Power, Identity, and Mathematical Practices Outside and Inside School

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This article explores how issues of power and identity play out in mathematical practices and offers a perspective on how we might better understand the sociopolitical nature of teaching and learning mathematics. We present data from studies of mathematics teaching and learning in out-of-school settings, offering a sociocultural, then a sociopolitical analysis (attending to race, identity, and power), noting the value of the latter. In doing so, we develop a set of theoretical tools that move us from the sociocultural to the sociopolitical in studies of mathematics teaching and learning.

Key words: Achievement; Equity/diversity; High school, 9–12; Learning; Social and cultural issues

Research on the sociocultural aspects of mathematics learning has highlighted the importance of understanding mathematics as a cultural process (Lave, 1997; Nasir, 2002; Saxe, 1999), and has attended to the social processes underlying the teaching and learning of mathematics in classrooms (Yackel & Cobb, 1996; Gresalfi, Martin, Hand, & Greeno, 2008). One direction has focused on investigating how mathematical sense-making and teaching occurs in out-of-school practices as a way to understand the links between cultural and cognitive processes. Another direction has focused on the social nature of learning activity in mathematics, including implicit norms in classrooms, participation structures, and collaboration. This shift in focus has been so prevalent and transformative that some argue that there has been a "social turn" in mathematics education research (Lerman, 2000).

The social turn has also highlighted the importance of issues of identity in understanding mathematics learning (Martin, 2000; Nasir, 2002). Scholars have argued that to understand learning and engagement in mathematical activity, it is critical to understand how learners develop a sense of membership in a practice and the extent to which youth identify as "learners" and "doers" of mathematics (Martin, 2000; Nasir, 2002). Nasir has argued that the relationship between learning and identity is bidirectional, with access to learning supporting stronger identities, and identity, in turn, supporting learning.

We have learned much from this "social turn" in mathematics education research, but it does not render visible how identities are informed by learning and schooling

experiences, as well as by the complex issues of social power and marginality (Diversity in Mathematics Education Center for Learning and Teaching, 2007). Ladson-Billings and Tate (1995) point out that to understand power in mathematics requires explicit attention to issues of race. They propose the use of critical race theory (CRT) as one strategy for understanding the ways that race operates at multiple levels to determine experiences and outcomes in mathematics. Martin (2009) and others (Gutstein, 2006; Gutiérrez, 2000) have taken up this challenge and developed work in the area of critical mathematics. This research examines the ways that race and power exert influence, both as we frame the "problems" of mathematics education within larger discourses, and as we study youths' experiences in classrooms.

In this article, we attend to the sociopolitical as well as the social and cultural nature of teaching and learning mathematics (Gutiérrez, 2013; Valero & Zevenbergen, 2004). We present data from studies of mathematics teaching and learning in out-of-school settings, offering a sociocultural analysis and then a sociopolitical analysis (attending to race, identity, and power), noting the value added of the latter. In so doing, we develop a set of theoretical tools that move us from the sociocultural to the sociopolitical. This move will require (in addition to new conceptual tools) attending to the same types of data in new ways and attending to new types of data. We will also consider the implications of a sociopolitical lens for how we think about teaching and learning in mathematics classrooms in schools. Before we turn to the data, we explicate the theoretical tools that will inform our sociocultural and sociopolitical analyses.

THEORETICAL TOOLS FOR A SOCIOCULTURAL ANALYSIS[1]

Sociocultural approaches have increasingly been used to understand learning and development in a way that takes culture as a core concern (Cole, 1996; Rogoff, 1990; Saxe, 1999) and to examine social and cultural processes as mediators of human activity and thought. These frameworks argue for the importance of local activity settings and examine learning through focusing on individuals' *participation* in particular activities, and how they draw on artifacts, tools, and other people to solve local problems.

Sociocultural theories are rooted in the work of Lev Vygotsky, a Soviet psychologist of the early 1900s, and articulate a view of culture as a system of meaning that is constantly being created and recreated in local contexts and across generations. In contrast to many psychological perspectives that focus on human cognition and behavior at the individual level, sociocultural theories locate the fundamental unit of analysis of human behavior as activity, or cultural practices. This notion of activity attends to the complex intertwining of the individual and the cultural and can shed light on the role of identity in learning and development.

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[1] Parts of this section were adapted from Nasir and Hand (2007).

Identity in a Sociocultural Analysis

Many scholars in this tradition focus on students' identities as learners (Wenger, 1998) and point to identity as a critical mediator of learning. Their research shows that how students view themselves as learners can influence how they participate in educational activities and settings, and is shaped by how teachers and institutions create or limit opportunities for participation. Thus, learning is not only about taking on new knowledge structures but also about personal transformation, about becoming.

A sociocultural analysis, then, focuses on the ways that activity in learning environments is socially and culturally organized, and examines social supports and cultural arrangements for learning. However, sociocultural analyses rarely attempt to understand race and power.

Tools for a Sociopolitical Analysis: Attending to Race and Power

A sociopolitical analysis attends to how race and power operate in learning settings, especially as they may relate to privilege and marginalization. We draw from the sociological theories of social and cultural capital (Bourdieu, 1977; Bourdieu & Passeron, 1990) and perspectives on critical race theory (Yosso, 2005) to illustrate how the social networks (social capital) with whom we identify and the sets of skills and knowledge that we accumulate (cultural capital) can be perceived as providing (or failing to provide) access to power. In fact, what defines "access" and "power" may shift, or be contradictory, across time, space, and/or cultural contexts, depending upon the types of knowledge, skills, and networks perceived as legitimate.

For Bourdieu (1986), power is represented by high-status resources for social mobility to which only certain individuals and groups have access. These resources are used as indexes of privilege, and their absence sets up barriers for social inclusion. A focus on power is central to Bourdieu's insights about how upper class and middle class families and individuals are able to continuously maintain their elevated positions within the social hierarchy. Bourdieu's notions of power are useful for thinking about access and identity in cultural practices, but his theoretical lens analyzes the reproductive quality of the status quo and reifies it as the "norm" against which everything else is deviant and inferior. His theory accounts for neither social resistance and agency nor the various forms of "capital" that exist and are utilized within marginalized communities (Yosso, 2005). Such a deficit orientation risks obscuring institutionalized stratification processes and the diverse resources of nondominant communities.

CRT and related perspectives of resistance (e.g., Latina/o critical theory, Asian critical theory) reject dominant claims that limit or disregard the value of the cultural knowledge systems and social networks of nondominant communities. In deconstructing the property of whiteness and its tenets—objectivity, neutrality, and normalcy—these perspectives offer theoretical tools that challenge social assumptions and bring to the fore the multiple voices and ways of being and knowing of

people of color. Lest we see these voices as idiosyncratic or disassociated from larger meaning or action, poststructuralist theories help us align such political struggles with the broader discourses within which we operate (Gutiérrez, 2013). Such theoretical tools allow us to interrogate how power relations are created, resisted, and potentially transformed through action and interaction in and across cultural spaces.

Although our current conversation—and our latter analyses—focus on the "cultural," issues of race and racism (Bonilla-Silva, 2006; Frederickson, 1988; Omi & Winant, 1994; Yosso, 2005) are central to the way we understand the ways that culture and capital exert influence in the lives of African American students.[2] Martin (2009) has noted the ways in which our society has bought into a master narrative about the mathematics achievement of African American students. The story we tell as a society about African American students in mathematics is about relative failure—about underachievement. In our view, that story assumes that such underachievement is a cognitive issue; that it stems from the lower capacity of African American students in mathematics at an individual or group level. Hence, the widespread stereotyping and marginalization of African Americans and their cultural practices is masked as an issue of cognition and individual failure, rather than one of structural inequality. Bonilla-Silva (2006) has referred to this process of viewing existing power relations as adhering to a type of natural order as the *naturalization* of racism. Some argue that the very purpose of schooling is to maintain racial and class stratification in society (Bowles & Gintis, 1976; Varenne & McDermott, 1998).

In this article, we use our data to discuss how sociocultural analyses afford a presentation of dominant social and cultural capital à la Bourdieu. We then consider a sociopolitical analysis that highlights the nondominant cultural capital (Carter, 2005) or "cultural wealth" (Yosso, 2005) of communities that historically have been marginalized. To better account for this wealth and its relation to dominant capital, we draw on Putnam's (2000) notions of *bonding* and *bridging* capital. We explain the different concepts of *capital* and *wealth*, and the processes of bonding and bridging these resources.

Cultural Capital and Social Capital Versus Cultural Wealth

Cultural capital refers to the high-status cultural attributes, codes, and signals (including both material and symbolic goods) that are valued in particular social formations. Material and symbolic goods become the means in a system of exchange that confers differential levels of power and status. For example, high-status parents

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[2] The use of static racial categories, for example, African American, often do not fully capture or describe the multiple subjectivities of individuals presumed to be represented within that group nor that which they would use to describe themselves. However, as Gutiérrez (2010) points out, "groups need to constantly highlight the differences between themselves and others to create collectivity while also bridging those differences so as to avoid further oppression" (p. 12). It is in this spirit that we have used racial labels in this article as a proxy for lived experiences.

provide their children with cultural capital by socializing them into attitudes and knowledge that are valued for success in the American educational system.

Cultural capital operates through interactions between individuals and institutions. In part, cultural capital resides within the individual through one's own sense of self, ways of thinking, and practices (i.e., habits). These individuals are then recognized or marginalized by institutional structures (e.g., schools, government, religion) that delineate and confer power. For example, schools, as institutions, can confer cultural capital in the form of academic credentials or qualifications.

Like cultural capital, *social capital* is not neutral but is a resource that can be used to produce or reproduce inequality. Bourdieu (1986) defines social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (p. 248). Social networks can provide benefits, in terms of power, to those with social relations that are valued in society. As with cultural capital, not all social capital is valued equally nor is it available to all. The value and availability of a source of capital depends on its status position within society. For example, African American students' ties with a genre of music or style of dress might weaken the group's perceived capital in the eyes of school authorities (Nasir, McLaughlin, & Jones, 2009), whereas their affiliation with students in advanced placement classes might strengthen their perceived capital with those officials. Because certain networks are perceived to be of higher value than others, there are often negative institutional consequences for identifying or affiliating with lower status practices and networks, including social exclusion, restrictions on individual freedoms, lowered expectations, and excessive claims on group members (Portes, 1998).

Challenging these stratified and exclusionary notions of capital, Yosso (2005) asks, "Whose culture has capital?" (p. 69). Yosso articulates CRT's objective of building upon "Outsider" theories to resist oppression and empower marginalized communities and their respective knowledge, an approach that recenters our research away from assumptions that nondominant communities need to acquire and conform to dominant values and practices and toward critiquing the inherent patterns of racial and social stratification within institutional structures such as schooling. It also recognizes that marginalized communities have accumulated and continue to acquire diverse forms of capital or "cultural wealth" (Yosso, 2005). Not limited to Bourdieu's bounding of social or cultural capital, cultural wealth includes other previously ignored forms such as *aspirational*, *linguistic*, *familial*, *navigational*, and *resistant* capital. Valuing these various forms of capital allows us to examine the diverse resources and types of day-to-day activities that individual actors draw upon to resist the patterns and practices of social stratification.

Bonding and Bridging Cultural Wealth

To acknowledge both the dominant forms of capital Bourdieu had in mind, and the diverse forms of capital present within marginalized communities, we draw on Putnam's (2000) concepts of bonding and bridging capital. With these terms,

Putnam signals how certain social networks are differentially valued in heterogeneous societies. *Bonding* refers to the value assigned to the development of social networks among a presumed homogeneous group of people, whereas *bridging* refers to the value assigned to the development of social networks across socially heterogeneous groups.

With respect to African American students in schools, bonding social capital can refer to students' building networks with one another, whereas bridging social capital facilitates students' gaining access to other social networks via interactions with other groups of students, teachers, administrators, and so on. Given the legacy of racial exclusion and domination in schools (Darling-Hammond, 2005), within-group bonding of African American students, particularly males, often has been assumed to be oppositional to that of creating a positive student identity (Ferguson, 2000; Fordham & Ogbu, 1986; Noguera, 2003). However, such assumptions essentialize the content, context, and scope of African American students' bonding activities and their relation to academic achievement and identity (Carter, 2005; Dance, 2002; Nasir, McLaughlin, & Jones, 2009). Of similar complexity is bridging social capital, which can provide African American students with access to other, more powerfully perceived social networks and resources as well as facilitate occasions for them to be socially excluded.

We extend the notions of bonding and bridging capital to think about cultural capital. Distinctions between forms of knowledge that are perceived as valued or not valued within institutions might result in negative consequences for African American students who engage in within-group bonding in contrast to engaging in forms of knowledge that promote cross-group bridging. These conceptual distinctions highlight how social capital and cultural capital are perceived not as horizontal or overlapping resources, but as hierarchical resources within systems of power that may operate at cross-purposes with students' individual interests and identities.

As we show in the next section, opportunities for bridging capital may be limited because the cultural capital that supports sustained success in school mathematics may not be directly aligned with the mathematical practices with which students engage in their communities and other social networks. Further, the practices of nondominant social networks are rarely recognized as valuable by the institutions that confer academic credentials. To understand how individuals and communities resist the processes of stratification, however, we need to attend to the diverse resources of cultural wealth. These may be the very resources that bolster students' interests and identities in and out of school and make them resilient to cross-context contradictions and stresses. A focus on the more inclusive notion of *wealth* allows for a treatment of how individual forms of capital can be bridged and bonded across a greater diversity of dimensions to accomplish multiple purposes within and across communities.

Attending to Identity in a Sociopolitical Analysis

The relationship between power and identity is linked to the various forms of capital. Identity involves becoming a member of a community or social network and is related to an individual's acquisition and alignment with particular bodies of

knowledge, goals, and practices valued by that community. Identity is not purely the property of the individual nor purely attributed to the social world and others, but is (re)created over time through an individual's agency in making meaning of and becoming aligned with communities through engaging in social practices (Nasir, 2002). In a sociopolitical analysis, we consider the kind of identities to which one has access and performs—by virtue of their access to certain kinds of cultural practices (via race, social class, institutional affiliations, and so on) and their positioning within these practices.

Next, we use both sets of conceptual tools (sociocultural and sociopolitical) to understand learning moments in two out-of-school learning activities.

TWO ANALYSES OF UNDERSTANDING
MATHEMATICS LEARNING OUTSIDE SCHOOL

We present findings from two studies, taking two analytical approaches on data from each study. In the first approach, we present a sociocultural analysis. In the second approach, we present a sociopolitical analysis and examine its relevance for understanding mathematical learning activity.

The data presented are drawn from two studies. The first study examined how African American high school students solved average and percent problems in relation to the mathematical practices in the sport of basketball, and in relation to the mathematical practices of school. The second study focused on the mathematical thinking and learning that occurs in the practice of dominoes.[3] For each data point, we offer an example of a sociopolitical analysis that involves bringing new lenses to the same types of data. We then use the third data point to examine what it might mean to take new types of data into account in our analyses of learning in cultural practices to consider these sociopolitical aspects of learning.

New Lenses on the Same Data: Knowing and Not Knowing Average and Percent

This study was part of a tradition of comparing problem solving in cultural practices outside school as compared to those inside formal school contexts (Gay & Cole, 1967; Lave, Murtaugh, & de la Rocha, 1984; Saxe, 1991, 1999). In general, this research shows that cognition is fundamentally related to the context in which it occurs, and that theories of cognition ought to better account for the ways in which the nature of thinking has to do with the types of social and cultural resources valued in a learning setting.

The research began with an ethnographic study of the mathematics of basketball, namely the ways in which players used mathematics to compare players' skill level and ability, often reported in terms of average and percent. The most common basketball statistics include total points scored in a game, average points scored per game, percent of shots made from the free-throw line, percent of shots made from

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[3] This is also cited in Nasir and Saxe (2003).

the field, number of assists, and number of rebounds. These statistics provide players, coaches, recruiters, and even fans an accessible measure of player competence, which can be used to guide recruitment efforts and/or which confirm or dispute their perceptions about players. In this context, players often faced problems of average and percent as they attempted to calculate their own statistics and those of other players.

These measures of competence were important in basketball, but they often involved estimation rather than exact calculations. In the context of basketball, it was sufficient to approximate percentages in order to compare two players or gauge improvement; usually it was not critical to make fine-grained distinctions as is often required in a mathematics classroom.

In addition, there was a clinical interview with 30 high school students (all African American, mean age 16.15): 18 were basketball players, and 12 were not. Students were given two sets of average and percent problems. One set presented basketball problems, and another analogous set presented problems on a school worksheet. We sought to compare the problem-solving ability and solution strategies of players and nonplayers across two settings: school and basketball. This comparison facilitated an exploration of the differences and similarities in problem-solving strategies in school and in basketball and the effects of participation in basketball on developing mathematical understandings. Key here was distinguishing between those strategies valued within schools and those valued out of school that nevertheless promoted mathematical understanding.

This distinction became salient during the scoring of the problems across the two sets as correct or incorrect. Initial analyses of the task-interview data revealed that a notable difference in the basketball players' solutions to basketball problems was that they relied heavily on estimation and did not necessarily produce exact answers. Indeed, as seen in other cognitive cultural work (e.g., Lave, Murtaugh, & de la Rocha, 1984; Saxe, 1991), there were different norms about what constituted an end to problem solving and the form of an appropriate answer in basketball and in school. This finding made it difficult to compare the "correctness" of answers across contexts and groups.

Each individual was assigned two scores for each problem to privilege both cultural forms of knowledge: one based upon a "school criterion" (exactly correct answers received credit) and the other based upon a "basketball criterion" (exact answers as well as close estimates received credit).[4] Answers were assigned 0 points if they were inadequate with regard to the score type criterion and 1 point if adequate.[5] Similarly, the proportion of correct scores for the basketball criterion and for the school criterion were calculated for each individual. Then a mean proportion correct for each group (basketball players and nonplayers) for each adequacy type (school criterion and basketball criterion) for each problem type was computed. This procedure afforded the ability to retain the distinctions by type of practices that were valued across responses within each network, basketball and school, yet compare the adequacy of solutions across the two contexts.

Figures 1 and 2 illustrate the mean proportion of correct scores for players and

nonplayers as a function of Problem Context and Adequacy type. A $2 \times 2 \times 2$ ANOVA [GROUP (player vs. nonplayer) $\times$ PROBLEM CONTEXT (school vs. basketball) $\times$ ADEQUACY TYPE (exact vs. close estimate)] on total scores revealed a GROUP $\times$ PROBLEM CONTEXT $\times$ ADEQUACY TYPE interaction ($F(1, 28) = 5.77$, $p < .05$). Duncan posthoc comparisons revealed that on basketball problems, players achieved a greater number of correct answers than nonplayers did when adequacy was defined as a close estimate but not when adequacy was defined as the exact solution. In contrast, on school problems there was no difference in the adequacy scores within or across player and nonplayer groups. Additional significant main and interaction effects are summarized in Table 1. These include a main effect for adequacy type, in which all students scored higher when given credit for ballpark estimates; a main effect for context, in which all students scored higher on the basketball problems than the school problems; and
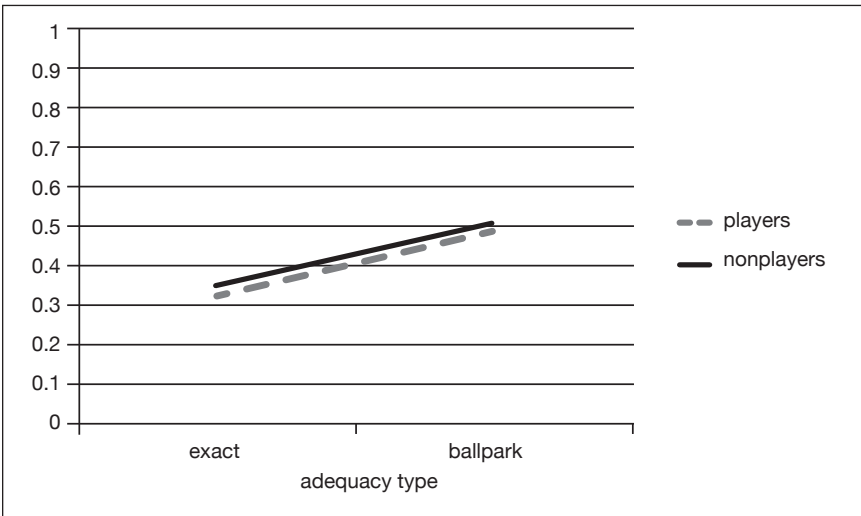

Figure 1. Players' and nonplayers' performance on school problems.

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[4] Assigning students two scores proved to be important due to differences in players' and nonplayers' problem-solving goals. The qualitative analysis revealed estimation as a central component of players' calculations of statistics. Because players' goals are often to compare the skills and performance of other players, players did not value precise numerical answers; instead, estimation was used. Thus, mathematical adequacy when solving average and percent problems in relation to basketball statistics was defined differently from adequacy for solving school problems, which is often based on whether or not a student's response is exactly accurate. This notion of different meanings of adequacy was corroborated during the interview sessions with students, when I noted that on the basketball problems, players (as compared to nonplayers) tended to give answers that were qualitative in nature. The solution goal of students in the two groups seemed to be different. Nonplayers attempted to find the exact correct answer, whereas players quite often estimated or gave a more qualitative response.

[5] Twenty percent of tests were double coded for reliability. Agreement for correctness of response and strategy surpassed 80%.
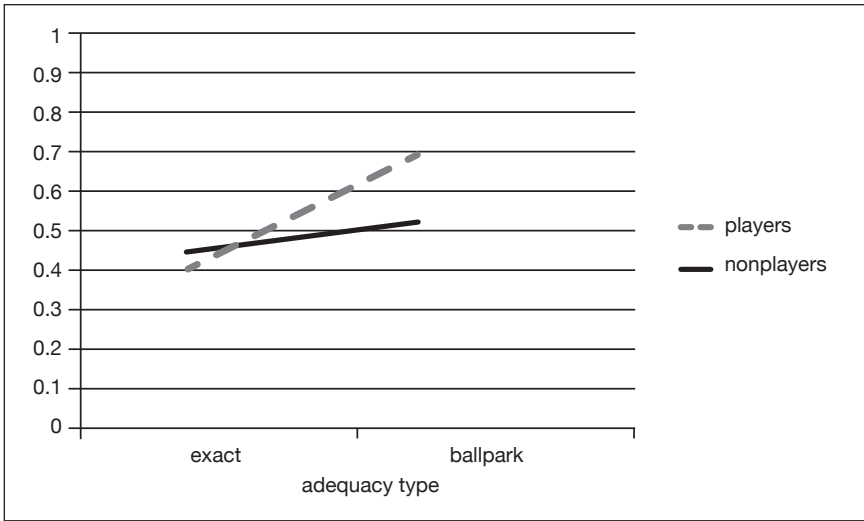
Figure 2. Players' and nonplayers' performance on basketball problems.

an interaction between adequacy type and context, in which giving credit for ball-park estimates made more of a difference on basketball problems than on school problems.

 A sociocultural analysis. These findings show that the problem-solving ability of players and nonplayers varied in relation to basketball and school problem-solving domains, with both groups scoring better on basketball problems, but with individuals scoring the highest when they had significant basketball experience. A sociocultural approach would focus on how basketball players approached average and percent differently in the context of basketball from the way in which they did in school, in ways that seemed to reflect estimation strategies that were valued in the basketball context. It may also attend to the ways in which players approached basketball problems differently from the way in which nonplayers did, indicating effects of practice participation and a different set of norms and values for mathematical problem solving in these different contexts.[6] In sum, a sociocultural analysis examines the ways in which experiences in the cultural world are intertwined with cognition and mathematical learning, highlighting the fact that cognition is deeply cultural. A sociocultural analysis might have explored the ways that the social organization of the practice made the learning of average and percent accessible, or provided important scaffolds for learning.

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 [6] For a discussion of the nature of mathematical problem solving (and the role of estimation) in the game of basketball, and of how the specific version of the game of basketball played at the high school level had implications for the mathematics, see Nasir (2000).

Table 1
F *and* p *values for Group* × *Adequacy Type* × *Context ANOVA*

Main effects	df	*F*
Group (players vs. nonplayers)	1, 28	.33
Adequacy Type (ballpark vs. exact)	1, 28	16.31***
Context (basketball problems vs. school problems)	1, 28	6.97**
2-way interaction effects		
Group × Adequacy Type	1, 28	2.03
Group × Context	1, 28	2.65
Adequacy Type × Context	1, 28	104.77***
3-way interaction effects		
Group × Adequacy Type × Context	1, 28	5.77*

*$p < .05$. **$p < .01$. *** $p < .001$.

A sociopolitical analysis. A sociopolitical analysis of these same data would be concerned with issues of power within and across history, settings, groups of people, practices, bodies of knowledge, and so forth. In valuing both dominant and nondominant forms of capital, a sociopolitical analysis would reveal the opportunities for within-group bonding and across-group bridging of learning experiences and identities that may have implications for students' mathematical practices in basketball, in schools, and outside schools. For example, an analysis of problem-solving strategies showed that students who identified as players were better able to solve the basketball problems in the context of basketball, and used different strategies across the two contexts. On basketball problems, players developed context-specific strategies that allowed them to easily assess their progress, such as computing the average by adding and subtracting equal amounts among the numbers until all were the same, or calculating percents by assuming that each shot was worth 10%. On school mathematics problems, players used algorithms, often misremembered, to perform calculations with numbers. In both cases, one could view the use of these strategies as players' efforts to "bridge" or use their different forms of capital across two contexts, given that each involves attempts to combine basketball practices with school practices.

Similar to a sociocultural analysis, a sociopolitical analysis of basketball players' patterns of solutions and strategies illustrates the discontinuity between students' everyday cultural knowledge about mathematics (developed in particular communities and practices) and the type of mathematics instruction and classroom

activities to which many students are exposed in school. In addition, a sociopolitical analysis would acknowledge that the knowledge about average and percent that basketball players already had may have been inaccessible in the mathematics classroom and/or that their teachers were unaware of it, because certain forms of knowledge and practices traditionally have not been valued within schools. Players did not posses the cultural capital with respect to knowledge of school mathematics to leverage what they knew about average and percent in basketball to help them solve school mathematics problems, nor did the school value the cultural wealth that the students had.

Instead, the types of mathematical knowledge that the basketball players demonstrated was a kind of bonding capital within their social network; it made them competent in the practice of basketball and thus had currency there. The basketball players and their teachers failed to recognize the forms of capital that could have been used as resources to bridge in- and out-of-school mathematical learning practices.

Identity and Power

There was also a type of power operating that had to do with the identity issues at stake for these players in solving these two problem sets. When students were asked the mathematical questions about basketball, the players were quite willing to share how they solved problems about average and percent in basketball. They took up the position of the expert, or skilled member of a particular community of practice, in these interactions. The players were confident; they sat up straight and answered in relaxed, even vocal tones demonstrating their alignment with that community of practice and their sense of legitimacy in being its representative. But when they were asked to solve school mathematics average and percent problems, players were visibly distressed. They shrunk down in their seats; they hemmed and hawed; they told the researcher how poor they were at mathematics. One student left to get a pencil and never returned. These observations suggest that the players felt a strong sense of identity and competence as basketball players, but perhaps not as mathematics students. Their identities were likely related to a sense that their forms of capital were not perceived as relevant to the practices of school mathematics.

This conversation about power has to do with access and the valuing of different forms of knowledge. The players did not have access to the types of school mathematics practices nor were they positioned in such a way that would allow them to fully take on an identity as students, much less as learners of mathematics. Beyond not physically or symbolically offering them access to the types of cultural capital and identities valued in mathematics classrooms, the schools also did not value the mathematical forms of knowledge and resources that the players possessed. In this case, they all attended a poorly resourced urban school that did not offer many advanced mathematics courses. One of the mathematics teachers (who also happened to be a tennis coach) observed players being interviewed in the coaches' office and inquired about the study. When the researcher indicated that the study focused on the types of mathematics learning basketball players were doing in their sport, he

responded, "I have most of these guys in math class, and I can tell you that they are not learning any math!" The teacher's comment highlights the interactional ways in which power can play out in terms of how an individual—or the racial or social group her or she is assumed to represent—is perceived and how certain practices or forms of knowledge (and the ideas, skills, networks, beliefs, and identities that go with them) are legitimized or marginalized within educational institutions.

It is through participation in cultural practices, and the taking up of the respective identities affiliated with those practices, that forms of capital are created; thus, access to participation in cultural practices is an aspect of power. Access has both real and perceived aspects. *Real* access to cultural practices has to do with the material aspects of access—the presence or absence of certain cultural practices in one's neighborhood or family, and in the institutions with which one is affiliated. *Perceived* access has to do with the ways in which one thinks about what practices are recognized as appropriate and important for him/her or for others. Our findings are concerned with these distinctions between what the basketball players did and did not know about basketball mathematics and school mathematics, and how the basketball players, and others such as teachers and administrators, viewed the knowledge the players were building and the players' competency in school mathematics, given their experience with basketball.

The varying degrees of perception relate to identity and, in some cases, stereotyping. Certain identities are perceptually associated with particular practices, which has implications for how students' identities are differentially perceived and valued. For example, powerful school actors, like the mathematics teacher, may have viewed the basketball players as players and made estimates about their knowledge and competency relative to school mathematics. There are strong societal and racially charged stereotypes about who can be good at mathematics (a field associated with intelligence) and who is predisposed to be good at basketball, with African American males being perceived to be good at basketball and not being good at mathematics. Arguably, stereotypes (by way of prejudice) are ways of perpetuating the existing social order and hierarchical status positioning of racial groups (Bobo, 1999). In this way, the very presence of these stereotypes denies students' power by disregarding the types of capital they bring into school based on their out-of-classroom and out-of-school affiliations and knowledge sets.

A sociopolitical analysis prompts us to interrogate these stereotypes, recognize the various forms of capital that the players have, as well as to consider how players can (and likely do) draw upon these forms of knowledge to maneuver within two seemingly different contexts.

Importance of Agency in Sociopolitical Analyses

A sociopolitical analysis attends to the dynamics of power, including how individuals have the agency to act and to resist. Noting the power differential present in the taking up of less valued identities and practices, Carter (2005) argues that African American students exercise and signify relevant forms of capital depending on the context. Mirroring Yosso's (2005) notion of navigational capital, Carter

points out that in one setting a student may use dominant capital to move up an educational or occupational ladder, whereas in another context the student may use nondominant capital to "authentically" position himself or herself in his or her peer groups to support a collective identity. Many students use different mechanisms of capital building in different community, family, peer, and school contexts for different goals (Carter, 2005). In our study, the basketball players identified with the practices of that sport and expressed their own form of bonding cultural and social capital that served as a source of status in the context of the game of basketball and in their local school context.

There was also variation in the degree to which the African American male students had access to, participated in, and identified with school mathematics practices and/or defined their identification with basketball or being African American. One student felt empowered with respect to the school mathematics practices as well as the basketball mathematics practices. During the interview, he expressed feelings of competence as he solved both problem sets and seemed to feel empowered by being able to display his knowledge. His affect alluded to the access he had and his appreciation of both being able to bond and bridge his multiple sets of capital.

It is also important to consider the ways in which individuals use their agency to resist being marginalized. For example, a student in another study saw his role in the mathematics classroom as defying the negative mathematics stereotypes others had of him as an African American male and as a basketball player. He went out of his way to fully engage in the mathematics classroom, and took pride in being a strong athlete and an exceptional mathematics learner. This attempt to defy stereotypes is a form of resistant capital that the student used to challenge the dichotomous power dynamic by personally privileging the cultural capital valued in schools *and* publicly privileging that which is valued in other social networks. Because identities are dynamic and contextual, students may opt to perform these identities differentially across settings, activities, and time, in order to align with, resist, or transform certain practices or perspectives. We could also recognize this student's use of his aspirational capital, namely, his ability to remain hopeful about his future success, in order to bridge in-school and out-of-school contexts.

New Lenses on the Same Data, II: Learning in Dominoes

The game of dominoes is deeply intertwined with cultural ways of knowing and intergenerational interactions. In many African American communities, young people learn to play dominoes in the context of their families: at home, at family reunions and barbeques, and at local parks. The culture of play aligns with African American discursive styles, and play is characterized by a tremendous amount of teasing and signifying. Further, playing the game of dominoes involves mathematics at multiple levels, from basic counting, addition, and multiplication, to sophisticated predictions about probability. Elsewhere Nasir (2000, 2005) has argued that in the cultural activity of dominoes, expert players offer assistance and support to novices in ways that maintain the novices' ability to participate competently in the activity.

The following data were collected during a weeklong dominoes tournament for elementary students, organized as a part of a research project. The public elementary school was in a low-income neighborhood in southern California. The school population was over 95% African American, and only about half of the students had prior experience with dominoes in their homes and communities. At the outset of the tournament, novice elementary school players were becoming familiar with the rules of dominoes and the flow of play. Initially, a major goal for them was simply to sustain play when it was their turn. Later in the tournament, as students became increasingly familiar with the game, they began to employ more sophisticated strategies, often with guidance from their more expert peers. In the interaction below, two African American students—David and Kevin—were partners, with David being the more novice participant. During one game, David began to attempt to score, rather than simply make a match. He accomplishes this shift only under very direct instruction from his partner.

David: [It is David's turn to play. He picks up his hand to examine it.]

Kevin: You better come on David, you better make some points, dude.

David: [Begins to play the 5-5, putting it face up on the table and starting to slide it over to the 5-4. Before the domino reaches its destination, Kevin interrupts.]

Kevin: Count it first.

David: [He slides the domino back over toward himself. He holds it closer to himself and begins to count the dots on the domino. He then proceeds to count all the dots on the board.] Fifteen. [The true count is 22.]

Kevin: Put it down.

David: [Plays the 5-5 on the 5-4, but once again violates the convention of how to play a double and plays the 5-5 end-to-end with, not perpendicular to, the 5-4]

Kevin: It goes this way. [Fixes the 5-5 to be perpendicular, then uses his fingers to count the dots on the board] It's 22.

A sociocultural analysis. Using a sociocultural approach, one is struck by two things: the mathematical strategies involved in playing the game and the interactional resources present to apprentice David into the practice of playing dominoes. In terms of mathematics, David engages with counting the dots on his own domino tiles and those already present on the board to mentally calculate, through either addition or multiplication, the various ways he can score points. Although his ultimate calculation is incorrect, he is engaged in the task of counting and tries to predict how many points he can score. Equally important is his attempt to play, supported by assistance strategies through explicit instruction during game play (i.e., Kevin directs David to count the ends after his first play to determine whether there is a score). Kevin also explicitly directs David to consider the potential score before the play, admonishing him to "Count it *first*." This assistance is possible only because the turn-taking structure inherent in the play of dominoes affords each person a chance to play and because the shared artifacts of the dominoes tiles on the board afford a visible record of the game that all participants can use. Further,

the flexible game structure employed by the participants allows for assistance to be given to novice participants in spite of it being against the official rules.

A sociopolitical analysis. As with the practice of basketball, the mathematical knowledge students demonstrated during this interaction highlights the process of bonding capital within their social network of dominoes players. By practicing and assisting one another, students became increasingly competent players and developed mathematical strategies that had currency in that context. This involved bonding social and linguistic capital in that players used distinct communication styles to support one another. It also involved bonding navigational capital, as novice players were apprenticed into becoming more competent, resilient players that strategized and remained focused despite the cajoling of more expert players and other onlookers.

The practice of dominoes may or may not support bridging social capital, depending upon how social networks from the game are valued and how the resources they provide bridge into other socially valued practices. The development of mathematics and problem-solving skills in the game will provide bridging capital only if that knowledge is leveraged in other social practices.

As players became more competent, they had opportunities to take up identities as dominoes players as knowledge of the game and the needed skills was made explicitly available to them, and because they were given legitimate opportunities to successfully engage with that knowledge. Through the practice of dominoes, the youth were able to align themselves with a legacy of African Americans that went beyond problematic social narratives present in dominant discourses about them.

Although this analysis has touched on the insight a sociopolitical lens might offer, much of it was speculative, given the nature of the data. Next, we consider how sociopolitical analyses of learning might draw on, and require, new types of data.

Considering New Types of Data: Adult Domino Play

The previous two examples have highlighted how one can layer a sociopolitical analysis onto the same data used for a sociocultural analysis. In the following example, we consider the potential benefit of collecting and analyzing new types of data on cultural practices as one conducts sociopolitical analyses of learning, and the insights these new types of data might offer. Specifically, this example draws on data that speak to the way participation in the practice of dominoes is perceived by others as signaling social status, race, and power.

The interaction occurred in a courtyard on a prestigious university campus near the medical and dental schools. A group of older African American male domino players convened every day during their lunch break to play the game. Most of the domino players at the site were blue-collar university employees. Rarely did medical and dental students join the group, and when they did, they seldom stayed for more than a few months. One day, as researchers were observing the players and video recording the game, an administrator from the medical school (an African American woman) walked by the group, where she saw Daniel, a 1st-year medical

student, playing with the group. Recognizing Daniel, she asked about the presence of the researchers' camera equipment.

Daniel:	[Replying to the administrator] I think she's doing some kind of study or something.
Player:	She be at home studying them things [referring to the tapes and field notes]. [Laughter]
Administrator:	[To Daniel] Ah, exactly what you s'pose to be doin' too. [She implies here that he should be studying instead of playing dominoes.]
Daniel:	Is that right?
Administrator:	[. . .] out here getting a cultural experience.
Observers:	The rain is coming down! It's raining on me! [Loudly and with laughter] [This comment refers to the "chastising" that Daniel received.]

In this interaction, the administrator seems to imply that dominoes is an inappropriate pastime for someone of Daniel's status as a medical student. In doing so, she alludes to and reinforces that the practice of dominoes imposes racialized and class-based affiliations upon its participants. Her comments might be taken as signaling the cultural and social restrictions on the kinds of public practices and networks in which an aspiring physician can participate, and as offering advice on how to manage the inherent tension between two seemingly opposed identities—being African American (and working class) and becoming a doctor. The other players had similar interpretations as indicated by an exchange immediately after the administrator left the group.

Willie:	You know they don't supposed to be out here. They don't allow y'all out here playin' those dominoes.
Daniel:	What, man?
Willie:	Wait till you get in your second year. You ain't goin' to be out here.
Off-camera:	You won't have time! [Laughter]
Willie:	That's what they goin' tell you.
Daniel:	I'll be alright.
Willie:	Yeah, you'll be alright.

In this segment, Willie, a well-respected older member of the group, appears to second what he takes as the administrator's sense of the tension that participating in the cultural practice of dominoes poses for Daniel. He implicitly reinforces the perception of dominoes as a lesser valued practice to be engaged in only by those marginal segments of society. Willie argues that Daniel will inevitably have to choose an identity viewed to be more appropriately associated with the privileged practices and networks of medical school.

In spite of the "real" access to mathematical thinking provided by dominoes play, within this context—a prestigious university—this practice was not evaluated as

leading to valued forms of capital, namely, academic credentialing as well as mathematical skills and procedures privileged in school. What is made clear in the conversation with the administrator is that participation in certain practices signals that we are certain types of people with membership in certain networks—here, playing dominoes signaled that Daniel was both African American and working class. Neither of those categories was in alignment with his trajectory as a future doctor. The administrator was tuning in to the issues of power and status at stake for Daniel through his choice of cultural practices, and offered advice to Daniel about navigating them so as not to hamper his social mobility. In her view, dominoes did not provide sufficient bridging capital, although she acknowledges the game as providing bonding capital within the African American community by calling it a "cultural experience." Concluding this analysis here—within the framework of Bourdieu's notion of capital—we accept the administrator's deficit orientations and do not interrogate the privileging of the institutional and academic practices, spaces, and networks.

Using the notion of cultural wealth would prompt us also to consider how Daniel's resilience and desire to succeed (aspirational capital) within a highly competitive medical school at a prestigious, largely white campus might be reinforced through his engagement within the dominoes group. It is possible that Daniel's intergenerational interactions with the blue-collar staff—their histories, dreams, support, and advice—might have motivated him to persevere in his upwardly mobile ambitions. Similarly, the navigational capital accumulated by the dominoes group from many years of service with the university could have been invaluable to Daniel in his attempts to maneuver through the institution. These suppositions are perhaps bolstered by the sense of kinship across players that resonate from the transcripts and from Daniel's own demonstration of commitment to participating in the cultural practices of African Americans regardless of what others think he should be doing. It is also possible that this familial capital can translate into tangible social capital, as individuals with more enduring or broader social ties may share them with newer participants in whose well-being and success they become invested.

The linguistic capital afforded to Daniel via his participation in dominoes play also has the potential to be a great resource in terms of developing communication skills, both as a speaker and a listener. Within the game of dominoes, successful players are often those who can be attentive and deduce critical information from body language, subtle vocal cues, and innuendos, as well as sustain clever banter while simultaneously engaging in perfunctory and/or highly sophisticated tasks. Many medical training programs place great value on developing in students an appropriate and humane "bedside manner" and an ability to draw conclusions from patients' limited explanations or nontechnical language.

Finally, a sociopolitical analysis allows us to highlight Daniel's agency in deciding to participate in the dominoes group despite the potential social class, available time, and other conflicts alluded to by the administrator. Daniel's somewhat dismissive response "Is that right?" to her chiding, which prompted the other players to

encourage him to consider her concerns, could represent his resistance to accepting the assumedly requisite social divisions between him and the other dominoes players. Later in the interaction, Daniel reaffirms his opposition (resistant capital) by saying, "I'll be alright." In a show of solidarity, another player who may or may not have truly believed that Daniel would be able to continue playing subsequently affirmed this statement.

Unfortunately, perceptions about what is valuable or appropriate, and what practices signal high status (and thus power), ultimately ended the courtyard domino games. Several months after observations of the group ended, the group was banned from playing there. The university administration said that the ban was due to gambling, but several of the players were devout members of a religion that prohibited gambling, and researchers never observed gambling. The players were convinced that dominoes was banned because the medical school administration did not want a public display of African American working class culture on campus. In this case, not only was dominoes viewed as a practice that did not provide bridging capital for its players, especially those seeking academic credentials, it may have been seen as inappropriate for a university setting. Whether this was really the sentiment of the university administration, players felt that their practice (by virtue of race and class) was viewed by the administration in this way. What is clear is that the dominoes players and outside observers such as the administrator did not recognize the cultural wealth of the players as resources that could bridge in- and out-of-school practices within more privileged social networks.

Complexities of the Relation Between Race and Cultural Practices

Although we have pointed to racialized aspects of both basketball and dominoes, it is critical not to essentialize these practices as ones in which all, or only, African Americans engage. For the participants observed, playing basketball and dominoes were racialized forms of belonging. For some students, other activities also would be seen as meaningful markers of belonging as an African American. Such meanings vary by gender, nationality, geographic region, age, and individual preference. The presence of this variability should challenge us as researchers to move beyond using racial labels as cultural markers and to consider how these identities fit into broader social and historical discourses (Gutiérrez, 2013).

What Can We Learn From Sociopolitical Analyses of Learning?

Our use of Bourdieu (1977, 1986), Yosso (2005), and Putnam (2000) have highlighted that cultural practices are not neutral with respect to power. Practices both symbolize and impart bonding and bridging different forms of capital, and thus position one with respect to power and social status. De Abreu (1995) called this differential valuing of types of mathematical activity *valorization* and found that young people were quite aware of how home and school mathematics practices were differentially valued. Yet, this differential valuing of various kinds of practices also means that being competent in certain kinds of practices offers one access to

power, whereas being competent in others may result in marginalization. It may not be enough for our studies of mathematics learning to compare knowledge in school and out of school and conclude that "transfer" is not occurring; rather, we must also consider the way in which power is being differentially—and often problematically—conferred as young people are positioned within cultural practices.

Our analyses have illustrated that race and identity are an important part of understanding the access to cultural practices and the types of capital expressed and taken up within them. Identities are developed through interaction within cultural practices and can be sources of power or marginalization. Coming to understand and develop ways of capturing processes of power in cultural practices is crucial to furthering our scholarship in mathematics education and in culture and learning. When we fail to account for power in our work, power dynamics are still present—we simply leave them implicit and remain unable to question, challenge, or deconstruct them.

Implications for Mathematics Teaching and Learning in School

We conclude by offering what we think are the implications for mathematics teachers and students, as well as researchers, in moving toward a power-oriented analysis similar to those presented here. Often, when Nasir has presented these data, audience members have concluded that the natural implication of this work is that we should teach mathematics to African American students using basketball and dominoes. From our perspective, that assumption is problematic for several reasons. First, it essentializes African Americans as homogenous—it is not true that all black students engage in these practices, and assuming that they do and teaching from that assumption may alienate students and reify racial stereotypes that all African Americans value these practices and related social networks (in addition to not being effective instructionally).

Second, teaching primarily within the confines of these particular cultural practices (for instance, basketball and dominoes) could limit students' access to bridging other important capital that is established within mathematics, because students need to be exposed to a variety of mathematical ideas and academic discourses. This includes those practices that traditionally have been valued in mathematics and its related networks. Likewise, teachers of mathematics need to recognize the diverse cultural wealth that students use to bridge their in- and out-of-school mathematical practices and experiences. And finally, such an approach assumes that certain students need special instruction because of cultural and/or cognitive deficits, as opposed to recognizing that there are dominant perspectives that make value judgments about what types of knowledge and practices should be empowered rather than marginalized. Although we would not want to foreclose the possible benefits of tapping into the informal mathematical knowledge students gain in the practices of basketball and dominoes (as they do in other out-of-school practices), we emphasize these cautions.

If the primary message is not "teach mathematics through basketball and dominoes," how might understanding these practices and their meanings to learners

outside school shift the way teachers think about their work with students? This work suggests that educators and researchers take a step back and invoke a broader analytical lens on teaching and learning in mathematics. We must see teaching and learning as a social and political process in addition to a cognitive process (for further discussion, see Gutstein, 2006, and Gutiérrez, 2000, 2002). The analyses presented here highlight the ways in which power is at play as our society decides which kinds of mathematical thinking, discourses, strategies, and social networks to privilege, as well as when we structure access to certain kinds of practices for some students but not others.

Another important implication of this work is that we might help students think about and value the various forms of knowledge that they have acquired from cultural practices and affiliations outside school and deconstruct the ways in which some kinds of knowledge are valued (hold power) in some settings while others are not. In other words, teachers could help students reflect on the types of mathematical knowledge they engage in outside school and on why only certain types of mathematical thinking and practices are valued in school. This would support the development of a critical consciousness in students, with which they would better understand and deconstruct the ways in which power operates in their lives in relation to mathematical thinking and learning.

Furthermore, teachers and mathematics educators should view achievement disparities in mathematics as part of a broader set of social forces that privilege some and marginalize others, rather than as individual student or group deficiencies. Given that school systems across the nation all reproduce the same general outcomes with respect to differences in achievement by race and class, then our work to teach *all* students requires disrupting these normative patterns of achievement. This knowledge means that we come to view the teaching and learning of mathematics as not only an issue of building the individual cognitive skills of students but also as a political issue: providing access and valuing diverse forms of mathematical knowledge as a civil right (Moses & Cobb, 2001). This view challenges the ways in which we currently diagnose failures in mathematics—as individual or cultural failings—and conceptualize what constitutes achievement.

Finally, this work has implications for thinking about how we as researchers analyze the relations between power and identity for students. We have argued that students' identity choices and memberships in particular social networks are eclipsed by limiting stereotypes about "people like them"—be they black people, poor people, or male people. This limiting of identity choices and differential valuing of certain groups is a key way that marginalization is perpetuated in schools, because it constrains both real and perceived opportunities and limits students' access to embodied and institutionalized forms of capital and networks. Rather than perpetuating these constraints, we as researchers must add to our analytical repertoire the tools to examine how issues of power and identity are at play within and across in-school and out-of-school learning settings. Approaching our data differently is one step we can take; the other is that we may, in fact, have to begin to consider different types of data that more appropriately illustrate how

power relations are reproduced and contested within our research settings.

It is our hope that the ideas presented in this paper prompt us as mathematics educators to see our work as fundamentally tied to teaching and learning as a social and political process. We are not simply creating new types of mathematical understandings in minds, but we also are educating *people* in a world that is deeply stratified and categorically unequal.

REFERENCES

Bobo, L. D. (1999). Prejudice as group position: Microfoundations of a sociological approach to racism and race relations. *Journal of Social Issues, 55*, 445–467. doi:10.1111/0022-4537.00127

Bonilla-Silva, E. (2006). *Racism without racists: Color-blind racism and the persistence of racial inequality in the United States* (2nd ed.). Oxford, England: Rowman & Littlefield.

Bourdieu, P. (1977). *Outline of a theory of practice*. New York, NY: Cambridge University Press.

Bourdieu, P. (1986). Forms of capital. In J. G. Richardson (Ed.), *Handbook for theory and research for the sociology of education* (pp. 241–258). Westport, CT: Greenwood.

Bourdieu, P., & Passeron, J. C. (1990). *Reproduction in education, society and culture*. London, England: Sage.

Bowles, S., & Gintis, H. (1976). *Schooling in capitalist America: Educational reform and the contradictions of economic life.* New York, NY: Basic Books.

Carter, P. L. (2005). *Keepin' it real: School success beyond black and white.* New York, NY: Oxford University Press.

Cole, M. (1996). Interacting minds in a life-span perspective: A cultural-historical approach to culture and cognitive development. In P. B. Baltes & U. M. Staudinger (Eds.), *Interactive minds: Life-span perspectives on the social foundation of cognition* (pp. 59–87). New York, NY: Cambridge University Press.

Dance, L. J. (2002). *Tough fronts: The impact of street culture on schooling*. London, England: Routledge.

Darling-Hammond, L. (2005) New standards and old inequalities: School reform and the education of African American students. In J. E. King (Ed.), *Black education: A transformative research and action agenda for the new century* (pp. 197–224). Mahwah, NJ: Erlbaum.

De Abreu, G. (1995). Understanding how children experience the relationship between home and school mathematics. *Mind, Culture, and Activity, 2*, 119–142.

Diversity in Mathematics Education Center for Learning and Teaching. (2007). Culture, race, power, and mathematics education. In F. K. Lester Jr. (Ed.), *Second handbook of research on mathematics teaching and learning* (pp. 405–434). Charlotte, NC: Information Age.

Ferguson, A. A. (2000). *Bad boys: Public schools in the making of black masculinity*. Ann Arbor, MI: University of Michigan.

Fordham, S., & Ogbu, J. U. (1986). Black students' school success: Coping with the burden of "acting white." *The Urban Review, 18*, 176–206.

Frederickson, G. (1988). *The arrogance of race: Historical perspectives on slavery, racism, and social inequality*. Hanover, NH: Wesleyan University Press.

Gay, J., & Cole, M. (1967). *The new mathematics and an old culture: A study of learning among the Kpelle of Liberia*. New York, NY: Holt, Rinehart, & Winston.

Gresalfi, M., Martin, T., Hand, V., & Greeno, J. (2008). Constructing competence: An analysis of student participation in the activity systems of mathematics classrooms. *Educational Studies in Mathematics, 70*, 49–70. doi:10.1007/s10649-008-9141-5

Gutiérrez, R. (2000). Advancing African American, urban youth in mathematics: Unpacking the success of one mathematics department. *American Journal of Education, 109*, 63–111. http://www.jstor.org/page/journal/amerjeduc/about.html

Gutiérrez, R. (2002). Enabling the practice of mathematics teachers in context: Toward a new equity research agenda. *Mathematical Thinking and Learning, 4*, 145–187. doi:10.1207/S15327833MTL04023_4

Gutiérrez, R. (2013). The sociopolitical turn in mathematics education. *Journal for Research in Mathematics Education, 44,* 37–68.

Gutstein, E. (2006). *Reading and writing the world with mathematics: Toward a pedagogy for social justice*. New York, NY: Routledge.

Ladson-Billings, G., & Tate, W. F., IV. (1995). Toward a critical race theory of education. *Teachers College Record, 97*, 47–68. http://www.tcrecord.org

Lave, J. (1997). The culture of acquisition and the practice of understanding. In D. Kirshner & J. A. Whitson (Eds.), *Situated cognition: Social, semiotic, and psychological perspectives* (pp. 17–36). Mahwah, NJ: Erlbaum.

Lave, J., Murtaugh, M., & de la Rocha, O. (1984). The dialectic of arithmetic in grocery shopping. In B. Rogoff & J. Lave (Eds.), *Everyday cognition: Its development in social context* (pp. 67–94). Cambridge, MA: Harvard University Press.

Lerman, S. (2000). The social turn in mathematics education research. In J. Boaler (Ed.), *Multiple perspectives on mathematics teaching and learning* (pp. 19–44). Westport, CT: Ablex.

Martin, D. B. (2000). *Mathematics success and failure among African American youth: The roles of sociohistorical context, community forces, school influence, and individual agency*. Mahwah, NJ: Erlbaum.

Martin, D. B. (2009). Researching race in mathematics education. *Teachers College Record, 111*, 295–338. http://www.tcrecord.org

Moses, R., & Cobb, C. (2001). *Radical equations: Math literacy and civil rights*. Boston, MA: Beacon Press.

Nasir, N. S. (2000). Points ain't everything: Emergent goals and average and percent understandings in the play of basketball among African American students. *Anthropology & Education Quarterly, 31*, 283–305. doi:10.1525/aeq.2000.31.3.283

Nasir, N. S. (2002). Identity, goals, and learning: Mathematics in cultural practice. *Mathematical Thinking and Learning, 4*, 213–247. doi:10.1207/S15327833MTL04023_6

Nasir, N. S. (2005). Individual cognitive structuring and the sociocultural context: Strategy shifts in the game of dominoes. *Journal of the Learning Sciences, 14*, 5–34.

Nasir, N. S., & Hand, V. (2008). From the court to the classroom: Opportunities for engagement, learning, and identity in basketball and classroom mathematics. *Journal of the Learning Sciences, 17*, 143–161.

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*, 78–114. doi:10.3102/0002831208323279

Nasir, N. S., & Saxe, G. B. (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. doi:10.3102/0013189X032005014

Noguera, P. A. (2003). The trouble with Black boys: The role and influence of environmental and cultural factors on the academic performance of African American males. *Urban Education, 38*, 431–459. doi:10.1177/0042085903038004005

Omi, M., & Winant, H. (1994). *Racial formation in the United States: From the 1960s to the 1990s* (2nd ed.). New York, NY: Routledge.

Portes, A. (1998). Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology, 24*, 1–24.

Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York, NY: Simon & Schuster.

Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context*. Oxford, England: Oxford University Press.

Saxe, G. B. (1988). Candy selling and math learning. *Educational Researcher, 17*(6), 14–21. doi:10.3102/0013189X017006014

Saxe, G. B. (1991). *Culture and cognitive development: Studies in mathematical understanding*. Hillsdale, NJ: Erlbaum.

Saxe, G. B. (1999). Cognition, development, and cultural practices. *New Directions for Child and Adolescent Development, 83*, 19–35. doi:10.1002/cd.23219998304

Valero, P., & Zevenbergen, R. (2004). *Researching the socio-political dimensions of mathematics education: Issues of power in theory and methodology*. Norwell, MA: Kluwer.

Varenne, H., & McDermott, R. (1998). *Successful failure: The school America builds*. Boulder, CO: Westview.

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

Yackel, E., & Cobb, P. (1996). Sociomathematical norms, argumentation, and autonomy in mathematics. *Journal for Research in Mathematics Education, 27*, 458–477. http://www.nctm.org/publications/jrme.aspx

Yosso, T. (2005). Whose culture has capital? A critical race theory discussion of community cultural wealth. *Race, Ethnicity and Education, 8,* 69–91. doi:10.1080/1361332052000341006

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