Journal of Urban Mathematics Education
December 2009, Vol. 2, No. 2, pp. 18–45

Social Identities and Opportunities to Learn: Student Perspectives on Group Work in an Urban Mathematics Classroom

Indigo Esmonde
University of Toronto

Kanjana Brodie
University of Toronto

Lesley Dookie
University of Toronto

Miwa Takeuchi
University of Toronto

In this article, the authors investigate group work in a heterogeneous urban high school mathematics classroom. Two questions are explored: How do students describe cooperative group work in their mathematics class? How do students describe the way their socially constructed identities influence the nature of their group interactions in mathematics classrooms? The authors present a case study of the ways in which race, gender, and other social identities might influence the nature of group work in reform-oriented high school mathematics classrooms. The analysis, based on 14 interviews with high school students, focused on students' perceptions of group work and their theories about when cooperative groups work well and when they do not. Students named interactional style, mathematical understanding, and friendships and relationships as the most influential factors. Using an analytic lens informed, in part, by critical race theory, the authors highlight the racialized and gendered nature of these factors.

KEYWORDS: cooperative learning, gender, identity, mathematics education, race

---

INDIGO ESMONDE is an assistant professor in the Department of Curriculum, Teaching, and Learning at the Ontario Institute for Studies in Education (OISE) – University of Toronto, 252 Bloor St. W., Toronto, ON, Canada, M5S 1V6; email: iesmonde@oise.utoronto.ca. Her research interests include equity and identity in mathematics education, sociocultural theories of learning, and teacher education for social justice.

KANAJANA BRODIE is an undergraduate student in the Equity Studies program at the University of Toronto; email: kanjana.brodie@utoronto.ca. Her research interests include minority representation and educational equity.

LESLEY DOOKIE is a recent M.A. graduate and current research assistant in the Department of Curriculum, Teaching, and Learning at the Ontario Institute for Studies in Education (OISE) – University of Toronto, 252 Bloor St. W., Toronto, ON, Canada, M5S 1V6; email: ldookie@oise.utoronto.ca. Her research interests include equity in mathematics education.

MIWA TAKEUCHI is a Ph.D. candidate in the Department of Curriculum, Teaching, and Learning, at the Ontario Institute for Studies in Education (OISE) – University of Toronto, 252 Bloor St. W., Toronto, ON, Canada, M5S 1V6; email: miwa.takeuchi@utoronto.ca. Her research interests include English language learners' opportunity to learn in mathematics classroom.

And then the next statement was, "I have been attracted to someone of the same sex," and absolutely everyone in the classroom sat down except for me. And I was standing there and, so uh. It was just horrendous. The next 2 weeks were just really painful to go through, and to have people treating me differently, and girls kind of like, scooting away whenever I sat near them.

– Willow, a 9th-grade, bisexual, biracial girl

Backgrounds, if our backgrounds are too different we don't get along. ...I don't know, [the teacher] always seats me with people she knows I'm gonna get into it with.
[Who do you get into it with?]
I don't know…
most of the White people in the class.

– Candie, a 10th-grade, lesbian, African American girl

In these two quotes, Willow and Candie tell the interviewer (Indigo Esmonde) about school experiences in which their socially constructed identities had an influence on their opportunities to learn. In the first quote, Willow describes an activity in a social studies class where she outed herself as bisexual, and then went through a very painful few weeks in which other girls acted uncomfortable around her. In the second quote, Candie describes her difficulty working with classmates who have a different "background." When asked to elaborate, Candie describes her difficulties with "most of" the White students in her class.

In these brief excerpts, the two students describe how some aspects of their social identities influenced classroom collaboration. (Willow describes the importance of her gender and sexual orientation, but not race; whereas Candie describes the importance of her race, but not gender or sexual orientation.) In many mathematics classrooms, students work together with their peers, in whole-class and small-group discussions. While student interaction has been lauded for its potential to support critical mathematical thinking and independent problem solving, educators have also recognized that these interactions have the potential to reinforce inequity, as highlighted by Willow and Candie's comments.

Several scholars have written about curricular and pedagogical strategies to enhance cooperative learning, and the issues of equity that might arise in cooperative contexts (see, e.g., Bianchini, 1999; Cohen & Lotan, 1997; Webb, Nemer, Chizhik, & Sugrue, 1998). Throughout this corpus of research, it has become clear that *who students are* influences what and how they learn together. In other words, issues of identity are central to the learning that takes place in cooperative

group work. Nonetheless, there is still little research that explicitly addresses student perspectives on their social identities and why or how they matter. In this article, we build on the research about cooperative learning by documenting what students have to say about group work in mathematics classrooms. Two questions guided our inquiry:

1. How do students describe cooperative group work in their mathematics class?
2. How do students describe the way their socially constructed identities influence the nature of their group interactions in mathematics classrooms?

Identity and Mathematics Learning

We use the phrase *socially constructed identities*, or sometimes *social identities*, to refer to social categories—including, but not limited to race, ethnic, or gender categories—that are often imposed on people within a particular context. We use the phrase to refer to identities that are self-imposed as well as those identities that one imposes on others. We are concerned with both because in everyday interaction people attend not only to their own identities but also to the identities of those around them. In this article, our goal is to understand more about which social identities matter in mathematics classrooms, and how they matter.

Understanding the importance of social identities in structuring opportunities to learn is especially important for mathematics education because the field has only recently begun to take equity as a central focus for research (Secada, 1995). A variety of studies have documented the racialized (Martin, 2006, 2007, 2009), gendered (Mendick, 2005), and classed (Lubienski, 2002) nature of mathematics learning in classrooms across the United States. These multiple facets of social identities operate simultaneously to structure people's lived experience. Therefore, in this article, we take an intersectional approach to analyzing identity (Crenshaw, 1991), and consider how people's multiple forms of identity, sometimes referred to as a "nexus of multimembership" (Wenger, 1998, p. 158), influence the nature of their experiences in school.

These social categories are complex, even more so when we consider their intersectional nature. For example, a recent study of racial identity development in high school focused on two prominent categories for African American youth: street savvy and school oriented (Nasir, McLaughlin, & Jones, 2009). In this study, Nasir, McLaughlin, and Jones demonstrated the multiple forms of working-class African American masculinities and femininities that were at play in the school. Barnes (2000), in another classroom study, developed an analysis of two types of middle-class masculinities in the mathematics classroom: one dominant and one subordinate. Both of these studies highlight the importance of recognizing the multiple ways that even a single social identity category can be instantiated in the classroom.

Therefore, the theoretical framework through which we view identity comes from sociocultural theories of learning in which learners are viewed as people-in-context and learning as shifts in identity within a particular learning context (Lave & Wenger, 1991; Rogoff, 2003; Wenger, 1998). As an analytic construct, identity allows the researcher to focus on individual experiences without losing sight of larger social contexts in which identities are constructed and made meaningful. Through participation in various kinds of social practices, individuals construct identities and have their identities constructed for them by others (Wenger, 1998). Nasir and Hand (2006) conceptualize identity as when

> individuals come to participate in a cultural practice, they negotiate an identity that is part what they have come to view as consistent about themselves in their lives, part what they perceive to be available to them in a practice, and part how they are perceived by social others. (p. 467)

In this conceptualization, the self, others, and socially organized practices all play a part in shaping practice-linked identities. Thus, identities are both enduring and shifting with each new context and experience.

The strength of the sociocultural approach is to consider identity as practice—activity- or community-based—constantly constructed and reconstructed in interaction. But the strength of sociocultural theory's focus on practice-based identities can also be construed as a weakness, given that with a few exceptions (see, e.g., Gutierrez & Rogoff, 2003; Lee, 2007; Nasir & Saxe, 2003; Nasir et al., 2009), the field has not adequately considered the ways social identities like race, gender, and class (or socioeconomic status), interact with and inform the construction of practice-based identities. Mainstream sociocultural theories are typically color-blind, and ignore the ways in which social identities are made part of the structure of everyday practices (Nasir & Hand, 2006).

The sociocultural approach has primarily been used to focus on how individuals come to self-identify within a practice, but research has also considered how identities are imposed by others, and how these imposed identities act to structure a practice (Rogoff, 2003). In the classroom, how a student identifies others can have consequences for that student's own learning, as in the case when a student decides who in the classroom is "smart" and therefore who might provide her or him assistance in her or his own learning. And how others identify a student has consequences as well, because if a student is seen as smart, for example, they are typically offered more opportunities to engage in meaningful academic activity (Cohen & Lotan, 1997).

We therefore turn to other theoretical approaches that inform our sociocultural-based analysis of social identities in schools. We provide three examples of classroom research—informed by three different theoretical approaches—that have attended to the influence of social identities in classroom mathematics learn-

ing. First, we discuss critical race theoretical approaches to study the racial and mathematical identities of African American learners; next, we discuss research on stereotype threat theory with respect to race, gender, and mathematics; and third, we discuss sociological research on expectation states theory, status, and social interaction.

First, since Ladson-Billings and Tate's (1995) introduction of critical race theory (CRT) into education, researchers have increasingly investigated ways in which race structures U.S. schools at the macro policy level and the micro interactional level (see, e.g., two edited volumes on CRT and education: Dixson & Rousseau, 2006b; Parker, Deyhle, & Villenas, 1999). For instance, Anderson and Powell (2009) used CRT to examine the role of race in constructing the historical conditions and the contemporary status of education in particular school districts and schools. Whereas, Martin (2006) used tenets of CRT to explore the racialized nature of mathematics learning for African American people in the United States. During Martin's interviews with adults, his participants described a number of ways in which White teachers responded to students' racial identities by diminishing the nature of the mathematics education they received. Along with critical race theorists (see, e.g., Dixson & Rousseau, 2006b), Martin argues that race and racism are pervasive in the United States, and that it is important to challenge claims of objectivity and alleged neutrality—often coded as "colorblindness" in educational settings and in educational research (see also Martin, 2009). Methodologically, Martin uses CRT's concept *counternarrative*, which places an emphasis on the voices of people of color to describe the effects of racism in their everyday experiences, as opposed to dominant narratives that deny the importance of race.

Second, in a psychology-based theoretical approach, Steele and colleagues have amassed an impressive body of research documenting the effect of stereotype threat on the performance of people from marginalized groups (for a comprehensive review of stereotype threat theory, see Steele, Spencer, & Aronson, 2002). Stereotype threat theory describes the threat, in "real-time," of one's performance being judged based on a stereotype. For example, African Americans can face a stereotype threat based on the stereotype that they cannot succeed academically, and women face a stereotype threat based on the stereotype that they are less mathematically capable than men. In some contexts, when (some) members of the marginalized group have reason to believe that they will be judged based on a stereotype, their performance (say, on an academic test) can suffer because of the anxiety of trying to manage the threatening situation.

Although the majority of stereotype threat research has been conducted using quasi-experimental methods, recently Nasir and colleagues have used ethnographic methods to explore the theory in classrooms (Nasir et al., 2009). In a similar ethnographic study (one that did not explicitly take stereotype threat as a

lens but whose findings nevertheless resonate with it), African American students in a school with a well-publicized racialized achievement gap reported that their peers treated them as if they were "ignorant" and expected them to struggle with their schoolwork (Rubin, 2003). In this school, even when teachers tried to build community by creating racially diverse collaborative groups, African American students were often isolated from their friends and marginalized in academic work. In diverse classrooms, students may be very aware of the ways that their teachers and peers view them as members of racialized groups, and may react to stereotype threats when they expect that others will treat them negatively because of their racial identities.

Third, we consider research on expectation states theory, a sociological theory of status that models how individuals construct expectations for one another's competence in activity (Berger, Cohen, & Zelditch, 1972). This theory states that in many situations, members of a group will act as if higher status people are more competent than lower status people, regardless of the demands of the activity. Status can be conferred based not only on social identity categories like race, gender, and socioeconomic status but also on other hierarchies such as a person's rank or credentials (e.g., well-educated people have more status; a manager has more status than the people they supervise). Classroom research has demonstrated the importance of status, highlighting how high-status students tend to dominate small-group and whole-class discussions and learn more from these interactions (Cohen & Lotan, 1997). While Cohen, Lotan, and colleagues have argued that popularity and perceived ability are the most consequential status characteristics in classrooms, social identities like race, gender, and socioeconomic status are likely to contribute to status hierarchies as well (Chizhik, 2001). Although the theoretical foundation of expectation states theory asserts that one can simply "add up" status characteristics, we argue, however, from an intersectional approach, that multiple status characteristics can qualitatively influence one another. Race is experienced differently depending on one's gender and one's socioeconomic status, and vice versa.

These three approaches to understanding the influence of social identities all point to the importance of not only analyzing how students self-identify in terms of social identities but also how they are identified by others, and how they identify others in the group. In other words, one's opportunities to learn are not only influenced by one's own identities but also by the identities of others. In short, from Martin's (2006) research and CRT, we emphasize the value of listening to narratives and counternarratives as students describe their experiences; from the research on stereotype threat theory, we consider the various stereotypes that might be present in the classroom, whether they are explicitly voiced or not; and from the research on status, we again emphasize the importance of intersectionality be-

cause of the ways multiple status characteristics might interact in classroom interaction.

This study considers how students' identities (their own identities, imposed identities, and the ways they identify others) are made salient in the narratives they tell about their mathematics classroom. We analyze a set of interviews conducted with high school students about group work in their mathematics classroom, and report on the social categories that students used to describe themselves and their peers. Drawing from CRT, we highlight the stories shared by students of color and girls, but we also include narratives from students from dominant groups, expecting that students from various social positions will tell different kinds of stories about their collaborative experiences. We discuss how various categories were invoked (or avoided) to explain the success and failure of group work for mathematics learning. Through this analysis, we contribute to a broader understanding of how social identities are made salient in mathematics classrooms, specifically as students work together in small cooperative groups.

Methods

The analysis used a case study design (Yin, 1989) in an attempt to better understand the nature of cooperative group work in one particular mathematics classroom. We were inspired by Willow and Candie's remarks on their difficulties working with peers because of their social identities, and constructed the present interview study to gain a better sense of the nature of group work in a single mathematics classroom community. (Unfortunately, Willow had left the school shortly after the interview quoted in the epigraph, in part because of the experiences she described. Candie, however, was still a student at the school at the time of the follow-up study but she had completed her required mathematics courses and consequently was not part of the focal classroom.)

Following Yin's (1989) recommendations for case study design, we outline the research questions and the related propositions, the unit of analysis, and then the research context, data collected, and strategies for interpreting the data. The research questions were: How do students describe cooperative group work in their mathematics class? How do students describe the way their socially constructed identities influence the nature of their group interactions in mathematics classrooms? We draw on interview data to describe students' perspectives on group work in a reform-oriented, urban high school mathematics class, and discuss several ways in which students argue that their socially constructed identities do (or in some cases, do not) influence their group work. The data for this analysis are taken from a set of 14 interviews that were conducted in the winter and spring of 2007. The interviews were part of a larger study examining mathematical thinking and learning at the high school level. The interviews took place at the

same school, and with many of the classmates of Willow and Candie, who took part in a related study in 2004–2005 (Esmonde, 2009b).

Although our approach to understanding identity is informed primarily by sociocultural theories, we are also informed by CRT's emphasis on "voice" in which the voices of people of color (students, parents, teachers, researchers) are highlighted as they tell their own stories (Dixson & Rousseau, 2006a). Often these stories are framed by educational researchers as counternarratives against the dominant racial (and racist) narratives of the educational community. Because this study is not limited to a focus on race, but instead discusses social identities more broadly, we chose to interview a variety of students. In our analysis, we will foreground counternarratives against a backdrop of the dominant narratives from our interviews.

Another reason to interview a broad range of students for this study is because we do not assume that race, gender, or any other a priori set of social categories are the most prominent ways that students conceptualize identity in the classroom. We recognize that most social categories are complex and contested, and that they may be strategically introduced in some contexts, and downplayed in others (Gee, 2000; Pollock, 2004). In other words, it is of interest to know whether and when students invoke race, gender, and other social categories in their narratives about mathematics classroom experiences.

At the outset of the study, we assumed that students would not necessarily openly discuss social identities that are sometimes taboo topics (e.g., race, socioeconomic status), especially if students were from privileged groups, or if they were hesitant to address these topics with the interviewers. Therefore, we designed the interview to provide opportunities for students to discuss these issues if they wanted to. By not directly asking about social identities, we could study the ways in which these categories were independently invoked or omitted by various students. We anticipated some explicit, and some covert, discussions of social identities, as well as some avoidance of this topic (Pollock, 2004).

We employed two levels of analysis for the study. The case focuses on a single classroom because we wanted to capture students' practice-linked identities for a single practice-linked community. However, we also expected that students with different social identities would have different perspectives on group work in their classroom; therefore, for our second research question that investigates the influence of social identities, our unit of analysis was the individual student. Each student lived at the intersection of multiple forms of identity, and would have a unique perspective on classroom group work that was shaped by these identities.

Research Context

The school was situated in a small urban city in northern California, USA, and was a small school program within a larger school. The larger school, Bay

Area High School (pseudonym, as are all proper names throughout), was the only high school in the city, and the student body was diverse in terms of race, ethnicity, and socioeconomic status. The small school, Media Academy, was a program that focused academically on issues of social justice as well as media studies and media production. Students in the small school applied to be part of the program, and were admitted, in part, to match the demographics of the broader school community. The school admitted between 60–90 students per year and emphasized community building both within and across grade levels.

With respect to social identity categories such as race, gender, socioeconomic status, and sexuality, the Media Academy included an explicit focus on issues that are often derived from these categories throughout all years of the program. In the 9th grade, this focus manifested particularly in the core classes of Social Studies and English in which students learned about systems of oppression and privilege. Students were encouraged to write about and explore issues of identity in writing and video assignments. In Willow's quote in the epigraph, she described an activity at the very beginning of her 9th-grade year in her core class in which issues of oppression and identity were explicitly discussed. Unfortunately, as Willow described, these conversations sometimes created unsafe spaces for some students. Additionally, in the same interview, Willow described her anger at other White students who did not defend themselves when accused of racism by students of color.

Despite efforts by teachers to provide an equitable education to all students in the school, the larger school's long-standing racial "achievement gap" was not erased in the Media Academy. In fact, during the year of this study, a group of students and teachers collaborated to educate themselves and the Media Academy community in general about racialized achievement differences in the school, advocating for more equitable educational opportunities.

With respect to mathematics, the Media Academy had two mathematics teachers in the year of this study. Ms. Delack, a White woman with a working-class background, was in her third year of teaching at Media Academy; she had taught the students of this study for all 3 years (except for three students, one of whom was interviewed, who joined the class in 2007). The three mathematics courses were de-tracked, using the Interactive Mathematics Program (IMP)[1] curriculum (i.e., all students experienced somewhat the same "level" of mathematics instruction). Students, however, had previously been tracked in middle school; therefore, a given mathematics class might contain students from different grade levels, depending on whether a particular student had taken Pre-Algebra or Algebra I in the 8th grade, or whether she or he had failed a mathematics course since

[1] For information about the Interactive Mathematics Program (IMP) curriculum, see http://www.mathimp.org/.

arriving in high school. The class we focus on in the present study was composed of 30 11th- and 12th-grade students.

Ms. Delack's approach to mathematics teaching relied on students' collaborative work. Students worked in groups on a daily basis and were responsible for constructing mathematical knowledge together. The IMP textbook did not contain the usual series of theorems, worked examples, and definitions. Instead, students were presented with lengthy word problems and were expected to work as a small group and then as a whole class to construct methods for solving the problems. Definitions, theorems, and generalizations were usually constructed in whole-class discussions, and often represented on collaboratively created posters that would remain displayed around the room.

Ms. Delack employed several techniques to help students work productively in groups. She generally asked them to ask one another questions first, and to only approach her if they could not resolve something on their own. She held what she called "process quizzes" in which groups were responsible for solving problems, while she assessed the quality of their collaboration. She held whole-class discussions in which students and teacher talked about the value of cooperative group work and encouraged all students to stay involved. In the latter half of the year, inspired by research on Complex Instruction (Cohen, Lotan, Scarloss, & Arellano, 1999), Ms. Delack began assigning roles to students (facilitator, reporter, recorder, process checker) so that each student had a specific task to perform, and groups reflected on their collaborative process every day.

Interview Participants

For the purpose of this case study, we invited all students in Ms. Delack's class to participate in the proposed study. Out of the 30 students, 14 agreed to participate. The demographics of our interview participants are listed in Table 1. All demographic information is derived from student self-identifications on surveys or responses provided during the interviews. The table demonstrates that our interview participants included both young men and young women, both grade levels, and almost all the racial/ethnic groups in the classroom. (The one Asian American-identified student in the class did not participate in an interview.)

Interview Protocol and Analysis

The first author (Indigo Esmonde) and a colleague from Stanford University conducted the interviews; both are White, middle-class women. Esmonde (the first author) was well known to the students, having conducted research and volunteering in their classroom for the past 3 years. The other interviewer (Kathleen O'Connor) was unknown to the students prior to the study, and visited the classroom several times for the sole purpose of conducting interviews.

Table 1
Names and Demographics of Interview Participants[2]

Name	Gender	Race	Grade
Namaya	W	African American	11
Tony	M	Latino	12
Tariq	M	Latino	11
Giulia	W	White	11
Haley	W	White	11
Mike	M	White	11
Noreen	W	White	11
Nuncio	M	Multiracial	11
Dustin	M	White	11
Chelsea	W	White	11
Elly	W	Multiracial	12
Karmina	W	Latina	12
May	W	Multiracial	12
Samantha	W	Multiracial	12

Interviews were semi-structured and focused on student beliefs about the efficacy of group work, and were designed to elicit stories from students about group interactions that "went well" and interactions that "didn't go well." After some initial general questions, the interview protocol was subdivided into four major sections. The first section contained questions that asked students to describe an incident in a group that didn't go well; the second, to describe an incident in a group that went well; the third, to reflect on how they might design a mathematics classroom community for effective group work; and the fourth, to describe their current group. Each major question in the subsections included a number of prompts to elicit detail from students. (See Appendix A for the full interview protocol, including prompts.)

To address the first research question, all interviews were roughly transcribed and then coded with a series of open codes. All data were coded iteratively, with new codes being added or refined throughout the process. These codes were used to capture the important factors that influenced the outcome of group work, according to students. Each of the authors participated in coding. Each of the codes was developed collaboratively, and refined until we came to agreement on examples and non-examples for each code. The four basic codes are defined in

[2] Although the category *multiracial* masks quite a bit of diversity, the term is used here because it is how students self-identified.

Table 2. (Further examples and explanations of these codes are developed in the Results section.)

Table 2
Codes for Interview Data

Code	Description
Interactional style	Utterances that describe the kinds of actions or ways of being that support or detract from group work
Mathematical understanding	Utterances that describe the ways in which the nature of a person or group's mathematical understanding supports or detracts from group work
Friendship and relationships	Utterances that describe the ways in which friendship, relationships, and feelings of comfort or safety (or lack thereof) support or detract from group work
Social identities	Utterances that explicitly make reference to socially constructed identities, and describe how these identities support or detract from group work

To address our second research question, we examined the socially constructed identities of each interviewee, and the socially constructed identities of the classmates they mentioned during their interviews. Our goal was to identify any patterns about how these identities were used or avoided, and to determine whether and how they influenced the cooperative group work experience. As a part of this analysis, we examined students' descriptions of one another to determine whether they matched or challenged stereotypes related to social identities and mathematics learning.

Our analysis of the second question was guided by both the responses provided during the interviews and the meanings conveyed through the "subtext" of the transcribed interviews (Banning, 1999). In other words, during the analysis, we drew on Banning's analysis of the internal conflicts and contradictions in a feminist course at a public university. Banning employed an analysis of the "text" (field-notes, transcribed interviews, etc.) and the subtext (the unspoken assumptions and beliefs) for her study. Similarly, in our analysis, we attempted to document the subtext of our transcribed interviews. While students did not always openly discuss socially constructed identities during the interviews, we argue that

some of their narratives employed covert strategies for discussing race, gender, and other social categories.

To explore the subtext of the students' transcribed interviews, we first identified (as best we could) the social identities—race, gender, and grade level—of all interview participants. For all participants, we collected narratives from their interviews in which they described their own interactional styles and the interactional styles of specific peers. We identified the social identities of these named students as well. (Not all of the students mentioned in this article were participants in the study, so they do not appear in Table 1.)

From this collection of narratives, we looked for relationships between students' identities and the descriptions and stories they told and that were told about them. In our search for these patterns, we were partly guided by familiar stereotypes based on race, gender, and socioeconomic status, and partly guided by any new patterns that might emerge from the descriptions and stories provided during the interviews. This approach is in keeping with grounded theory; in that, we stayed close to the data and allowed the findings to emerge from constant comparison between the interviews and a gradual elaboration of a set of codes (Glaser & Strauss, 1967). However, we were also guided by CRT; therefore, we were expecting that race, gender, and socioeconomic status (among, perhaps, other social identities) would emerge during the interviews but that these might be hidden. As Banning (1999) points out, in contexts marked by hierarchies, those with power tend to use "power-evasive discourse"(p. 160) and it would be naïve to expect them to explicitly highlight the ways in which they maintain their privilege. We next describe the themes that emerged from this grounded theory approach.

Results

Students' Perspectives on Successful and Unsuccessful Groups

In the discussion of the findings, we first describe the results of the first research question: How do students describe cooperative group work in their mathematics class? For this investigation, our unit of analysis was the entire class and we did not distinguish between individual students. The four codes (or themes) were developed through repeated analyses of the data to describe factors influencing mathematical group work. We summarize students' views on how these four factors—interactional style, mathematical understanding, friendship and relationships, and social identities—influenced success and failure of group work. In presenting the data, we attempt to maintain the complexity and internal tensions that students expressed during their interviews. The analysis for this research question might appear unrelated to our earlier comments on the centrality of social identities in mathematics classrooms. However, we feel it is important to

describe what students did focus on during their interviews before deconstructing the more covert messages of the interviews in the later analysis.

Interactional Style

The most common factor that students mentioned during their interviews was what we called *interactional style*. This category included descriptions of student personalities, and different ways of interacting in a group. For example, the following two statements were coded for interactional style:

> I felt like they've been pretty supportive. (Noreen)

> When there's people that take, I guess a dominant role in a group? And kinda work through everything themselves and just tell people the answers? Like that doesn't work for me. Just because of the fact that I need to be able to work through it for myself to really get it. I'm a very experiential learner. (Karmina)

Both statements describe styles of individual group members or the group as a whole.

When asked to describe a positive group work experience, all students agreed that "good" group work involved a combination of people who could work well together. Students emphasized the importance of sticking together as a group, solving problems together, and not leaving any members behind. There was strong agreement amongst the students in these descriptions of positive group work.

Despite this near consensus on the characteristics of good group work, there was additional complexity revealed during the interviews. Students discussed the constellation of factors that could influence the appropriate interactional style for a group, and in a related note, discussed the tensions inherent in collaborating in school when their primary responsibilities were to themselves as individuals, and not to the group. Furthermore, students differed in their opinions about whether there was a single best way to interact, or whether different individuals had different best interactional styles. We discuss each of these findings in turn.

According to the students' responses, interactional style alone could not account for the success or failure of group work; there was a set of variables at play. During the interviews, it was rare that a student's narrative about group work was coded only for interactional style. For example, students recognized that interactional styles were often influenced by the context of the group collaboration—the type of task, their level of mathematical thinking, or their comfort level or friendship with others in the group.

Students also described a tension between trying to do good group work (i.e., spending as much time as needed so that all group members understood the material) while also trying to complete their schoolwork correctly and quickly. In

other words, students were torn between their desire to be inclusive and the pressure to succeed academically. For example, some students told us they (or their peers) liked to work quickly so they could complete the homework in class and some students reported that they were reluctant to ask too many questions, because they did not want to "slow down" their peers. Noreen, for instance, reported feeling pressured to say she understood explanations from her peers even when she did not in order to allow them to move on. Her statement illustrates the dilemma faced by many students in which they had to choose between what they considered good group work, and their personal academic or social goals.

An additional complexity relating to students' comments on interactional style was found when they acknowledged the diversity of learning needs in the classroom and how it influenced group work. For example, Noreen stated, "there are certain people, with their personalities, [who] are never really going to work really, really well together, and you can't really make them." Karmina reiterated this point in her earlier quote (in which she identified herself as an "experiential learner"), implying that different students might "need" different kinds of interactions to support their learning. Thus, what might work for one person might cause difficulties for another. Several other students echoed this sentiment.

Mathematical Understanding

Students often discussed how different levels of *mathematical understanding* influenced how well a group worked together. For this code, we focused on the instances where students described how their own level of mathematical understanding, as well as their perceptions of the mathematical understanding of other students, affected the group's interactions. For example, the following statement by Haley is categorized into this code: "The groups that usually do the best, [are] where someone's really good at math and they're someone that's like broadly liked." (Note that Haley discusses mathematical understanding in the context of other personality factors, i.e., "being broadly liked.")

Generally speaking, our interview participants took one of two differing views on the optimal mathematical understanding for a group. Some students asserted that groups should consist of a heterogeneous mix of people with different levels of understanding so that those who needed extra help could ask their peers. Other students, however, argued that they preferred to work in groups where everyone had similarly high levels of mathematical understanding.

All students who advocated this second position characterized themselves as high achievers. Giulia stated that she did not like group work because she did not like being put into groups where people were "behind in math" and "don't bother" to get caught up. She preferred groups where everyone had "the same amount of math" and successfully finished their work. Noreen was another high achiever who felt that some group members with different levels of understanding "just

aren't going to work." She described the pressure of being in charge, and said she never wanted others to feel like she was "taking over" or being a "suck up." Therefore, she preferred to be in groups where others did not need her help.

Even among students who said they preferred heterogeneous (ability) groups, we heard many stories about how difficult it was to work in such groups. High achieving students who held such beliefs often admitted to feeling that their groups slowed them down and they were not always keen to stop their work to help out their peers. For example, Dustin reported during his interview that he preferred to get his work done as early as possible, rather than help out struggling students. For those who requested help from peers, such behavior was upsetting, as they felt that they were being ignored. Samantha stated, "I'd ask [a student in the group who was making progress] well, like, do you know what's going on and she would be like, 'Oh, and it's like this' and then kind of just ignore it and I'd get really frustrated." In contrast to high achievers, students who were positioned as "slower" than the rest of the group sometimes felt they slowed down their group's progress. These students reported feeling pressured to say they understood certain concepts when they did not.

Friendship and Relationships

With the code *friendships and relationships*, we focused on the parts of the transcribed interviews where students described whether or not they were friends with group mates, liked someone, had something in common (e.g., common interests), got along with people, had prior knowledge of people, and the importance of building community in the class and in the group. For example, Haley said: "I think that with the right people everyone could be working and learning. But I think that, like, with the wrong people you can really get set back."

Students agreed that friendships had both positive and negative impacts on group work and explained some associated tensions. While students perceived good relationships as necessary for successful group work, they also reported that friendship could add challenges. For example, Tariq claimed, "some friends will work good together and some friends just won't do anything."

Students said they felt pressured to socialize with friends, felt left out when they were not friends with group members, and also felt that they could not stop friends in their groups from talking with each other and getting distracted. Students pointed out that this "social talk" usually did not lead to productive mathematical work. Regarding this point, Chelsea stated that friendships can be "a drawback because if we're all so close we're going to be talking to each other." Similarly, Dustin said, with friends, "it's a little tempting to like, catch up on stuff you haven't caught up on."

The negative effects of friendships could also extend to group members who were outside of the circle of friendship. When describing one group in which she

was with two older girls who were good friends, Haley remarked, "I didn't have really like any sort of authority to get them to start working" because she wasn't friends with them. Haley, Tony, Noreen, and several other students argued that feeling comfortable in a group was an important aspect for the success of group work. When students felt comfortable in their groups they were able to ask questions without embarrassment and this supported their mathematical learning.

Social Identities

During the interviews, students rarely discussed socially constructed identities such as race, gender, or socioeconomic status. In this section, we report on many of the explicit statements that students made regarding these kinds of identities and their influences on group work. In our coding of the interview responses for this category, we searched for any explicit reference to race, gender, socioeconomic status, or other relevant identity markers. In the process of coding, we added one other type of identity that was frequently mentioned: grade level. We also coded statements into this category when students mentioned a value for "diversity" without specifying what type of diversity they were referring to. We felt that the word diversity was often a way of talking about race or culture, without explicitly mentioning this potentially controversial term (Pollock, 2004).

Grade level. Many students mentioned grade level during their interviews. Their mathematics class included both juniors and seniors, and this fact influenced students' narratives about one another. This social identity may have been related to friendship and relationships because students tended to know same-grade peers better.

The implications of this social category on classroom hierarchies were complex. On the one hand, we felt that in this high school, as in many others in the United States, the seniors were at the top of a social hierarchy, followed by juniors. A remark from Noreen illustrates this hierarchy as she described group dynamics. Noreen claimed that Kim was in "an older position" because she was a senior in a group of juniors. Because Kim was older, Noreen believed that Kim would have felt confident that people were not "taking over" and that she "had a voice." On the other hand, in this particular class, the students who were seniors had either failed or been tracked into a "low-level" mathematics course in the past. Therefore, the juniors in the course were more likely to be positioned as mathematically talented.

Race, gender, and socioeconomic status. Members of marginalized groups most frequently mentioned social categories. That is, girls were more likely to mention gender, and students of color were more likely to mention race. Only one student mentioned socioeconomic status (in an oblique way, by referring to students from "different neighborhoods" in a social context where someone's socioeconomic status could be predicted based on the neighborhood they lived in).

When these categories were explicitly raised, students often described valuing diversity—that is, having groups that included students of different racial or ethnic backgrounds, students from different neighborhoods, or half boys and half girls. For example, Chelsea, a White girl, described a group that she felt had not worked well because the group contained four "leader-ish girls." She felt that groups needed people with different personalities, linked personality with gender, and ended by saying that groups worked better when they consisted of half boys and half girls.

Although many of the students' statements superficially applauded diversity, several students described diverse groups that were not functional. Specifically, students from marginalized groups told us they preferred groups that were more homogeneous. For example, Elly, a multiracial girl of low socioeconomic status told us that she preferred to work with other girls. Elly went on to tell us that when she worked in groups she could not help but interpret people's individual behaviors through a "social justice lens." She provided, in some detail, a narrative about being grouped with two White boys and a Latina girl in which the two White boys dominated every interaction. She then pointed out that sometimes more homogeneous groups might lessen this type of power struggle.

Another student, Tony, a Latino boy, told us that he preferred to work with other people of color, and specifically Latino boys, because they socialized outside of school and he knew them fairly well. This comment was interesting, because earlier in the interview Tony had said that it did not matter "who you are." He stated that so long as students stayed focused, group collaboration could go well. We emphasize that in this remark he does not essentialize students of color by saying that there is something about these students that makes collaboration work better. Instead, he told us that his social sphere was mainly composed of students of color and that their positive social interactions outside of school supported positive mathematical interactions in class.

Analysis of Subtext of Student Interviews

After we completed the aforementioned analysis on students' perspectives of successful and unsuccessful groups, we developed an interest in uncovering some of the more subtle ways in which students' socially constructed identities appeared during the interviews. Although students rarely discussed the importance of social identities for group work explicitly, upon closer examination of student talk, we anticipated finding implicit messages about race, gender, and social identities. This section focuses on our second research question: How do students describe the way their socially constructed identities influence the nature of their group interactions in mathematics classrooms?

For the analysis of the second question, we examined the students' interview responses more closely to identify whether and how social identities might have

been implicated in their descriptions of interactional styles, personalities, and mathematics achievement. By setting individual students as the unit of analysis, we considered how our interview participants described themselves, and how they described their peers. In many cases, we had access to students' self-identifications for race and gender, and after researching and volunteering with these students for 3 years, I (the first author) also had access to the ways in which students were routinely racialized and gendered by others in the classroom. Therefore, for each interviewee, we listed all the classmates that they mentioned, the social identities that were associated with each of these classmates, and then we considered how interviewees described their classmates. For example, when Chelsea described being irritated with the way Haley dominated group work, we noted that both Chelsea and Haley were White girls. Race, gender, and grade level were the most visible categories to us. We were not, however, aware of all students' socioeconomic status or other social categories that might have been at play.

We recognize that there is danger in imposing social identities on students. We risk simplifying multiple layers of students' social identities or erasing diversity within one social category. However, we observed that these identities were routinely imposed on the students every day in the classroom. When we used the construct of social identity for our analysis, we referred to identities that are self-imposed, and also to the identities that one imposes on others. In other words, we were concerned with both self-identification and the identities students imposed on others. When we looked under the surface of students' innocuous discussions of interactional style, mathematical understanding, and friendship and relationships (or feelings of comfort), we began to make connections between these themes and students' social identities. In particular, we discuss patterns that emerged in three areas: group leadership and other styles of group interaction, the ways in which students handled the tension between getting their own work done and helping others, and student preferences for group mates.

Our analysis of the interview responses revealed a general tendency for White students to describe themselves as taking on leadership type roles in the group work and for Latino/a, African American, and multiracial students to describe themselves as taking on more passive roles. This tendency was the case even for students of color who described themselves as "dominant" or "leaders" in general. More specifically, Mike (White boy), Haley (White girl), and Giulia (White girl) described themselves as leaders throughout their interviews whereas Tony (Latino boy), Karmina (Latina girl), and Namaya (African American girl) described a general reluctance to take on such a role.

When considering the relationship between gender and roles within group work a similar pattern emerged—boys tended to be group leaders. This pattern was particularly evident in groups that consisted of all White students, or all stu-

dents of color (where gender seemed to be the most salient marker of difference between students). As one example, when Tony (Latino boy) was working with Tariq (Latino boy), Namaya (African American girl), and May (Multiracial girl), Tony described that he and Tariq took on the leadership roles and did most of the work. Tony went on to report that he and Tariq also did the group presentations. A similar example was noted in the interview with Haley, a White girl. When working with a group of girls, Haley described herself as being a leader. However, when put in a group that included boys, Haley said she took on a more passive role and described a boy who took on a strong leadership role:

> There was this guy and he was really kind of like the leader and he was really, he got everyone to do their work. …Well he just, he dominated every conversation we had, so then when he decided to do math, which he did, he wanted to do his work, he did get good grades, so when he decided to do his math, kind of our group did it. And not to say that I didn't have conversations with other people in my group, it's just he was like kind of like a leader and kind of, I don't know, I don't actually like him that much but like it's just he is good at getting people to do group work. (Haley)

As evident in these examples, students' social identities—their own, and the identities of others in their groups—became salient and likely influenced the roles they took on during group work.

During this second phase of the analysis, we found further examples of the tension that students described between doing good group work (working collaboratively and helping one another) and getting work done. The analysis of the transcribed interviews revealed that students responded to this tension in various ways, which led, in several cases, to the exclusion of some students from the group work. For example, when telling her story of a group that did not work very well together, Namaya shared her experience of being excluded that may have contributed to her frustration and lack of participation in the group:

> I was like, "what's going on?"and they kept telling me like, "hold on" and then they would just forget that I had even asked them what was going on. I had to beg them to keep me…to tell me what was going on. …I really needed them to keep me included so I could understand, but they didn't. (Namaya)

Her group members at the time were Chelsea and Chris (two White students) and Jaime (a Latino boy).

This tension between getting one's own work done and helping the group was reported many times during the interviews. However, students responded to this tension in different ways. Karmina, a Latina female, tells a story in which she chose to assist a classmate. Specifically, she recalled an incident working with Dustin (White boy), Amelia (White girl), and Kayla (African American girl):

> I was in a group with, Amelia and Dustin, and Kayla, I think. Um, and Kayla had been gone [to a youth leadership program] for a week, so, when she came back, she had a lot of catching up to do. And Dustin and Amelia are both really dominant people when it comes to, like, the work, um, so, they were kinda speeding through it, not really making sure that, we got it, and I was kinda like catching Kayla up. So, it, it was just, really weird cuz then we would get to these things and we'd be like I don't get it and then they'd get kinda frustrated and not wanna tell us, and just kinda get an attitude. (Karmina)

While Karmina was engaging in what most students would have agreed was good group work, her two peers were rushing to get the work done, thus leaving her behind. Good group work, then, does not always benefit all students.

Her peers in the group, both White students, clearly did not make the same choice. They chose not to slow down to help Kayla. We also interviewed Dustin, and although he did not specifically discuss this group, he told us that in general, when he was in heterogeneous groups, "I feel like maybe they're not getting it as fast as me, so I feel like I just wanna get it done or go ahead or whatever." These examples illustrate the impact that this tension had on various students and how, as a result, students of color were marginalized and excluded. This exclusion is even more poignant because of the way Namaya and Karmina described themselves as strong leaders in other groups, consisting primarily of other students of color.

We stress, however, that it is important not to see students of color as helpless victims in groups where they do not take on leadership roles. In Namaya's narrative above, she explained how she repeatedly asked for help from the group, but the group ignored her. She attempted to be an advocate for herself, but the other group members still excluded her from their discussions. As critical race theorists have insisted, Namaya's story about her participation in this group provides a counternarrative to the dominant stories being told about group work in this classroom. More specifically, these stories contrast with dominant narratives about students who just "don't care" and therefore do not voluntarily participate in group work (echoed in Giulia's previous narrative). Far from not caring, Namaya's counternarrative illustrates that students can be excluded from groups despite their best efforts to engage. That exclusion can lead to frustration and disengagement, which ironically may then further exclude students from productive group work.

Perhaps as a result of such clashes, we found that when we examined whom students named as good group members we noticed that, by and large, students of color identified other students from marginalized racial groups. For example, Tony, a Latino boy, explicitly reported his preference for working with Latino and African American students. He later explained that he learned better when working with these students because he felt comfortable to ask questions and to answer

the questions of his peers. When working with these students, he tried to be as "active" as he could in this group.

More evidence came during the interview with Karmina, a Latina girl, when she described working well with her best friend Samantha, a multiracial girl. Specifically, she recalled that they helped each other work through problems and built understanding together. The fact these students are both seniors is also noteworthy. Karmina reported, however, not working well with Haley, a White girl, who was also a junior, as Haley would rush through work and "jump in" to explain the answers.

Overall, we found that all of the students of color in our small sample demonstrated a preference for working with other students of color. They were more likely to be friends with one another, more likely to be in the same grade level, and to have similar values or interactional styles. The White students that we interviewed named some White students and some students of color as their most preferred peers to work with. This preference might be because these privileged students did not have to struggle to create opportunities to learn for themselves.

This pattern of marginalized students preferring to work with other marginalized students did not hold out for gender, demonstrating that the way gender operated in the classroom was distinctly different from race. Most boys and girls displayed a preference for mixed gender groups, although two of the girls (Elly and Chelsea) mentioned all-girl groups that had worked well. In Chelsea's story, she described being surprised to find that an all-girl group could work well.

Discussion

In this article, we provided an analysis of the texts and subtexts of a group of high school students' narratives about mathematics group work. Based on our analysis, we have shown that students experience mathematics classrooms as sites for power struggles that are often related to their social identities, and we have discussed how these power struggles may affect student opportunities to learn. We found that within this classroom, White students, especially boys, despite the best efforts of marginalized students to make their voices heard, often dominated group discussions.

The major themes that students described in their narratives—interactional style, mathematical understanding, and friendships and relationships—held covert racialized, gendered, and classed meanings. Our analysis of the subtext of the transcribed interviews resonates with other research about the impact of social identity. In California high schools, mathematics achievement and friendship groups tend to be highly racialized and gendered, and, perhaps less visibly, classed (Noguera, 2003; Olsen, 1997; Pollock, 2004; Rubin, 2003). As pointed out previously, in this school, students recognized racialized and socioeconomic

patterns of achievement. Students of color were over-represented in lower tracked mathematics classes while White and Asian students were under-represented. Furthermore, stereotypes about boys' superior mathematics skills continued to be a subject of debate in public forums, and in this particular high school, it was well known that middle- and upper-class students from the "hills" tended to be higher achievers than their working-class or poor counterparts from the "flats." Thus, when students talked about how mathematics achievement influenced the way groups worked together, and dismissed some students as not caring, or not staying focused, there may have been an unacknowledged racialized, gendered, or classed dimension to these assertions.

Friendship patterns also tended to be associated with these social identities. Although many students had cross-race or cross-gender friendships, and this small school community had done much work to build community across race, gender, and socioeconomic status, it was still the case that friendship groups were relatively homogeneous with respect to race and socioeconomic status. Our interview respondents mentioned that they were friends with people they felt "comfortable" with, perhaps indicating some shared experiences, shared language, and shared understandings of the world that can come from sharing similar social identities.

This study is particularly important for sociocultural theories because the interviews were grounded in a particular practice—group work in a mathematics classroom—and therefore highlight the interconnections of practice-linked identities with broader social identities. These practice-linked identities as mathematics students were shaped by students' social identities (as when Tony described his preference for working with other Latino/a students), and reciprocally, the social identities were shaped by their mathematics identities (as when some of the "leader-ish girls" decided that this social identity made mathematical collaboration more difficult). Our analysis therefore provides one possible methodological and empirical perspective to include these social categories into a sociocultural analysis of learning.

The CRT perspective proved important to our analysis because of the emphasis on counternarratives. Although only a small number of students explicitly discussed social identities during their discussions of group work, we believe it is no coincidence that the students who did so were those who were in traditionally marginalized groups. White students did not discuss race, and boys did not discuss gender, perhaps because their privilege blinded them to these aspects of classroom life. (Another explanation, of course, is that they were simply reluctant to discuss these identities during the interviews.) The juxtaposition of these dominant narratives with counternarratives highlights some of the complexity of group work in mathematics classrooms.

This complexity was represented many times during the student interviews. Students described not only the multitude of factors that influence group work but

also the real tensions inherent in trying to accomplish the multiple and sometimes competing goals of group work. In telling their narratives, students never relied on just one factor to explain the success or failure of group work. Instead, they described how interactional styles, mathematical understanding, friendships and relationships, and (in some cases) social identities all contributed to the process and outcome of group work.

Group work has been touted as a way to get students from "different groups" to respect one another, but researchers have cautioned that teachers must take an active role in fostering that respect (Aronson &Bridgeman, 1979; Boaler, 2006). In our interviews, boys and girls of color and White girls reported their marginalization in group work in this classroom. Students seemed to have mixed feelings about heterogeneous groupings, whether these grouping were heterogeneous based on mathematical understanding, friendship, grade level, or social identities. While students almost universally recommended heterogeneous groups, they also almost universally described problems that arose in such groups. Valuing diversity may be a powerful narrative in current high schools, yet these stories provide counternarratives that illustrate that in diverse groups the same power imbalances that characterize social life outside schools might be reinscribed in collaborative groups.

These "heterogeneous groups" might actually be supporting privileged groups—especially White boys—rather than creating spaces with rich opportunities to learn for students of color and for girls in general. While our analysis is certainly speculative in some cases, we feel that the stories we were told during the interviews call into question the role of heterogeneous groups in mathematics classrooms. Even in a classroom with a teacher who was aware of equity issues, and in a school where students studied issues of oppression and social justice, these systems of oppression were at play and influenced students' opportunities to learn mathematics.

Conclusion

As I (the first author) have argued elsewhere (2009a, 2009b), equity issues in mathematics classrooms are complex and simple solutions may not be enough. Although in this article we have used student narratives to highlight the ways in which heterogeneous groups may reinforce pre-existing inequities, we do not support racialized or gendered forms of grouping or tracking as solutions to this problem. While in some cases, single-sex or race-based (e.g., Afrocentric) schools may help some members of marginalized groups to succeed academically, in most cases the *de facto* segregation that happens in schools deepens the divide between groups. We urge the mathematics education community to take this issue on di-

rectly, and to consider ways in which teachers in heterogeneous classrooms can support all students' opportunities to learn rich mathematics.

Acknowledgments

This article is partially based on a presentation given at the Research Presession of the annual meeting of the National Council of Teachers of Mathematics, Washington, DC, April 2009. This work was supported, in part, by the National Science Foundation under Grant No. SBE-0354453 to the Learning in Informal and Formal Environments Science of Learning Center, as well as by the Connaught Fund at the University of Toronto. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the position, policy, or endorsement of the National Science Foundation or the Connaught Fund.

The interview protocols were created as part of a collaborative effort fromBrigid Barron, Nicole Casillas, Leslie Herrenkohl, Emma Mercier, Veronique Mertl, Na'ilah Nasir, Kathleen O'Connor, Roy Pea, Leah Rossman, and Kersti Tyson. Indigo Esmonde and KathleenO'Connor conducted the interviews. We would like to thank the students and teacher at Bay Area High School who generously donated their time to this project.

References

Anderson, C. R., & Powell, A. (2009). A metropolitan perspective on mathematics education: Lessons learned from a "rural" school district. *Journal of Urban Mathematics Education, 2*(1), 5–21. Retrieved from http://ed-osprey.gsu.edu/ojs/index.php/JUME/article/view/34/12.

Aronson, E., & Bridgeman, D. (1979). Jigsaw groups and the desegregated classroom: In pursuit of common goals. *Personality and social psychology bulletin, 5*(4), 438–446.

Banning, M. (1999). Race, class, gender, and classroom discourse. In P. Laurence, D. Donna, & S. Villenas. (Eds.), *Race is—race isn't: Critical race theory and qualitative studies in education* (pp. 153–180). Boulder, CO: Westview.

Barnes, M. (2000). Effects of dominant and subordinate masculinities on interactions in a collaborative learning classroom. In J. Boaler (Ed.), *Multiple perspectives on mathematics teaching and learning* (pp. 145–170). Westport, CT: Ablex.

Berger, J. B., Cohen, B. P., & M., Z.,Jr. (1972). Status characteristics and social interaction. *American Sociological Review, 37*, 241–255.

Bianchini, J. A. (1999). From here to equity: The influence of status on student access to and understanding of science. *Science Education, 83*(5), 577–601.

Boaler, J. (2006). How a detracked mathematics approach promoted respect, responsibility, and high achievement. *Theory into Practice, 45*(1), 40–46.

Chizhik, A. W. (2001). Equity and status in group collaboration: Learning through explanations depends on task characteristics. *Social Psychology of Education, 5*(2), 179–200.

Cohen, E. G., & Lotan, R. A. (Eds.). (1997). *Working for equity in heterogeneous classrooms: Sociological theory in practice*. New York: Teachers College Press.

Cohen, E. G., Lotan, R. A., Scarloss, B. A., & Arellano, A. R. (1999). Complex instruction: Equity in cooperative learning classrooms. *Theory into Practice, 38*(2), 80–86.

Crenshaw, K. W. (1991). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Review, 43*(6), 1241–1299.

Dixson, A. D., & Rousseau, C. K. (2006a). And we are still not saved: Critical race theory in education ten years later. In A. D. Dixson & C. K. Rousseau (Eds.), *Critical race theory in education: All god's children got a song* (pp. 31–54). New York: Routledge.

Dixson, A. D., & Rousseau, C. K. (Eds.). (2006b). *Critical race theory in education: All god's children got a song*. New York: Routledge.

Esmonde, I. (2009a). Ideas and identities: Supporting equity in cooperative mathematics learning. *Review of Educational Research, 79*(2), 1008–1043.

Esmonde, I. (2009b). Mathematics learning in groups: Analyzing equity in two cooperative activity structures. *Journal of the Learning Sciences, 18*(2), 247–284.

Gee, J. P. (2000). Identity as an analytic lens for research in education. *Review of Research in Education, 25*, 99–125.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory; strategies for qualitative research*. Chicago: Aldine.

Gutierrez, K. D., & Rogoff, B. (2003). Cultural ways of learning: Individual traits or repertoires of practice. *Educational Researcher, 32*(5), 19–25.

Ladson-Billings, G., & Tate, W. F. (1995). Toward a critical race theory of education. *Teachers College Record, 97*(1), 47–68.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.

Lee, C. D. (2007). *Culture, literacy and learning: Taking bloom in the midst of the whirlwind*. New York: Teachers College Press.

Lubienski, S. T. (2002). Research, reform, and equity in U.S. mathematics education. *Mathematical Thinking and Learning, 4*(2 & 3), 103–125.

Martin, D. B. (2006). Mathematics learning and participation as racialized forms of experience: African American parents speak on the struggle for mathematics literacy. *Mathematical Thinking and Learning, 8*(3), 197–229.

Martin, D. B. (2007). Mathematics learning and participation in African American context: The co-construction of identity in two intersecting realms of experience. In N. S. Nasir & P. Cobb (Eds.), *Improving access to mathematics: Diversity and equity in the classroom* (pp. 146–158). New York: Teachers College Press.

Martin, D. B. (Ed.). (2009). *Mathematics teaching, learning, and liberation in the lives of black children.* New York: Routledge.

Mendick, H. (2005). A beautiful myth? The gendering of being/doing 'good at maths'. *Gender and education, 17*(2), 203–219.

Nasir, N. S., Atukpawu, G., O'Connor, K., Davis, M., Wischnia, S., & Tsang, J. (2009). Wrestling with the legacy of stereotypes: Being African American in math class. In D. B. Martin (Ed.), *Mathematics teaching, learning, and liberation in the lives of black children* (pp. 231–248). New York: Routledge.

Nasir, N. S., & Hand, V. (2006). Exploring sociocultural perspectives on race, culture, and learning. *Review of Educational Research, 76*(4), 449–475.

Nasir, N. S., McLaughlin, M. W., & Jones, A. (2009). What does it mean to be African American? Constructions of race and academic identity in an urban public high school. *American Educational Research Journal, 46*(1), 73–114.

Nasir, N. S., & Saxe, G. (2003). Ethnic and academic identities: A cultural practice perspective on emerging tensions and their management in the lives of minority students. *Educational Researcher, 32*(5), 14–18.

Noguera, P. (2003). *City schools and the American dream: Reclaiming the promise of public education*. New York: Teachers College Press.

Olsen, L. (1997). *Made in America: Immigrant students in our public schools*. New York: New Press.

Parker, L., Deyhle, D., & Villenas, S. A. (Eds.). (1999). *Race is—race isn't: Critical race theory and qualitative studies in education*. Boulder, CO: Westview.

Pollock, M. (2004). *Colormute: Race talk dilemmas in an American school*. Princeton, NJ: Princeton University Press.

Rogoff, B. (2003). *The cultural nature of human development*. Oxford, UK: Oxford University Press.

Rubin, B. (2003). Unpacking detracking: When progressive pedagogy meets students' social worlds. *American Educational Research Journal, 40*(2), 539–573.

Secada, W. (1995). Social and critical dimensions for equity in mathematics education. In W. Secada, E. Fennema, & L. B. Adajian (Eds.), *New directions for equity in mathematics education* (pp. 146–164). Cambridge, UK: Cambridge University Press.

Steele, C. M., Spencer, S. J., & Aronson, J. (2002). Contending with group image: The psychology of stereotype and social identity threat. *Advances in experimental social psychology, 34*, 379–440.

Webb, N. M., Nemer, K. M., Chizhik, A. W., & Sugrue, B. (1998). Equity issues in collaborative group assessment: Group composition and performance. *American Educational Research Journal, 35*(4), 607–661.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge, UK: Cambridge University Press.

Yin, R. K. (1989).*Case study research: Design and methods* (Revised ed.). Newbury Park, CA: Sage.

Appendix A

Interview Protocol

1. Tell me about yourself (name, grade level, etc.).
2. How often do you work in groups in your math class? How much of each class period is spent working in groups?
3. Tell me a story about a time you were in a group that didn't work so well.
    a. Who were the characters involved?
    b. Can you describe what the group was supposed to be doing together? What happened?
    c. How did it work out?
    d. What do you think the other people were thinking/feeling in this situation? (Can probe for a specific person from their story)
    e. Why do you think it didn't work so well? (What's your theory about why this group didn't work so well?)
    f. If you were to go back and were in this situation again, what do you think you might do differently to make this go better? What might others have done to make this go better?
4. Tell me a story about a time you were in a group that worked well together.
    a. Who were the characters involved?
    b. Can you describe what the group was supposed to be doing together? What happened?
    c. How did it work out?
    d. What do you think the other people were thinking/feeling in this situation? (Can probe for a specific person from their story)
    e. Why do you think it worked so well? (What's your theory about why this group worked so well?)
5. Imagine you (are a teacher, and you) are going to set up a new collaborative unit for your students. Take us through how you would set it up—what would you think about, what would you do to make sure the groups would work well? What resources would you use? When would you use group work?
   (Note: Ask each probe question separately after they have had a chance to answer fully.)
    a. What would the physical setup look like?
    b. How would you form the groups?
    c. What kind of feedback would you give the groups?
    d. How would you assess how the groups are doing?
    e. What kind of product would you have the groups working on?
    f. What kinds of relationships would you want people to have, how would you support this?
    g. What kinds of challenges do you think you would face? How would you address them?
6. Tell me about the group you're in right now. How is the group working together?
    a. What is your role within the group?
    b. What roles do the other group members take on?
    c. Do these roles change for different kinds of activities?