by others (Boaler, 2002).

Somewhere between enjoying mathematics and not enjoying mathematics is where the remaining students' feelings lay. Both Gena and Leilani expressed uncertainty, by saying "I think I do" enjoy learning mathematics, as if they weren't sure if they liked learning math or not. While Leilani didn't expand on this thought, Gena went on to tell me about skipping a grade level of math in middle school, something she attributed to being good at math. "I think it's because I was good […] at math, and the fact that I picked it up so quick" (Gena, Interview), implying again – despite not being sure about if she liked learning mathematics – there is a positive correlation between being good at mathematics and enjoying learning mathematics.

Mya's feelings towards mathematics varied over time, meaning that while she used to enjoy learning mathematics in middle school, this feeling shifted for her over the years:

> [Math] actually used to be like my favorite subject when I had like my favorite teacher and then when I got to like Algebra 2 here in sophomore year it just, I didn't have a good teacher […] Now it's okay like I don't not like it but I don't love it at the same time, like

> I just do it 'cuz I have to do it. Like I feel like it's better than last year's math 'cuz I was in precalc last year and it was kinda like really hard for me but this year is like easier than precalc so it's just, I dunno, I don't really enjoy it as much.

Mya's feelings towards mathematics and her enjoyment of learning mathematics shifted based on the teacher she had and whether or not she found the math content to be easy. Mya attributing her enjoyment of mathematics to the person teaching it is a unique and important case that I discuss further below. Aside from the attribution to the math teacher, Mya is suggesting again the relationship between finding math easy or feeling success in math and the enjoyment of mathematics, when she expressed liking math more this year than the last, but still not as much as she used to.

Gena is the only other student that referred to sources outside of herself in regards to why she got a lower grade than she expected. Gena said that she ends up with lower grades in math because: "we didn't really have a lot of things to grade, cuz we do a lot of like group work." For Gena, doing group work meant less opportunities for graded work, and even sometimes she felt when they did graded work it didn't end up counting for her grade, making it even harder to pull up her grade. "I did all my homework but I don't think she graded that like in the grade book[10], like when we get graded but it's not in the gradebook but I'm like 'why did I do it then?'" At the same time, Gena expressed her frustration with the mathematics textbook explaining that often she will do something correctly but second-guess herself and her answer because of the textbook, and then it turns out the textbook has a mistake or wrong answer.

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[10] A grade book is where the teacher keeps all students' grades. For something to not end up in the grade book, means it does not count towards the students' final grade.

Along the same line, while Carlin recognized that with learning "you don't get everything right away," when it came to mathematics she said "I enjoy it when I get it," expressing that as long as she understood the mathematics she was learning and she felt it was easy and she could be successful at it, then she enjoyed learning it. Carlin further clarified, when it comes to learning math, she does "get it most of the time" meaning she does generally enjoy it. With all students attributing the enjoyment of learning mathematics to being successful at it.

Table 4
Focal students' common grades and measures of success in mathematics

Name	**Common Math Grades**	**What it takes to succeed in Math**	**Why aren't you succeeding? Why did your grade slip?**
Carlin	B or C	Being persistent, Time management	"Mainly cuz I'd just like given up and I'd stopped trying in class. And then in middle school I had all Bs. […] It was just like a lot of work, and everything started meshing together and it was like different classes and everything and I was just not focused." "Mainly my focus, cuz I tend to like go off topic or think about other things and then I won't remember what I was supposed to be doing, and so when I try to get back on track it's kind of hard."
Gena	C+ or B-		"I think it's cuz like we didn't really have a lot of things to grade, cuz we do a lot of like group work" "I think it's cuz like, I think it's like 1. It's either too hard and I can't get it or it's too like it explains in the book it's like the book says this is how you do it and how I'm doing it is wrong [when it isn't, and the book was wrong]. I think it's just so hard to get your grade up"
Jane	B	Hard work, Dedication	"Well I think math is a lot of self-teaching and prior knowledge from previous years. And I just feel like I never really was really interested, so it's like a domino effect when you're not interested and you're not getting stuff from 8th grade it carries on to 9th grade, it carries on to 10th grade so it's kind of my fault that I'm doing bad" "Lack of motivation, to take charge and doing, studying, participating… it's all about what you put in and what you get back."
Leilani	B or C	Studying, Getting help inside and outside of class, Taking advantage of tools and resources	"Uhhh I didn't study… well enough, I was being lazy or just not… I was like ohhhh I'm a procrastinator so sometimes I blow things off until the last minute and I'll be like I'm gonna get this done and then like, it's be like 30 minutes before and I'll be like oh! Let me do it now. Sometimes I do that and I think that really messes me up with things […]Yeah. I've always been a procrastinator, but (laughs) I dunno I need to work on that, I'll wait until the last minute to like do something, sometimes, not all the time, but I'll wait until the last minute to do something. In writing that's always been easy for me

			because I'm a good writer so I can like wait until the last minute and then make, do something and I'll usually do good at it, but when it comes to like math or science, that's not.. I need to stop doing that"
Lia	B	Listening	"Umm either not being there or not doing work or something. Or like not doing good on a test"
Mya	B or A	Making sure you understand right away, Asking questions	"umm probably because I feel like honestly not like every assignment I know not everybody like does their best on it so I feel like if I don't get a grade that I expected it's like probably because I didn't do my best on it like I should have so I would like maybe talk to the teacher and like maybe ask if I could redo it or something or like ask questions about it or like how I redo it or fix it or like make it higher you know, like that. […] I think it was probably me like I probably needed to like spend more time on it and like do it more efficiently like you know cuz sometimes like when I do assignments I feel like I'm just rushing like I'm writing just whatever down, sometimes people don't really like take the time to focus on the problem so I do that sometimes and that's probably why."

Individual Responsibility for Mathematical Success

> It's kind of like your education is your responsibility and you need to do whatever it takes to succeed.
>
> –Jane, Interview

For students, their enjoyment of learning mathematics was related to their feeling successful with it – and feeling successful in mathematics often meant achieving high grades. All but one student (Gena) and I spoke about what it takes to succeed in mathematics. Most students expressed that succeeding in mathematics was on the individual – meaning that it is the responsibility of the individual (in this case this student) to do certain things in order to succeed. Mya's anecdote above makes her an exception to the rule, as she associated her enjoyment in mathematics as well as her success to having different teachers. In other words, with the exception of Mya, for these students, success in mathematics had little to do with the teacher, teaching or the curriculum. This is remarkable but also unsurprising, given that educational institutions tend to teach students of color to take responsibility for their circumstances, and put forth that success is about merit.

Pointing to work ethic and taking on all the responsibility for one's learning, Jane said that "hard work and dedication" was what it takes to succeed in mathematics. Similarly, Carlin said that it was important to "be persistent and keep going and trying." She explained sometimes she feels like she shuts down when doing a test, so she has learned the importance of "time management." According to Carlin, one can feel more successful as long as you "don't get caught up on one thing and just continue going and then come back to it and then if you're stuck with that just like take a breather." Carlin and Jane both suggested taking full responsibility for their learning – in fact they did not refer to their teacher, their peers, their classroom or their schools when it came to deciding what it takes to succeed in mathematics. Students' responses about what it takes to succeed in mathematics are summarized in Table 4 above. The lack of mention of peers is surprising given that these students are learning AP Statistics in a Complex Instruction classroom, in which they routinely worked in small groups.

The remaining students (Lia, Leilani, and even Mya) all spoke about the importance of listening carefully in order to succeed with mathematics. Lia said that "listening" was important "cuz sometimes it's confusing and it you just listen to how they're explaining it, then it would be easy" to understand the math. Mya – who earlier attributed some of her success in mathematics to her teachers – spoke to the cumulative nature of learning mathematics and thus the importance needing to understand the math right away: "If you don't' get the last [topic] then you're not gonna get like the new one." Mya elaborated that it is important to "understand [the math] like right when they kind of explain it to you […] cuz if you don't understand then, then it's going to be kind of hard to like understand it later cuz math is like new stuff every time." Here, she suggests that if one doesn't understand right way it's their responsibility to ask questions so they

don't fall behind. Keeping up with mathematics learning was the responsibility of the learner, according to Mya.

While like Mya and Lia, Leilani valued listening carefully as a tool for success, her ideas around what it takes to be successful were unique in that she highlighted the importance of the student seeking help *outside* the classroom. Leilani said that being successful in math means "a lot of studying" and "making sure you get help outside of class." She insisted that "you can't just depend on help in the classroom you also have to reach out and get help outside of the class." Mya and Leilani both referred to tools outside of the classroom for helping with mathematics, however in Leilani's case – being the only one to refer to one's role outside of the classroom in order to succeed with math – these tools were described as a necessity to succeeding, rather than where to go for help as needed. Specifically, Leilani said that students should use "tools outside of the class, like khan academy" or other YouTube videos that help you learn math content and keep up.

Here, I further expand on this claim, but focusing especially on how they made sense of instances in which they felt they were *not* successful in mathematics. Excerpts from student interviews, describing to what students attributed not doing well, are captured in Table 4 above. Along with a low grade on a test, Lia also said that having a decreased sense of success could be due to being absent or not keeping up with her work load. Similarly, Carlin knew that a lower grade was the indication that she was no longer feeling successful in mathematics, citing that while she had Bs through her middle school math years, along with her freshman and sophomore years, her grade plummeted to a D in her junior year of high school. She attributed this lower grade to less effort on her part, saying "I'd just like given up and I'd stopped trying in class […] It was just like a lot of work, and everything started meshing together and it was like different

classes and everything and I was just not focused." Carlin expressed that even in the current year, her grade dropped for similar reasons. For Carlin, feeling less successful was her fault, due to a loss of focus. "I tend to go off topic or think about other things and then I won't remember what I was supposed to be doing, and so when I try to get back on track it's kind of hard," said Carlin.

Similarly, Mya attributed a loss of focus to not doing as well as she expected, saying it's because "I didn't do my best on it." Mya felt that sometimes she would rush through her work ("I'm just rushing") rather than "really like take the time to focus on the problem." Leilani, like the others associated lower grades with her own actions and habits. Here she describes that often she procrastinates and then rushes through the work, and because math is not easy for her she can't do well when she rushes through it.

> I didn't study well enough, I was being lazy or just […] I'm a procrastinator so sometimes I blow things off until the last minute and I'll be like I'm gonna get this done and then like, it's be like 30 minutes before and I'll be like oh! Let me do it now. Sometimes I do that and I think that really messes me up with things. Yeah. I've always been a procrastinator, but (laughs) I dunno I need to work on that, I'll wait until the last minute to like do something, sometimes, not all the time, but I'll wait until the last minute to do something. In writing that's always been easy for me because I'm a good writer so I can like wait until the last minute and then make, do something and I'll usually do good at it, but when it comes to like math or science, that's not. I need to stop doing that.

Leilani much like Mya and Carlin, said that when she isn't learning as she would like, it's because she isn't taking the time to focus on mathematics. In our conversation, Leilani often contrasted math to writing, and in this case expressed that while leaving work until the last

minute worked okay for writing, in mathematics (and science) it was not a good strategy and thus affected her performance in those subjects.

In most students' accounts of taking individual responsibility, race or other forms of identity were not explicitly invoked. In contrast, suggesting a belief that mathematics ability at least to some extent is an innate quality (Devlin, 2000), Jane's explicitly talks about ability being located within the individual.

Jane's account of her grades in math was indicative of the common association between high grades and success. Here Jane explains that in all her classes but Math, she is used to getting As, which means that she is not a good student in math. She then goes on to explain why she feels she doesn't do well, despite all her hard work.

Jane: I get Bs. Yeah, Bs mostly. Which is different than my other classes, I'm usually good, a good student in other classes, math is probably the hardest.

Nazemi: What do you mean by good student?

Jane: As. I mean getting As.

Nazemi: So you consider a good student to mean getting As, and because you're not getting As in math you don't consider yourself a good student?

Jane: Yeah. It's that As are typical for me, except for math.

Nazemi: Is that true in prior years too?

Jane: Yes. Always.

Nazemi: Why do you think that is? Why with all the hard work, and retesting and all these opportunities, why do you think you still get Bs?

Jane: Well I think math is a lot of self-teaching and prior knowledge from previous years. And I just feel like I never really was really interested, so it's like a domino effect when

you're not interested and you're not getting stuff from 8th grade it carries on to 9th grade, it carries on to 10th grade so it's kind of my fault that I'm doing bad.

Nazemi: So you feel like it's impossible to catch up when it's compounding year after year?

Jane: Yes.

Jane blamed only herself for not being able to make good grades and be successful with mathematics. Some of her ideas about math being difficult, and difficult to keep up with because of its cumulative nature, was a commonly held view, expressed in a variety of ways by most other students, as we've seen above. When I asked Jane to what she would attribute not doing as well as expected in mathematics, she said it would have to be due to a "lack of motivation, to take charge, and studying, participating," again taking full responsibility for a lower grade or lower sense of success in her math learning experience. She said that when it comes to learning mathematics "it's all about what you put in and what you get back," hinting at meritocratic ideals that those that are successful in math must be so due to their innate ability and intelligence. In response to my wondering about if there were other indicators to her success or lack thereof, aside from grades, Jane responded: "No. I'm pretty sure what I have in here (points to head) is what I'm getting back." So, while Jane began to imply that taking charge and studying had to do with being successful with mathematics, she also expressed that the idea that you either have the ability or you do not, falling again with the prevalently held view that mathematics – to at least some extent – is an innate ability that you either have or do not have.

Unique to Jane's story was her motivation for trying hard to get good grades and succeed in mathematics and school in general. Jane was the only participant that tied her racial/ethnic identity to why it mattered that she do well in school. Here, she explains that because of her

family's – and especially her dad's – hardships and experience escaping genocide and not being able to secure good employment due to a lack of education, Jane wants to have a better job so that she isn't seen by her children as uneducated and tired.

> I think I try, based on my cultural background. You know my dad survived a genocide and he came here I think his freshman year of high school, so he was just thrown into this whole new system, new learning and he was only able to get a high school diploma, so he was working minimum wage jobs and I see him suffer and be tired when he comes home. So it motivates me to be successful so that I don't have to see, so that my kids don't have to see me being, I dunno, uneducated and tired every day, unhappy and all that stuff.

While this narrative has less to do with the neoliberal context in which students' stories and realities are placed, we can see here that there are very real structures in place that make it difficult for students, and their family to participate fully in the advantages of a capitalist society. In Jane's case, war, migration, labor and working class jobs due to a lack of education are things she's seen her father experience so the onus is on her to make different choices – especially around education so as to not end up in the same hardships as the generation before. While immigrant student identities are not focal to this study, for Jane this was a salient part of her identity that contributed to the pressures she placed on herself to succeed despite, according to her, not having the innate ability to do well in math.

My findings are consistent with other studies, namely Zavala (2014) who found that most of her Latinx participants "expressed a view that mathematics achievement is a matter of individual motivation and race is not and should not be a factor" (p. 68). It is unsurprising that students looked to themselves rather than looking at structures in which they are located. As Martin (2009) suggests, consistent with Bonilla-Silva (2006) as discussed in Chapter Two,

touting a colorblind perspective allow the perpetual image of fairness amidst dark neoliberal times. The impression that everyone is equal and that we are in a colorblind and presumed-to-be-post-racial era (Bonilla, 2006), privileges "individual effort over contextual constraints such as navigating a racial hierarchy of success in mathematics" (Martin, 2009, as cited in Zavala, 2014). Finding out from students about the interplay of their mathematical and racial identities, as I have done here, helps to uncover neoliberal and racialized discourses that favor meritocracy and self-blame.

Concluding Remarks: Racialized and Neoliberal Discourses of Students of Color

Most of the students I spoke with were insistent about bearing full responsibility for their own learning. Students' narratives about their grades being lower than they expected points to neoliberal ideologies of individual responsibility, as well as meritocratic notions that those who succeed have an innate ability to do so. While most students attributed not doing as well as expected in math to something in their own immediate control, such as motivation and work ethic, all students associated high grades in math with success in mathematics.

Ultimately, learning about students' ideas around success in mathematics, helped uncover if and how students were seeing themselves as competent doers of mathematics and what this meant for their identity development in the context of learning mathematics. It turned out that students tended to not see themselves as competent doers of mathematics, attributing this either to something they did not do or an innate ability that they lack. Additionally, students' sense of responsibility for their learning and their success was overwhelmingly high – which is important to consider in conjunction with the previous chapter where I examined the - Complex Instruction with a race conscious teacher – classroom context in which students' racialized narratives take place.

Chapter Seven: Contributions, Future Research, and Implications for Practice

The purpose of this study was to attend to the narratives of students of color in an upper-level mathematics classroom, in order to better understand how experiences shape students' mathematical and racial identities whilst learning mathematics in an increasingly neoliberal sociohistorical context. The classroom was purposefully selected to be one in which equity-oriented instruction – namely Complex Instruction – was employed by a White teacher who considered her racial identity with respect to her students' identities and made explicit attempts to engage in discussion around race and racism. In this chapter, I highlight the main findings and contributions of this study in relation to the important scholarly work it builds upon. From there, I speak back to the theoretical underpinnings that I've drawn upon for this research. Next, I describe the limitations to this study, leading to ways in which future research will address these limitations. This chapter ends with the implications of this research for teacher educators and leaders of professional development, as well as teachers.

Main Findings and Contributions

It is worth noting that most studies around race and identities in mathematics education have squarely focused on one racial group – often Latinx (Gutstein, 2003, 2005; Gutiérrez et al., 2011; Jilk, 2010; Oppland-Cordell, 2014; Zavala, 2015) or African American (Berry, 2008; Martin, 2000, 2006; McGee & Martin, 2011; Nasir et al., 2013; Spencer, 2009; Stinson, 2006, 2008). Exceptions include McGee (2016), who looked at both African American and Latinx students, and Esmonde et al. (2009), who looked across various racial social location. My study looked across racial lines, much like Esmonde et al. (2009), in order to capture the complexities of identities and racialized experiences in the mathematics classroom.

Each of the three analysis chapters of this study were organized around one of three (rather than four) of Martin's (2000) levels for examining the identities of students of color. Chapter Four focused on the intrapersonal level of students' identities, while Chapter Five focused on the classroom context, and Chapter Six looked at the sociohistorical level. In the remainder of this section, I describe in greater detail the main findings of this study, whilst engaging with literature upon which this study was built.

Racial Hierarchies Persist in a Complex Instruction Classroom. Much of the work around equity-oriented mathematics instruction in secondary schools – particularly Complex Instruction – has been void of issues around race and the process of racialization. While research suggests that Complex Instruction supports students' mathematics identities as well as their opportunities to learn and succeed in learning high-quality or ambitious mathematics (Boaler & Staples, 2008; Cohen & Lotan, 1997; Cohen et al., 1999; Jilk, 2011), research had not inquired into how this type of instruction is experienced by students of color, or how racialized discourse might persist in such classrooms.

In Chapter Five, I showed that within the focal classroom, like other Complex Instruction classrooms, students' academic identities and learning opportunities appeared to be supported. However, I also illustrated that even with high-quality implementation of Complex Instruction by a race conscious teacher, this AP statistics classroom continued to be a site in which racialized discourse persisted regarding how students are positioned as doers of mathematics in relation to how they racially identify or are identified by others. Various focal students' narratives revealed that racialized assumptions were routinely made by their peers regarding these students and their abilities in mathematics. The narratives regarding students' positioning in terms of intelligence in mathematics and racial group membership reflected what Martin

(2009) called the racial hierarchy of mathematics ability. Particularly, students recounted ways in which peers positioned Black students as less capable in mathematics than Asian and White students. However, focal students also exhibited counter-narratives and resisted the racial hierachy. For example, Leilani, a Black student, explained that while she remained aware of the racial hierarchy, she worked to actively resist dominant racial narratives around Asians being good at math because of what this meant for her and other African American students. Her counter-narrative allowed her not to let the stereotype work against her. More generally, this study suggests that pedagogical innovations like CI, while equity-oriented, still need to consider the racialized narratives that circulate within the classroom and its members, and find ways to disrupt them.

Students' Racialized Perspectives Reflect That They Are Learning Mathematics in a Neoliberal Era. In Chapter Six, I showed that while my focal students expressed assumptions about their and their racial group's ability vis-à-vis other racial groups, following and navigating what Martin (2009) called the racial hierarchy of success in mathematics, they also conveyed talk that followed colorblind and meritocratic ideologies. This could only be explained in relation to the larger sociohistorical context within which these students and their mathematics classroom are situated. Drawing upon an understanding of how neoliberalism plays out for people of color and their identities in larger social contexts helped me to make sense of these focal students' internalized meritocratic discourse.

Scholars agree that the social paradigm in which we have been situated for decades has been and is increasingly becoming neoliberal in nature (Anyon, 1980; Apple, 1992; Bowles & Gintis, 1976; Giroux, 1981; Harvey, 2005; Lipman, 2012; Martin, 2013; Wilson, 2007). This means that, as we have approached a presumed-to-be-colorblind era, neoliberal discourse and

institutional racism have together created a reality that feels deterministic, especially for poor people of color. Whiteness and thus white supremacy persists as privileged and in power, under the pretense that this position was earned through merit. The consequence is that people of color, and especially poor people of color, have been led and encouraged to believe that the inequitable circumstances in which they are struggling are located within a just and colorblind context, meaning they must be at fault for the conditions that have been imposed upon them.

Understanding the way that neoliberalism and institutional racism are at play within our sociohistorical context is tremendously relevant and important for our schools, classrooms and ourselves as teachers and students. Very few scholars have communicated the importance of situating mathematics classrooms and mathematics learning within a neoliberal context – Atweh et al. (2008), Lipman (2012), and Martin (2013) are notable exceptions. In my study, drawing on this important, yet rare, work has been helpful in better situating and understanding students' racialized narratives that emerged.

Specifically, I showed that the six focal female students of color both are subject to and participate in racialized and neoliberal discourses, when talking about themselves, others, and learning mathematics. In other words, this study helps to understand student identities from these students' own perspectives and as situated within larger neoliberal trends that impose colorblind, and race-neutral ideologies, internalized by those most affected by it. Students' narratives revealed the racialized and neoliberal nature in which students see themselves, in relation to others and in relation to their learning. For example, when students spoke about what it takes to succeed in mathematics, they all described innate mathematics ability and/or the need to bear full responsibility for one's mathematics learning. I postulated that these ways of talk are unsurprising given the larger social context in which students are located that teaches people –

and particularly poor people of color – to take full responsibility for their circumstances and struggles, leaving external factors such as the teaching, the curriculum, as well as the systems and structures in which they are situated, hugely unquestioned. That said, there were exceptions. Gena and Mya attributed characteristics outside of themselves for struggling in mathematics. In this case, Gena and Mya were those holding counter-narratives and beginning to realize that there is more than just what one is capable of controlling, as a student, within an educational system.

Students Articulate Counter-Narratives Regarding the Relevance of Race in Teaching and Learning Mathematics. In Chapter Four, at the intrapersonal level, as we got to know focal students and their orientations toward teaching, it became clear that all of them – except for Leilani, who exhibited a strong counter-narrative – adopted a colorblind stance towards teaching and teachers. They expressed more-or-less that as long as a White teacher was unbiased and treated all students the same, race would not matter in relating to students or in teaching them. On the other hand, as described in Chapter Five, all students identified ways in which racial hierarchies persisted in the classroom regarding who was positioned as "knowing" mathematics. There were instances of counter-narratives in both cases, some of which I reminded the reader of above. As another example of a counter-narrative, recall that Leilani remarked that White teachers need to become aware of their own stereotypes and work to eliminate them so that they aren't acting on them and creating environments of learning that have negative consequences for students of color.

Moreover, all students in the study spoke about race in complex and nuanced ways. Recall, for example, how Gena expressed layers upon layers of social constructs and assumptions around citizenship, birth place, language, culture and race, when sharing about her

own identity and how others made sense of her. More generally, based on these findings, as I remark on below, it would benefit teachers and others to understand and learn from students' talk about race.

Speaking Back to Theory: Why Sociocultural Theory needs Critical Race Theory, and The Importance of Attending to Neoliberalism

Sociocultural theories of learning and identity have been helpful for situating students' experiences within various contexts and over time. Through a sociocultural theoretical lens, I situated students' intrapersonal identities within their classroom and sociohistorical contexts. Nesting students' experiences in this way allowed for meaningful connections across the various levels of identity. However, sociocultural theory, in and of itself, does not foreground that all contexts are racialized (Esmonde & Booker, 2016). Relying on it alone, therefore, does not help one uncover structures of power that operate across settings.

Race and power have tremendous consequences for students of color. I therefore found it essential to bring Sociocultural Theory together with Critical Race Theory. Critical Race Theory allowed me to begin with the assumption that race matters, and supported me to find out how and why it matters for these focal students. Namely, I drew on Critical Race Theory to center race and privilege the racialized narratives – and counter-narratives – of my focal female students of color. As suggested above, at times these narratives reflected dominant discourses, for example, colorblind ideologies that suggest that race is not relevant to learning and relationships between teachers and students, and meritocratic discourses that encourage students to take full responsibility for every aspect of their learning, even the structural aspects that are out of their hands. At other times, their narratives ran counter to these dominant ideas, challenging

colorblindness and meritocracy. Regardless of being dominant or counter, these narratives were always racialized in nature.

In bringing together Sociocultural Theory and Critical Race Theory, I found it especially useful to draw on Martin's (2000) framework for making sense of students' racialized identities at various levels of investigation. As a reminder, Martin's framework includes four levels of investigation: (1) the sociohistorical level, (2) the community level, (3) the school level, and (4) the intrapersonal level. In my study, I considered the classroom level in place of the school level, and I did not attend to the community level. While Martin's work has been foundational in my study, in my data there emerged a need to examine the sociohistorical level as one that is neoliberal in nature, and this framework did not give me the tools to do this. After all, it is through the sociohistorical structures of racism and neoliberalism that students are led to believe that we live in a non-discriminatory post-racial society where power and privilege are attained through hard work and merit. On the basis of my findings, it appears important that future work centering race and identity take into consideration the context of neoliberalism.

Limitations of the Study and Future Research

I want to start this section with being explicit about the importance of intersectionality. Because we are built from many intersecting social locations, research always benefits from centering the lives of those at various historically underserved intersections of identity. This study does not do this, but future work will pay closer attention to race with respect to other social locations, some of which are described as follows.

Centering a Spectrum of Gendered and Sexual Identities. Two social markers that are missing in this iteration of my research are gender and sexual identification. In my study, while the focal students were all female students of color, I did not center gender as part of my

analysis. Additionally, the gender identification of my participants was limited, in that I did not know more than how they identified in the most gender normative of ways. Just as this study looked across various racial identifications, I intend for future research to look across various gendered and sexual identifications. This means that in future work I will take the time to more explicitly center gender and sexuality, and particularly I will take a nuanced regard to gender and sexuality, recognizing that both gender identification and sexuality are located within a spectrum. Few studies have looked at gender in mathematics in these nuanced ways – the only one I know is Mendick's (2006) book *Masculinities in Mathematics*. I would like to take the opportunity of "queering mathematics" in future work, drawing on queer studies to inform this important work.

Centering Students' Socio-Economic Identities. In this study, while class was not an explicitly centered focus, it continued to be relevant when articulating the increasingly neoliberal social contexts in which students and their classrooms are located. While this study looked some ways in which neoliberalism and racism work to be mutually supportive so making the lives of people of color – and particularly poor people of color – difficult, class was not a central focus of my analysis of students' racialized narratives. Like gender, it emerged out of the data as relevant. As we know, in this country, disparities, whether based on gender or race for example, all have very real socioeconomic consequences (Lubienski & Gutiérrez, 2008). This to say that while class was not an explicit focus of this study, it is important to note that participants' experiences are shaped not only by race. Future work should make it such that class is more explicitly a focus of studies around students' identities and experiences in mathematics.

Centering Marginalized Racial Identities. In this study, notions of identity were limited to racial identity, and even so were limited in span. Specifically, within racial identities, a shortcoming of this research was that I did not have participants who identified as Indigenous or

Native American. In the United States, much of the concern that exists around African American (and often male) students is often an even larger concern for Indigenous groups and Native American populations. These groups in general, and the experiences of students who identify with these groups, have been by and large ignored and remain unknown. Given the geographic relocation I am embarking upon soon after this dissertation is complete, I am expected and excited to address this shortcoming in mathematics education. In the future, my efforts – especially around centering students of color and empirically inquiring into questions around racial and mathematics identities as embedded within classrooms and within the larger sociopolitical climate – will aim to squarely center Indigenous and First Nations populations.

Whiteness and White Identities. It is important to find out how these sorts of neoliberal and racist discourses (for example the racial hierarchy) are being communicated – and this entails inquiring into the production of whiteness in mathematics classrooms – especially in classes with predominantly students of color. However, I would like to explicitly state that I have no intention of centering White identities or whiteness in future work. Situating myself in my research is important to me, and I am not White. Nor am I White passing. In fact, the one time I was read as White, I was shocked and upset, and all I could hear in my head was the NOFX song entitled "Don't call me White."

That being said, I would like to suggest that White mathematics educators take up theorizing and empirical inquiry into White teacher identity, particularly regarding White teachers that teach mathematics to predominantly students of color. My study aimed to theorize and empirically explore the racialized narratives and identities of students of color. I would like to see future work center the White teacher's identity, within a similar context (upper level equity-oriented mathematics classroom). I would imagine this work to be like this study, but

centering the teachers' narratives and identities, vis-à-vis her self, mathematics teaching, her students, and her profession.

A Time and Place. Data collection for this study ended prior to the 2016 US presidential election. While the election, in my opinion, exposed longstanding (rather than new) social issues, it was a moment after which the lives of everyone in the US, and arguably in the entire world, changed drastically. While I have not been allowed to spend much time in the US since this current Trump era (a situation I wish to further write about elsewhere), I have experienced and seen some of the ways in which the lives of people of color – and particularly Muslims – have shifted for the worse. I share the hope, with others, that this era will bring about new solidarities and growth. I am hopeful that we are moving towards practicing anti-oppression, rather than just dropping the trendy term that is intersectionality. This being said, in terms of future mathematics education research, I intend to look to how students' racialized narratives and identities – particularly those of students identifying as Black and Muslim – might have shifted post the 2016 US presidential election.

Community Level of Inquiry into Identities. As noted above, in mapping my research onto Martin's (2000) levels of inquiry for students' identities, I did not attend to his proposed community level, which exists in between the classroom level and sociohistorical levels of students' identities and experiences. Looking at the community level – namely family and community members – would benefit our understanding of students' racialized narratives and identities. In fact, as part of this study's data collection I was able to gather some information about the focal students' families and at-home lives. This information included things like what sort of expectations about mathematics learning and success come from home, and to what extent these expectations varied when considering parent(s), grandparent(s) and whether the

focal student is the eldest child of the family. That said, future research – in line with what some important work Jackson (2011b) has done – would benefit from engaging students' families in discussions around identities and mathematics experiences at the community level.

John Henryism in Mathematics Education. Along with considering the necessity of exploring the community level of students' identities and experience, there are other lenses that can be useful in understanding and making sense of students' racial identities and experiences. Particularly, much like the importance of situating this study within the larger neoliberal climate, John Henryism is a lens common to the field of social psychology (Steele, 2010; James, 1994) that could shed light on trends within racialized and meritocratic narratives in the context of mathematics education. John Henryism initially comes from early 1970s health-related research that "demonstrated that 'high effort' coping (i.e., sustained cognitive and emotional engagement) with difficult psychosocial stressors" was a common response (leading to hypertension) for working class African American men in the Southern United States (James, 1994, p. 165). More broadly, since that early research, social psychologists have shown that often poor people of color learn to, and tend to, cope with difficult – and often racist situations – through an increase in effort (James, 1994). To date there are few studies in education – Steele (2010) captures the bulk these in his book about stereotype threat and management – and no studies in mathematics education, that employ John Henryism as a lens with which to look at the resilience of responses to social stressors experienced by students of color.

Future interdisciplinary work – between mathematics education and medicine or psychology, for example – could benefit from drawing upon the hypothesis of John Henryism. Specifically, it would be useful to mark the physiological or psychological effects students of

color trying harder to succeed mathematics as a coping response to systems and structures that are unfair and thus not built with their participation or success in mind.

Implications for Practice

Resistance is a symptom of the way things are, not the way things necessarily should be.

-Ahmad White, from the TV show Atlanta

In the case of a classroom like this one, at first glance one could assume that equity has been achieved as there are a large number of students who identify racially with historically underserved populations engaged in an Advanced Placement mathematics course. While having a disproportionate number of people of color in a negative circumstance (like in prisons, low-tracked courses) signals inequity, having an appropriate representation of people of color in a positive circumstance does not necessarily signal equity. In other words, as Gutiérrez (2012a) indicates, access to high-quality mathematics is only one aspect of equity; the other aspects being achievement, power and identity. Access refers to the resources and learning opportunities that are made available to students, while achievement has to do with access to, participation in, and success with mathematics. Identity has to do with attention to oneself and to others with the intent of supporting one's sense of self, and power is about social transformation (Guitierrez, 2012a). Highlighting student success, persistence, resistance, and resilience, as an increasingly large body of work has done (Berry, 2008; Carter, 2005; Ellington, 2006; Martin, 2012; Martin & McGee, 2011; McGee, 2009; Stinson, 2008; Thompson & Lewis, 2005) is important.[11] At the same time we cannot stop there. We cannot simply give students access to upper level

[11] Some scholars have called the resistance of students of color in mathematics as their "oppositional identity." See Gutstein (2002), Gutstein (2007), Martin (2000).

classrooms, yet leave them to fend for themselves in the hopes that they are resilient enough. As Ahmad White suggests above, meeting hardship with resistance or resilience is a symptom of a problem, a problem of inequity. It is not on students of color to take full responsibility for their learning and figure out how to succeed in mathematics, all while remaining true to their sense of selves.

Leaders of Professional Development (PD) and teacher educators ultimately have the job of supporting students, through their support of teachers. This means that a leading goal of teachers, teacher educators, and PD leaders is to serve and support the varying needs of diverse student populations. For this reason, all implications discussed here are most relevant to students (and specifically students of color), being that they are among those most affected. Yet, while students are most affected by the circumstances of their classrooms contexts, it is the on teachers, and in turn teacher educators and PD leaders to know about students' experiences and their identities and find ways to support their identities and their success in mathematics. For this reason, this section is organized as implications for teacher educators and PD leaders, followed by implications for teachers.

Implications for Teacher Educators and PD Leaders. Teacher educators and PD leaders are tasked with supporting teachers, who in turn support students. It is essential that teacher educators and PD leaders – whether or not they are supporting Complex Instruction – first understand and second work to address the racialized narratives that exist in the classrooms of the teachers they support.

First, by understand, I mean that teacher educators and PD leaders must believe that race and racism affect students of color, their learning and their identities, even within an equity-driven context of instruction. More generally, as educators, we often hope that alternative ways

of instruction have the power to push against racialized and neoliberal discourses. Yet, I found that in a classroom (in a mathematics department) that employs Complex Instruction, in which students are purposefully engaged in group work to contribute collectively to solving problems, racialized and neoliberal discourses persisted.

Second, by address, I mean that teacher educators and PD leaders need to raise questions of race and racialization through discussions (for example around the racial hierarchies in mathematics) with the teachers they are supporting. This requires that teacher educators and PD leaders are aware and willing to address the sociohistorical context in which the teachers they support are teaching.

In my own teacher education program, I took to heart a guiding principle that we learned in theory: as teachers, we have a social responsibility to students as well as an academic responsibility. In practice, this is a complicated task. Teacher educators must model for pre-service teachers how to do this. By taking the time to know pre-service teachers and recognize, and accommodate as much as possible, their out of school lives, teacher educators can show teachers that taking on a social responsibility is a task that can be upheld along with upholding the curriculum one has to teach. It is this balance that my focal students attributed to good teaching, taking the time to connect with students and know what's going on in their lives. If students are asking for this, then as teacher educators we need to teach teachers how to do it.

In order to support teachers in talking about race and their students' lives, teachers could spend some time engaging with case studies during their teacher training or professional development. For example, why not show teachers how Gena describes her identity and have a discussion around how complex, nuanced, and intertwined language, citizenship and racial identity can be? Or show them that even in an equity-oriented classroom with an excellent

teacher who is race conscious, racialized narratives – most often dominant in nature – persist. For example, show teachers what Leilani has to say about what the assumption about Asians being good at math means for students like her who identify as African American. In other words, there is power in engaging teachers in discussions regarding what students of color say about their experiences in mathematics classrooms – and how to disrupt the dominant racial hierarchy in mathematics. This could be facilitated by showing teachers the advice my focal students have for White teachers, such as Leilani's advice about becoming aware of your assumptions based on race so that you can work to eliminate them rather than act on them.

Implications for Teachers. In this study, the focal students showed us that even when a teacher is doing important equity-driven work in the classroom, students are still grappling with narratives around race and racialized experiences. Said differently, the narratives and experiences around race and racial identity, that students in this study have shared, create a different equity demand than being a teacher that just thinks about race and tries to incorporate culturally relevant curriculum.

Specifically, teachers need to understand and respond to the racialized narratives that are in their classrooms. Teachers, whether or not they are purveyors of Complex Instruction, and more broadly equity-driving teaching initiatives, must take into consideration not only that their students are subject to processes of racialization, but also that their classrooms are not immune to racialization and the larger neoliberal context in which they are situated.

In particular, through students' own voices about their own narratives, teachers can help surface what students of color learning mathematics might be experiencing in their mathematics classrooms. Ms. Williams' students' anonymous letter about their racial identities and experience is one way teachers can begin to do this. Without reaching out to know students, a teacher has

limited access to students' identities, usually only how they are identified by school level data and what the student has shared with the teacher. By noting and privileging the voices and racialized experiences of students of color in the mathematics classroom, teachers can better connect with students, learn more about them, and support student learning and students' identities at the same time. This is a tall task. It will require seriously difficult work on the part of teachers – much of whom are White and female – who must take the time to examine their own racial identities, for themselves and in relation to their students.

Along with gathering information and making oneself aware of students' racialized experiences and identities, teachers need to find ways to engage with students in conversations around race and racism, within the context of mathematics tasks as well as the broader context of mathematics learning and assumptions around ability. I agree with what Shah (2013) suggested in his dissertation that looked closely at racialized discourse amongst students of color in mathematics. Specifically, teachers can immediately and consistently address assumptions around race and ability by treating "explicit invocations of racial-mathematical narratives with the same level of gravity as they would blatantly racist statement" (p. 120). Student learning and students' sense of selves are what's at stake when racialized narratives circulate in the classroom. It is up to teachers to make note of and disrupt these racialized discourses that have a harmful impact on students' identities, mathematical and otherwise.

Recall that at Champlain, AP Calculus is primarily composed of White and East Asian students, while AP Statistics is primarily African American and Pacific Islander students. The mathematics faculty has been concerned about the perception of AP Calculus and AP Statistics as two racialized mathematics tracks. I recall this because addressing racialized discourse (such as the racial hierarchy of mathematics that students experienced) cannot happen only in the

context of one classroom, but needs to happen across all classrooms and across entire schools. Discussions like those amongst the mathematics teachers at schools like Champlain are necessary, and from there immediate action is also necessary. Together, teachers and school leaders can and should find ways to ensure that their classes are disrupting racial hierarchies, and that individual students should not and do not bear, alone, the responsibility for succeeding in mathematics.

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Appendices

APPENDIX A-1:

INTERVIEW PROTOCOL FOR TEACHER INTERVIEW ONE (PRE-OBSERVATION)

(Expected to take 60 minutes)
Thank you for taking the time to meet with me today. As you know, I am interested in hearing about your experiences teaching mathematics at this school and to this particular group of students. I am going to be asking you questions about your teaching choices, how you interact with your students, your views on mathematics instruction, and how you interact with all the students in your classroom.

Before we begin the interview, I want to remind you that participating in this study is voluntary and your responses are completely confidential. At any point during the interview, if you would like me to turn off the recorder, just tell me to do so.

Do you have any questions before we begin?

Part I: Participant Information

1. How long have you been teaching mathematics?

    a. How many years of that have been at this school?

    b. Where did you complete your teacher training?

    c. What mathematics courses have you taken at the college level prior to teaching mathematics? What mathematics methods courses have you taken at the college level prior to teaching mathematics?

2. What mathematics classes do you teach?

    a. What grade level(s) do you teach?

    b. Are the classes you are teaching grouped/tracked by skill level?

    c. Which class would you like me to observe and ask about? (Explain that I would like to have 25% or more students that identify as being of color).

    d. What are the primary resources and/or text/curriculum you use to teach [chosen] class?

3. What are the most important challenges of teaching mathematics in this class?

a. Is that a challenge for other classes or is it particular to only this class?

b. Is that a challenge for all the students in this class or only some of them? Which ones? Why do you think that is?

c. What do you do to address this challenge?

Part II: Vision of Quality Instruction

Now I'd like to ask you a few questions about your view of high quality mathematics instruction.

4. If you were asked to observe another teacher's math classroom for one or more lessons, what would you look for to decide whether the mathematics instruction is high quality?

*Notes to interviewer:

- Probe on depth/specificity of response until you understand what the participant describes (e.g., If a teacher says "student engagement," ask "Engaged in what?").
- Keep the form/function distinction in mind. Ask participants why they think ____ is important (e.g., Why do you think it's important for kids to work in groups? Why do you think it's important to hold a whole class discussion?).
- If the interviewee talks about the structure of discourse (who's talking to whom and when) probe on content (and vice versa). If the interviewee says, "Teachers (or students) should be asking questions," probe to find out the kinds of questions the teacher (or students) should ask and for what purpose, as well as whether they conceive of discussion as happening in whole class settings and/or in small groups alone.

a. Is there anything else you would look for? (Ask BEFORE probing on the following issues.)

b. What are some of the things you would expect to find the teacher actually doing in the classroom for instruction to be of high quality?

c. What kinds of problems or mathematical tasks would you expect to see the students working on for instruction to be of high quality?

i. Can you please describe a _____[use the word or phrase—e.g., "task" or "problem"—that the participant used for "task"] that you would consider to be of high quality?

d. Can you please describe what classroom discussion would look and sound like if instruction were of high quality?

i. Would you expect to see the entire class participating in a single discussion, or would students be talking primarily in small groups?

e. Can you please describe what the introduction of a lesson would look like if it was of high quality?

i. In your view, what's the purpose of introducing the lesson in that way?

Part III: Instructional Practices

5. In your own classroom, when the students do not learn as expected, what do you find are typically the reasons?

a. Probe for how teacher categorizes groups of students and what behaviors/ characteristics s/he ascribes to the various groups. For example, "I hear you saying that the boys have a harder time than the girls working in small groups. Why do you think that is?"

b. Are all of the students motivated in your classes?
   i. If not, why do you think they are not motivated?

c. (If the teacher has not brought up African American students or ELLs yet, please ask the following; if you know that there are not ELLs on this campus, you don't need to ask about them.) In general, I am aware that disparities exist regarding African American students and English Language Learners' achievement in math. Do you have any concerns regarding low-performing African American students in your classroom?
   i. Depending on what the teacher tells you, probe regarding why/the source of the problems s/he describes.

d. Do you have ELLs in your classes? If so, Do you have any concerns regarding the ELLs in your classroom?
   i. Depending on what the teacher tells you, probe regarding why/the source of the problems s/he describes.

6. (Build on what you find out in the question above regarding categories of students. For example, if the teacher says s/he has ELL students and some of them struggle, ask, "How do you adjust your instruction, if at all, for your struggling ELL students?") Do you feel you need to adjust your instruction or different groups of students?

a. If not, why not?

b. If so, for which groups of students?

c. How do you adjust your instruction?
   i. Do you adjust the tasks you use? If so, in what ways? (Please ask for examples).
   ii. Do you group students? If so, how?

d. If the teacher teaches different "tracks" of students, ask: Do you find you teach differently in your honors class than you teach in your regular class? In what ways?

7. Do you offer extra help to students before school, at lunch-time or after school, for example? What groups of students tend to need this extra help (i.e. what groups of students do you have in mind when you are offering this extra help)? What groups of students tend to take advantage or attend these extra help sessions?

Part IV: Self-Identification and Interactions with students

8. How do you identify racially? Please explain.

a. (How) do you feel that your racial identity plays a role in how you relate to your students?
b. Do you feel that you relate to all your students? (Probe about where students of color fit into this response – if relates to all students, only students of color, only white students, only students from the community or not…)

9. How would you describe your interactions with your students of color, compared to other students, in a whole class setting?

a. Can you describe a recent time in class that stands out where you felt good about your interaction with a student of color in front of his or her peers?
b. Can you describe a recent time in class that stands out where you felt concerned about your interaction with a student of color in front of his or her peers?
c. Does this differ when you are interacting with students of color one-on-one (instead of in a whole class setting)? If so, how?

Closing Question:

10. Is there anything that we haven't talked about that you would like to tell me so that I can better understand your experiences in teaching this class and these students? Recall that I want to get at how you are interacting with your students of color with respect to the whole class.

APPENDIX A-2:
INTERVIEW PROTOCOL FOR TEACHER PARTICIPANT
(POST-OBSERVATION)

(Stimulated Recall; Expected to take 30 minutes)
Thank you for taking the time to meet with me again today and for allowing me to observe your classroom. As you know, I wanted follow up with you since I've now had a chance to talk with some of your students and observe your class a couple of times. I am still very much interested in hearing about your experiences teaching mathematics at this school and to this particular group of students.

For this interview, we will be using a method called Stimulated Recall. Basically, I will play back segments that I've video-recorded from your classroom and ask you to recall what you might have been thinking at certain times and/or why you might have made the choices that you made. I can pause the tape at various points or play the segment numerous times if you prefer to ease this process.

Before we begin the interview, I want to remind you again that participating in this study is voluntary and your responses are completely confidential. At any point during the interview, if you would like me to turn off the recorder, just tell me to do so.

Do you have any questions before we continue?

Play whole video or segments of video for teacher participant. The segments I choose and the questions I might ask are not yet clear. These depend on what the teacher has said about his/her interaction with students in the last interview, what students have said about the same sort of interactions, and these prompts and questions also depend on what I will have observed relative to what I've been told by both the teacher and that students. Additionally, the teacher might want me to focus on particular segments of the video depending on how she felt that the lesson went that day.

Possible approaches include (in order to assist teacher's recall and help with analysis):

-Have teacher think aloud about the video as it's played
-Use a series of structured but open-ended questions (that are description-thinking-noticing-alternative behaviors structure or reflective on the study's focus) during or immediately after viewing the video
-Have teacher list thoughts about the video during or after viewing
-Have teacher compare what takes place in the video to what they might have responded in the first interview.

APPENDIX A-3:
INTERVIEW PROTOCOL FOR STUDENT INTERVIEW

(Expected to take 30 minutes)
Thank you for taking the time to meet with me today. As you know, I am interested in hearing about your experiences with learning mathematics at this school. I am going to be asking you questions about your mathematics teacher and classroom, how you interact with your mathematics teacher, your views on learning mathematics and being successful at it, and the supports and resources that have been provided to help you succeed.

Before we begin the interview, I want to remind you that your participation is completely voluntary and so you at any point if you decide you don't want to answer some or all questions just let me know. Similarly if you would like me to turn off the recorder, just tell me to do so.

Do you have any questions before we begin?

Part I: Participant information

1. So first off: What math class(es) are you are currently enrolled in?

2. How long have you been at this school?
a. Where were you before this school?
b. Did you have the same math teacher prior to this year?

3. Do you live nearby this school? Who do you live with at home?

Part II: Grades and Success in Mathematics

4. In your opinion, who is the best math teacher you've every had?
   a. Can you tell me about a specific time when you felt really successful in ____'s class? (What is it about this time that made you feel successful?)

5. Do you enjoy (learning/doing) mathematics in general?
   a. How about learning/doing mathematics in this math class?

6. In your opinion, what does it take to be successful in math, in general?
   a. What does it take to be successful in this math class?

7. What kinds of grades do you tend to get in math? (How are your grades this year in math compared to last year and the year before? – find out about two years prior so that you can know about transition from elementary or middle school) Why do you think this is?

8. When you don't get a grade that you expected or don't learn something as you or your teacher expected, what do you find is the reason(s)?

Part III: Interactions with Math Teacher

9. How do you identify racially? Please explain.
a. How do you feel your math teacher treats you compared to other students in your class? Why do you think this is?
b. Do you feel that your racial identity plays a role in how your teacher relates to you?

10. How do you feel about your mathematics teacher? In your opinion, how do you think he/she feels about you?
    a. Can you tell me about a recent interaction with your teacher that was really good?
    b. What about a recent time that you thought was not as good?

11. Think back to a recent time where you were able to interact with your mathematics teacher one-on-one. Can you please recount this experience to me? (Probe for how this made the student feel).

12. Some students feel that they learn math differently, do you feel that you learn differently than your peers? If so, do you feel like your teacher supports your different learning style?

Closing Question:

12. Is there anything that we haven't talked about that you would like to tell me so that I can better understand what it's like for you in this math class? Recall that I want to know about how your teacher interacts with you (as a student of color).