

A Framework for Understanding Whiteness in Mathematics Education

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In this article, the authors provide a framework for understanding whiteness in mathematics education. While whiteness is receiving more attention in the broader education literature, only a handful of scholars address whiteness in mathematics education in any form. This lack of attention to whiteness leaves it invisible and neutral in documenting mathematics as a racialized space. Naming White institutional spaces, as well as the mechanisms that oppress students, can provide those who work in the field of mathematics education with specific ideas about combating these racist structures. The framework developed and presented here illustrates three dimensions of White institutional space—institutional, labor, and identity—that are intended to support mathematics educators in two ways: (a) systematically documenting how whiteness subjugates historically marginalized students of color and their agency in resisting this oppression, and (b) making visible the ways in which whiteness impacts White students to reproduce racial privilege.

KEYWORDS: mathematics education, race, racism, whiteness, White supremacy

Whiteness is a widespread ideology in society (see, e.g., Leonardo, 2004; Lewis, 2004). While the effects of whiteness are receiving more attention in the broader education literature, mathematics educators have generally been immune to researching its impact on students (Battey, 2013a). Only a handful of scholars address whiteness in mathematics education in any form (see, e.g., Battey, 2013a; Brewley-Kennedy, 2005; Martin, 2007, 2008, 2009, 2013; Stinson, 2008, 2011). This lack of attention to whiteness leaves it invisible and neutral in documenting mathematics as a racialized space. Racial ideologies, however, shape the expectations, interactions, and kinds of mathematics that students experience. Martin (2009) calls for the de-silencing of race in mathematics through ideologies of colorblindness and whiteness by actively acknowledging students' co-constructed academic and racial identities as well as providing opportunities to engage with mathematics as a tool for social change. This call, for us, means documenting the

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ways in which whiteness subjugates historically marginalized students of color (e.g., different forms of micro- and macro-aggressions¹) and their agency in resisting this oppression, as well as to make visible the ways in which whiteness impacts White students to reproduce racial privilege.

The goal for us is to support the development of a mathematics space that builds collective consciousness of racism to prevent students of color from internalizing deficit ideologies (Feagin, 2006; Moore, 2008). This collective consciousness, in turn, could open more space for student identities that challenge existing racial hierarchies in mathematics. Scholars posit that such perpetuation of racist structures in White institutional spaces like mathematics classrooms can be halted through purposeful analyses of whiteness with the voices and experiences of those marginalized brought to the fore (Andersen, 2003; Martin, 2009; Moore, 2008). In addition to these voices, however, researchers must also deconstruct the ways in which institutional spaces privilege Whites (Martin, 2008). Naming White institutional spaces, as well as identifying the mechanisms that oppress and privilege students, can give those who work in the field of mathematics education specific ideas of how to better combat racist structures. As Martin (2013) states, few “White scholars, have turned their analyses inward to examine the internal structure of mathematics education as a politically oriented project in order to expose its own enactments and validations of racial hierarchies and inequities” (p. 322). Along the same lines, we offer this (*developing*) framework to support mathematics education scholars in general, and White scholars specifically, in examining the racist internal structure of mathematics education.

But before reviewing existing literature, we wish to clarify some key concepts, including White supremacy, White privilege, whiteness, and racism. Evidently, these terms are interwoven. It is crucial to note, however, that in developing a framework for whiteness in mathematics education, our goal is not to re-center whiteness, but rather to document White supremacy as opposed to White privilege. Leonardo (2004) makes the case that for White privilege to take shape it must be accompanied with a process of racial domination. In other words, while White privilege refers to benefits from racism in favor of Whites, White supremacy is the systemic maintenance of the dominant position that produces White privilege. Therefore, White supremacy takes on power more centrally than privilege alone and focuses “around direct processes that secure domination” (Leonardo, 2004, p. 137). Whiteness is the ideology that maintains White supremacy, valuing one racial group over others. Thus, the foundational ideology of whiteness maintains a system of White supremacy, which produces privilege. Finally, in relating racism and whiteness, Kivel (2011) states:

¹ Microaggressions are subtle, possibly unconscious, automatic insults to individuals from historically marginalized groups (Solórzano, 1998). Macroaggressions are broader acts against marginalized groups on systemic levels (Sue et al., 2007).

Racism is based on the concept of whiteness—a powerful fiction enforced by power and violence. Whiteness is a constantly shifting boundary separating those who are entitled to have certain privileges from those whose exploitation and vulnerability to violence is justified by their not being white. (p. 17)

Thus, whiteness is a foundational concept for racism. Whiteness creates an ideal race, with which to devalue and subsequently oppress other racial groups. Understood in this way, whiteness has a dual nature: privileging Whites and oppressing those outside the boundary of White. While this boundary is not static, it can be viewed through both lenses to determine its presence in an institution. Whiteness then is the fictive ideology from which racism is established. The goal of the framework presented here is not merely to name White privilege in mathematics education but rather to document the institutional ways in which White supremacy in mathematics education acts to reproduce subordination and advantage.

We begin by briefly reviewing some of the approaches that scholars have taken to document whiteness in mathematics education. We follow with a review of work on whiteness in literatures across law, sociology, history, and education as an introduction to central ideas. Because so few scholars have taken up Martin's (e.g., 2009, 2013) calls around interrogating whiteness, we intend the review to be a broad introduction for mathematics educators. We first address whiteness as a construct that shifts over time, but oppresses those outside its boundary. From there, we examine work on how White supremacy currently functions through dialectical mechanisms: symbolic (ideologies) and material (resources). We then move to examples of whiteness functioning through colorblind policies in housing, taxes, and education. Throughout the review on whiteness, we draw specific connections to what the concepts can mean for work within mathematics education. After the review, we introduce our theoretical framework aimed at documenting mechanisms operating in White institutional spaces within mathematics education. In the framework, we illustrate three dimensions in documenting White institutional space: institutional, labor, and identity. We hope this framework serves as a tool to detail the ways in which whiteness reproduces advantage and disadvantage in mathematics to consciously find ways to confront and challenge its effects. The question that the framework aims to address: How does whiteness operate in mathematics education?

Whiteness in Mathematics Education

While there is limited work on whiteness in mathematics education, the approaches taken to examine whiteness have been quite varied. Researchers have examined whiteness as hegemonic discourse, property, identity, and privilege. Stinson (2008, 2011), for example, explores how academically and mathematically successful African American male students negotiate discourses of whiteness. In particular,

the African American male participants of his study responded to Fordham and Ogbu's (1986) burden of acting White theory (among others) to show how they accommodated, reconfigured, or resisted the discourse. Stinson claimed that the burden of acting White was most often an oversimplification or misinterpretation of their experiences; in that, the participants did not place academic success as only within whiteness or somehow outside blackness. Instead, they experienced whiteness more generally as pressure to mold themselves into a White ideal rather than being called out as acting White by Black peers. The young African American men in Stinson's study, however, were able to navigate the expectations of whiteness successfully. This work represents a unique approach in having African American students, through counter-storytelling, deconstruct the hegemonic narratives of whiteness.

Taking a different approach to whiteness, Battey (2013a) provides an example of whiteness at an institutional level. In his project, Battey calculated the investment in whiteness due to mathematics course taking in the United States. In this sense, he examined access to mathematics education as property. Given that there is no reason to expect different "races" to do better or worse in terms of mathematics—other than historical and institutional inequities producing differential opportunities and access—the differences in course taking can be tied to racist structures. Battey examined data from three time points, 1982, 1992, and 2004, using mathematics coursework as a proxy for property, to predict differential racial investments upwards of \$1.5 trillion advantaging Whites over Latin@s,² African Americans, and Native Americans. While 25% of this total can be attributable solely to race (see Rose & Betts, 2001), a net advantage for Whites of over \$400 billion still remains. These calculations illustrate how mathematics education reproduces racial income and wealth differences that perpetuate an ideology of whiteness.

At an individual level, Brewley-Kennedy (2005) explores how one mathematics teacher educator's White identity influenced her instructional practices in a mathematics methods course. From interviews and observations, Brewley-Kennedy found that the teacher educator encountered several struggles when attempting to implement an "equity" agenda. First, the teacher educator worried about creating an emotionally heated space if she explicitly challenged preservice teachers' beliefs about race and poverty. Rather than an intellectually challenging space, she wished to maintain a "safe space." In addition to worrying about her preparedness with pedagogical practices and having simply "book knowledge," she also avoided exploring equity more broadly due to the pre-service teachers' resistance about dis-

² We use the @ sign to indicate both an "a" and "o" ending (Latina and Latino). In alignment with Gutiérrez (2012), we see this use as a way to de-center the patriarchal nature of the Spanish language. It is customary for groups of males (Latinos) and females (Latinas) to be written in the form that denotes only males (Latinos) and we see the @ symbol as better than denoting an either/or (Latino/a) form that promotes a gender binary.

cussing it. While the teacher educator was comfortable with discussing gender and special education because they were not, from her perspective, emotionally loaded, she was worried about “politically correct” terms and overly generalized issues of race. Brewley-Kennedy’s research illustrates how an identity of whiteness serves to constrain a teacher educator in discussing equity with future teachers. Her research exemplifies what DiAngelo (2011) calls “white fragility,” or Whites’ discomfort with race resulting in behaviors of silence, fear, guilt, or avoiding discussions about race altogether, which serves to reproduce a status quo of White supremacy.

The most extensive work on whiteness in mathematics education comes from Martin (see, e.g., 2007, 2008, 2009, 2013), who has discussed various concepts such as racialized mathematics identity, White privilege, and White institutional space in his scholarship. Because we review Martin’s work on White institutional space later, here we focus on his research on racialized mathematics identity and White privilege. In his article “Beyond Missionaries or Cannibals: Who Should Teach Mathematics to African American Children?” Martin (2007), drawing from the work of Bonilla-Silva (e.g., 2003), discussed four ideological frames—liberal individualism, naturalism, cultural racism, and minimization of racism—that can constrain White teachers’ expectations and teaching of African American children and youth. These frames serve to position African American students as deficient and as needing to “live up,” so to speak, to White norms of behavior and achievement. The flip side to these frames is the assumed privilege that they bestow to White students. Assumptions of Whites’ high ability in mathematics and avoidance of pathologizing Whites serve to privilege them as a group. For instance, despite mathematics achievement tests showing Asian American students outperforming White students, society resists pathologizing Whites’ underachievement (Martin, 2009). Whiteness here serves as a means to resist attaching deficient frames to White students.

Across this work, scholars discuss various aspects of mathematics education and whiteness. We take a broad view of mathematics education that includes policy, ideologies, research, curriculum, instruction, identities, and the people who populate the field. As noted in the introduction, we aim to introduce the research base for mathematics education scholars and practitioners to better understand critical facets of whiteness in the existing literature. We begin with a focus on its ideological construction.

Whiteness in Law, Sociology, History, and Education

Lipsitz (1995) states that the fictive concept *whiteness* appeared in law as an abstraction, and it became actualized in everyday life. Much like “Black” is a cultural construction based on skin color, not biology, “White” developed out of the reality of slavery and segregation, giving groups unequal access to citizenship, im-

migration, and property. By giving Whites a privileged position in relation to the “other,” European Americans united into a fictitious community. Whiteness is a constantly shifting boundary separating those who are more valued from those whose exploitation is justified by not being White. The boundaries of this social construction show how the definition has shifted over time. While many in the United States conceptualize race as a Black/White binary, groups such as Jews, Native Americans, Asians, and Latin@s have proved more difficult to classify in the racial hierarchy within the U.S. context (Haney-Lopez, 2006).

In the 1840s and 1850s, for example, citizens of California had debates about the status of Mexicans and Chinese. There were some Mexicans with considerable wealth who partnered with Whites, while the Chinese were exploited for work on railroads and in fields, which impacted who could become citizens, own land, and marry Whites (Almaguer, 1994). To complicate things further, though Mexican Americans were considered White legally, they were denied rights and privileges that whiteness bestowed (Foley, 2002). Despite being ruled as White in California courts, the U.S. government added a category of Mexican in the 1930 census, counting only 4% of Mexicans as White. This action prompted the League of United Latin American Citizens (LULAC) to turn its back on civil rights battles of the 1940s and 1950s with statements such as “tell these Negroes that we are not going to permit our manhood and womanhood to mingle with them on an equal social basis” (B. Marquez, as quoted in Foley, 2002, p. 56).

In contrast to LULAC, the Chican@ movement of the 1960s rejected the assimilationist strategies. They rejected whiteness and all it had come to mean, including the rejection of ancestry and cultural heritage as well as the adoption of “American” values. The response from Whites was “Why do you insist on being different? Why do you have to be Mexican or Chicano? Why can’t you just be American?” (Foley, 2002, p. 56) Such questioning failed to recognize that differential treatment and institutional racism did not afford Chican@s the benefit of being American or White. Thus, the lure of whiteness and all that it entails has been a contested boundary for those in the Latin@ community, some seek it out and others reject it (Bonilla-Silva, 2002; Haney-Lopez, 2006).

Muddying the definitional space further, from 1878 to 1909, courts in the United States heard twelve naturalization cases of persons seeking citizenship. Eleven of those cases were barred from citizenship including persons from China, Japan, Hawaii, as well as two mixed race applicants (Foley, 2002; Haney-Lopez, 2006). Across the cases, neither white skin nor being Caucasian guaranteed one’s rights to citizenship and thus, whiteness. There is extensive work examining the shifting definitions of White historically, from Jews, Irish, and Russians to eastern and southern Europeans (e.g., Haney-Lopez, 2006). Over the last few decades, although there is still prejudice against these groups, they are generally considered White in the United States (Brodin, 1998). Many ethnic groups have sought out

equalization through citizenship, but when African American citizens still had to sit at the back of the bus and could not vote, assimilation became the goal for some. When the 1940 census stopped distinguishing foreign-born versus native-born Whites, official assimilation as White became a possibility. As “not-yet-white” ethnic immigrants strove to assimilate as a way to attain whiteness (Roediger, 2002), “immigrants of color always attempt to distance themselves from dark identities (blackness) when they enter the United States” (Bonilla-Silva, 2003, p. 271). Rather than laws, concrete definitions, or biology determining citizenship, an ideology of whiteness wedded to the idea that Blacks were culturally and biologically inferior to Whites (Morrison, 1993), determining access and power.

What all of this means within mathematics education is that an ideology of whiteness operates to devalue, oppress, and discriminate those perceived as “less” or not White. In conjunction with this devaluing, the ideology maintains Whites in an objective and neutral position of power to divvy up access. An ideology of whiteness would then serve to position White people, White ideas, and White behaviors as more valued institutionally and in classrooms, which may not always be visible in terms of curriculum designers and policy developers. Moreover, whiteness oppresses blackness through deficit ideas, poor treatment, and lower quality of instruction. The creation of a racial ideology of whiteness then brings with it very real consequences. We next detail the function of this racial ideology and how it interacts with colorblindness to produce material racism.

The Function of Racial Ideologies of Whiteness and Colorblindness

Ideologies provide a framework for making sense of the world and they gain power based on legitimizing the present state of things. Racial ideologies, then, work best when they offer invisible, commonsense explanations to keep the status quo (Hall, 1990). These forever-present but invisible ideologies retain power and endure to the extent that they enable an understanding of the stratification of society, securing the positions of both the dominated and the dominant (Lewis, 2004). Thus, the functioning of racial ideologies like colorblindness and whiteness is complex.

Whiteness is supported by a colorblind ideology, a form of maintaining the social order institutionally, and with the appearance of not being racial. Bonilla-Silva (2003) connects colorblindness with the resistance to framing, defining, or pathologizing whiteness and the ways that race plays out in the United States since the Civil Rights movement. While racism often calls forth overt practices such as slavery, the Jim Crow era, and lynchings, the more recent avoidance of explicit racial discourses signifies colorblind racism, the dominant racial ideology since the Civil Rights movement (Bonilla-Silva & Forman, 2000). This racial ideology fits with Martin’s (2009) discussion about the framing of White achievement versus that of historically marginalized students of color along two lines. First, it shows the

denial to recognize how institutional inequality bestows unearned advantages to Whites. This denial allows the dominant ideology to locate racism today in a few prejudiced individuals. Second, it fits with framing lower achievement by students of color as due to cultural deficiency. This reasoning essentially blames African Americans and Latin@s for their lower status (Bonilla-Silva & Forman, 2000). An unwillingness to question how institutions benefit Whites, coupled with statistics showing lower achievement scores for African American and Latin@s shifts the blame to students, families, communities, and culture and away from whiteness.

Colorblindness shifts explicit racial arguments about genetics to supposedly non-racial arguments or proxies of student failure, uncaring parents, and devaluing of education, which leaves whiteness invisible and allows those who assert it to defend their views in apparent nonracial ways (Bobo & Hutchings, 1996; Bobo & Smith, 1994; Bonilla-Silva, 2003; Bonilla-Silva & Forman, 2000; Carmines & Merriam, 1993; Jackman, 1994). For instance, colorblindness as a racial ideology provides an explanation for the framing of disparate achievement as “gaps” when White students (the dominant group) score better than students of color (the dominated group), yet not when Whites are scoring lower, in the case of international comparisons (Martin, 2009).

Under whiteness, it does not matter whether Whites are racially conscious or not. Whites benefit from an external reading of themselves as White (Lewis, 2004), whether or not they identify as White. In other words, a felt identity or groupness is not a prerequisite to reap unearned privileges. Lewis discusses this situation as a passive collective; whites are unified by their actions around certain objects (passive collective), rather than a self-conscious choice to be a member of a group (identity). Lewis writes—

Although numerous all-white groups are not explicitly racial, their racial composition is not an accident but is a result of whites’ status as members of a passive social collectivity whose lives are shaped at least in part by the racialized social system in which they live and operate. (p. 627)

The concept of a passive collective allows for the enactment of whiteness through institutional racism, including unearned advantages, without the intentionality of Whites. All Whites experience race daily, living and working within racial structures, though race and racism are not necessarily explicit for them. For instance, White identities can operate more explicitly in the form of exclusive policies (e.g., country clubs that do not allow Blacks to join), but in a colorblind society, these are less acceptable. Other settings function as a result of an outcome of exclusive policies (e.g., housing segregation affects who shops at particular grocery stores and attends local schools). Here, there is no felt identity of whiteness in these settings, although housing segregation whitewashes particular stores, schools, and communities. A third type of setting also functions as a passive collective based on long his-

tories of racial exclusion. An example of this type is when educational and work experience is used for promotions and better jobs, based on past racial discrimination of the labor market, allowing more Whites to serve on boards, attend partner meetings, or serve on personnel committees (Lewis, 2004).

These settings illustrate the different ways that whiteness can work as an ideology, without it necessarily being adopted as a White identity. Whiteness functions within structures, deciding how resources, labor, and space will be distributed by means of housing segregation as well as educational and financial stratification. These structures are in place to benefit future generations. The point is not that all Whites benefit the same in all of these settings or by all policies, as this would be essentializing a highly diverse group of people, but rather that a person's racial position is constructed in relation to a racial history, which has distributed space, resources and labor as well as generated racist language and discourses (Young, 1994). This distinction is important in understanding whiteness as an ideology rather than as an identity and thus shifts how one might study whiteness in mathematics education. As opposed to approaching whiteness through interviews and post-hoc analyses of individual experiences, which has worked so well for example with African American identity, the formation of a passive collective will make study of the construct more difficult. Because most Whites passively identify as White, directly asking them how whiteness affects them will glean limited insights. Instead, a researcher must study the proxies used for race, moment-to-moment interactions, and the institutional settings in which Whites participate. Doing so places more emphasis then on observation and examining multiple levels of mathematics education including policy, curriculum, and teaching, in addition to identity construction as reflected in the framework presented here.

Symbolic and Material Racism in Policies

Sewell (1992) and Lewis (2004) discuss racism both ideologically and concretely through considering its dialectical nature: symbolic (ideological) and material (structural resources). Race is more dynamic than having racial ideologies create material differences; racial ideologies are also reproduced in relation to material circumstances. More specifically, Sewell (1992) explains how race is socially constructed by the dialectic relationship between symbolic and material resources as follows:

Must be true that schemas are the effects of resources, just as resources are the effect of schemas.... If resources are instantiations or embodiments of schemas, they therefore inculcate and justify the schemas as well.... If schemas are to be sustained or reproduced over time...they must be validated by the accumulation of resources that their enactment engenders. (p. 12)

Racial groups, therefore, are divided because of real material conditions; which, in turn, reproduce deficit ideologies about intelligence, effort, and values. At the same time, racial ideologies are employed in the continual production of this material stratification (West & Zimmerman, 1987). The dialectic relationship between ideologies creating more racial disparity, and racial disparity producing these ideologies is critical in understanding the consequences of policy and educational institutions including in mathematics education.

The production of whiteness then can be felt in material form. Lipsitz (1995) coined the phrase *possessive investment in whiteness* over two decades ago. In his article, he discussed federal policies in the United States around housing, taxes, and education among other areas, which have reproduced an ideology of whiteness. Many policies seem neutral (i.e., colorblind), yet their material effect is anything but that. As one example, the Federal Housing Administration used a confidential city survey as well as destroyed housing in city centers, which affected twice the percentage of African Americans compared to Whites in the 1950s and 1960s. They have also shifted loan money and therefore future investment in real estate away from communities of color and toward Whites since 1934 (Lipsitz, 1995; Logan & Molotch, 1987). More recently, studies have shown that African Americans are 60% more likely than Whites to be turned down for loans in Boston (controlling for credit qualifications), disqualified for loans almost three times as much in Houston, and are four times less likely to receive conventional financing in Atlanta (Campen, 1991; Logan & Molotch, 1987; Massey, 1996; Ong & Grigsby, 1988; Orfield & Ashkinaze, 1991; Zuckoff, 1992). There is an extensive literature showing how seemingly colorblind policies have produced material stratification in resources and, in turn, reproduced whiteness.

Furthermore, changes in federal tax policies during the 1980s made taxation on goods and services higher than it was for profits from investments (Lipsitz, 1995). This colorblind policy has allowed Whites to increase their wealth in comparison to Blacks (Oliver & Shapiro, 2006). To illustrate this point, Whites held \$20,000 more wealth in 1984 than Blacks in the United States and increased to \$95,000 in 2007 (an over 40% increase, controlling for inflation). A policy aimed at lowering investment taxes on capital gains benefited those owning their own homes and profiting from raised home values, transforming a supposedly neutral policy that advantaged Whites who benefited from more home ownership and increased property values due to previous racist policies. Similarly, Proposition 13 in California granted tax relief to property owners and reduced funds by \$13 billion a year for public education and other social services (McClatchy News Service, 1991). With 69% of Whites owning homes in California versus 46% of Blacks (U.S. Census Bureau, 2004), this tax relief served to return more wealth to Whites. These policies again reproduced advantages for Whites.

Educationally, funding in schools is one way that Whites maintain privileges. While the history of *Brown v. Board of Education* is well known, the fact that we are now at similar levels of segregation in schools as the 1960s (see Orfield, Losen, Wald, & Swanson, 2004) means the problems of resource differentials are just as big an issue today as they were 40 years ago (Fairclough, 2007; Walker, 1996). Policies of school funding tied mostly to local property taxes have maintained differential funding for suburban schools at levels twice that for urban schools (Kozol, 1991). This well-documented difference impacts teacher quality, curricula, building conditions as well as numerous other educational issues. These differences then play out in instructional resources, quality of instruction, and achievement test scores, further reifying whiteness in terms of “achievement gaps” over historically marginalized students of color.

Despite these investments in Whites—generated through slavery, segregation, and colorblind social reforms—a poll noted that 70% of Whites believe that African Americans “have the same opportunities to live a middle-class life” (Orfield & Ashkinaze, 1991). These policies purport colorblindness while advantaging a racial group, Whites; however, these policies serve to increase racial stratification rather than ameliorate it. Colorblind policies then maintain the guise of neutrality while reproducing whiteness by increasing material benefits due to historic advantages. Mathematics education has similar policies such as “Algebra for All” and the “Common Core” that espouse colorblindness, but reproduce or even increase material differences for students (Martin, 2003, 2013). The production of racial stratification (material) in course taking or achievement differences then provides evidence validating the higher value of Whites, reproducing whiteness (symbolic). Bringing a lens of whiteness to policy can support analyses that deconstruct rather than accepts the claimed neutrality.

Such a dialectical relationship between symbolic and material racism is also at play within mathematics education. The belief in a racial hierarchy of ability in mathematics—namely, Whites and Asian Americans at the top—produce real benefits for these groups. Perceptions are then made real as far as how African Americans and Latin@s are treated in mathematics classrooms, the forms of instruction available to them, and what courses (Advanced Placement [AP] or not) schools provide; which, in turn, lead to different testing outcomes (gaps). Institutions make these ideologies concrete when they provide African Americans and Latin@s impoverished forms of instruction through tracking and reduced funding in the form of property taxes. This then serves to legitimize the ideology that African Americans and Latin@s are innately worse at mathematics rather than deconstructing the role of institutions or noting the efforts of educators and communities to combat these racist structures daily. The framework presented here examines multiple levels of mathematics education to document mechanisms that reproduce whiteness both symbolically and materially.

Mathematics Education as a White Institutional Space

In laying out the framework, we discuss three dimensions to consider in documenting how White institutional space operates in mathematics education: institutional, labor, and identity (see Table 1). Each of these dimensions interacts with the other, but they provide three lenses to capture the operation of whiteness. We draw on a number of scholars in building our framework, but none more so than Martin. More specifically, Martin (2009, 2013) calls for research on whiteness operating in mathematics education to address forms of racism in relation to achievement, participation, and student learning. Sociological work (e.g., Feagin, Vera, & Imani, 1996; Moore, 2008) informs Martin's conceptualization of mathematics education as a *white institutional space* based on four tenets:

(a) numerical domination by Whites and the exclusion of people of color from positions of power in institutional contexts, (b) the development of a White frame that organizes the logic of the institution or discipline, (c) the historical construction of curricular models based upon the thinking of White elites, and (d) the assertion of knowledge production as neutral and impartial, unconnected to power relations. (Martin, 2013, p. 323)

Not surprisingly, these four tenets specifically informed the institutional level of the framework. For example, Martin's fourth tenet (d) connects to the maintenance of whiteness as neutral and objective, which relates to ideological narratives about whiteness. Meanwhile, tenets (a) and (b) speak to the organizational logic of an institution, which includes how power is distributed across demographics. Finally, tenet (c) is specifically about history of curricula, although we broaden it to include the history of schools and communities and how they speak to economic and racial segregation. Despite our close attention to Martin's tenets, other scholars were also central in building each dimension of the framework.

In addition to Martin's influence at the institutional level, Moore's and Acker's respective work is critical. Moore (2008) specifically laid out the physical space of institutions including images displayed, history illustrated, and signs of recognition showing the values of specific institutions. Therefore, her work is cited under the element of physical space as well as the elements that Martin (2013) drew on in his work. In line with Martin's notion of the logic that organizes an institution, Acker (2000) used work on gender to examine how organizational logic impacts intersections with race and class through processes, actions, and meanings, maintaining inequities within broader society. Disparities in decision-making, control over resources, distribution of work, job security, and opportunities for promotion and recognition are ways to control and leverage power in organizations (Acker, 2006). Using these mechanisms, institutions can distribute power in a seemingly neutral and objective way while reproducing whiteness. Across these four elements

are key points of expressing and carrying out an ideology of whiteness at the institutional level.

The labor level draws on both Acker's and Moore's work as well. Acker (1990) discussed how gendered forms of interaction place more of an emotional burden on women that they must then bear in the workplace. In extending this work, Moore (2008) connected this emotional labor to the burden that African Americans bear due to whiteness. This emotional labor comes in the form of regulating dissatisfaction, frustration, and anger due to being subjected to deficit views, racial slights, and forced compliance. Such regulation is required when these emotions are deemed unacceptable in schools, with expectations of students being unemotional and placid in mathematics, placing the emotional burden of dealing with racism and discrimination on those oppressed. Behavioral regulation works similarly in schools, especially through fear of Black boys and youth, who the ideology of whiteness degrades as aggressive and violent and therefore in need of being controlled, while White boys and youth are seen as fooling around and playful (Gregory, Skiba, & Noguera, 2010). Finally, Steele and Aronson's (1995) work on stereotype threat and Dovidio's (2001) work on implicit racism raised the cognitive effects of dealing with racism. Together, they have found that deficit framing of historically marginalized groups depresses test scores and hinders group problem solving. Whiteness, therefore, serves as a dividing line between those implicitly asked to perform additional cognitive, emotional, and behavioral labor within mathematics education.

The last level of the framework, identity, draws most heavily on Martin's work once again. Martin (2009) argues that colorblind ideologies and practices marginalize students of color and prevent their positive co-construction of racial and mathematics identities. We want to stress that the conception of identity we utilize is one that is interpersonally constructed and thus negotiated between the individual and the multiple contexts in which she or he participates, which is what we mean by the co-construction of meaning. Lewis (2004) discusses schools as key sites of identity formation through racial-ascription processes that distinguish Whites from non-Whites using markers of otherness (e.g., culture, language, skin color, socioeconomic status). While boundaries of whiteness shift, the markers for being non-White are still signifiers of lower status. For example, lower status is something that White students do not have to deal with as they are assumed to be legitimate participants in mathematics. While not all Whites are attributed this legitimacy equally (e.g., female and low SES students more times than not are not afforded the same guarantees in mathematics classrooms as their middle-class, male peers), they still benefit from being seen as White. Meanwhile African Americans, Latin@s, and Native Americans are delegitimized mathematically, raising the need to prove themselves (see McGee & Martin, 2011).

Despite such racial de-legitimization in mathematics, it is important to also consider students' agency in negotiating their racial identities and mathematics success. Although Martin (2009) uses African Americans' experiences to illustrate these racial struggles in mathematics, his discussion can be extended to other racially oppressed student populations as they "negotiate and resist the racialization processes that attempt to position and confine [them] within an existing racial hierarchy" (p. 325). It is in this light that we consider identity, because as racism acts on students through institutions and interpersonal interactions, students also act back on these dimensions to resist racism in mathematics.

Table 1
Framework of Whiteness in Mathematics Education

| Dimensions | Elements | Links to Literature |
|----------------------|-----------------------------|---|
| Institutional | Ideological Discourses | Martin, 2013 (d); Moore, 2008 |
| | Physical Space | Moore, 2008 |
| | History | Martin, 2013 (c); Moore, 2008 |
| | Organizational Logic | Acker, 2000, 2006; Martin, 2013 (a, b) |
| Labor | Cognition | Dovidio, 2001; Steele and Aronson, 1995 |
| | Emotion | Acker, 1990; Moore, 2008 |
| | Behavior | Gregory, Skiba, and Noguera, 2010 |
| Identity | Academic (De)Legitimization | Martin, 2009 |
| | Co-construction of Meaning | Lewis, 2004; Martin, 2009 |
| | Agency and Resistance | McGee and Martin, 2011; Moore, 2008 |

Before examining each dimension in more detail, it is important to communicate that the dimensions are not independent of each other. Instead, they provide three lenses with which to detail and examine the construction of White institutional space in mathematics education. For example, the identities that students develop are negotiated with respect to the ideologies they must navigate as well as the emotional and behavioral norms established with others. Therefore, to establish that whiteness is framing a context where one lens or dimension may be primary, the others must be taken into account as well. Additionally, we reference the dual nature of whiteness once again. In order to document whiteness, the dual nature of privilege and oppression needs to be considered. As Whites are advantaged by the ideology, whiteness positions people of color as culturally deficient, intellectually inferior, and behaviorally aberrant. We detail ways in which each of these dimensions operates using various elements as well as providing indicators for each element.

Institutional

Institutional spaces constrain or afford differential access to people, resources, and work. In distributing this access, institutions legitimize certain ideologies

through the physical space, positioning of different groups in terms of power, and presentation of history (see Table 2). Just as with the examples mentioned earlier related to housing, when institutional decisions are made through a colorblind lens, it is easy to predict their impact on historically marginalized communities of color. If a freeway is going to be built in an urban area that is predominantly African American, then we know whose homes will be destroyed. This decision is not racially neutral. Much the way that testing and standards shift over time, we can predict the ways in which these policies that distribute resources will impact the organizational logic and physical space of schools and districts. In this way, the institutional dimension of our framework shapes the labor and identity dimensions given that it is responsible for the organization of labor and determines the ideologies and people with whom individuals will develop relationships. This shaping, however, is not to say that people cannot be agents of change in mathematics, but rather that institutions establish what those agents are acting against.

Table 2
Institutional Elements with Indicators

| Dimension | Element | Indicator |
|---------------|-------------------------------|---|
| Institutional | <i>Ideological Discourses</i> | <ul style="list-style-type: none"> • Racial hierarchy of mathematics ability • Innateness of mathematics ability • Mathematics as neutral • Abstract individualism • Meritocracy |
| | <i>Physical Space</i> | <ul style="list-style-type: none"> • Concrete representations • School messages • Visibility of students • Control of physical expression |
| | <i>History</i> | <ul style="list-style-type: none"> • Histories of schools • Patterns of inclusion and exclusion • Curricular perspectives |
| | <i>Organizational Logic</i> | <ul style="list-style-type: none"> • Distribution of power and work • Organizational structure • Positioning of stakeholders (e.g., parents) |

Ideological discourses. Broad discourses such as colorblindness, meritocracy, and abstract individualism often accompany whiteness in institutional spaces. These examples of symbolic racism, as discussed previously, are helpful in examining the presence of whiteness as has been detailed elsewhere (Bonilla-Silva, 2003; Martin, 2009; Moore, 2008; Ullucci & Battey, 2011). Here, however, we focus on specific ideologies common in mathematics education. Within mathematics education, whiteness takes the form of racial hierarchies of mathematics ability (Martin, 2009), the maintenance of mathematics as a cultureless or neutral domain, as well as the

innateness of mathematics ability (Ernest, 1991). Each of these ideologies plays off the others positioning African Americans, Latin@s, and Native Americans as less engaged, intelligent, and mathematically capable (Shah, in press). In particular, the innateness of mathematics intelligence aligns with colorblind ideologies in mathematics to produce advantages for Whites. The dialectic discussed earlier in terms of symbolic and material racism is important here. For example, if one holds the belief that mathematics ability is solely innate, then a teacher has less responsibility and control in generating student learning, and interestingly, this perspective has been shown to make teachers more susceptible to unconscious stereotyping (Jordan, Glenn, & McGhie-Richmond, 2010; Levy, Stroessner, & Dweck, 1998). This ideology (symbolic), coupled with racial achievement differences (material) in mathematics that are constantly reported in the news and academia, produces the racial hierarchy of ability. The achievement differences are material evidence that innate mathematics ability is not equitably distributed by race. Therefore, a belief in innate mathematics ability serves as a colorblind way of unconsciously believing in the racial hierarchy of ability shaped by whiteness.

The racial hierarchy of mathematics ability benefits the identities that White and Asian American students can construct with the domain while the accompanying discourse of innateness of mathematics ability makes the racial hierarchy stable. Evidence of these discourses can be observed in teachers' and schools' stable notions of "high" and "low" mathematics students that are then institutionalized in forms of tracking and subsequent differential access to cognitive demand. Pervasive discourses in schools about fixed levels of low and high students as well as "honors" or remedial labels construct ways to discuss innateness that link to racial discourses (DiME, 2007). In terms of privilege, the discourses are evidenced by the automatic attribution of Asian Americans and Whites as being good at mathematics and surprise when these students struggle. Even young students understand the value of different races in predominantly White schools (Lewis, 2001). Ideologies play out daily, becoming part of classroom routines to the point that students internalize positive associations with whiteness and negative ones with blackness. Identifying the ideologies at play in contexts provides a way to note when whiteness is present in mathematics education.

Physical space. Physical manifestations of ideologies also connote power through representations such as office size and placement of different participants. Rousseau Anderson (2014) urges urban mathematics educators to seriously consider space. Bullock and Larnell (2015) build on this idea to remove the veil of what is considered "urban" by taking seriously the physical urban space in detailing race and racism in mathematics education. Physical representations can come at many levels. For instance, it can come in the form of images, charts, symbols, and objects serving as concrete representations that communicate values and other central aspects of institutions. Moore (2008) uses these concrete representations to paint a

picture of whiteness in two law schools. Pictures that designated notable people, student recognition, and school history passed on messages about who was accepted and welcomed as well as who excelled academically. Images, histories, and perspectives of African American and Latin@ students can be invisible at times (Moore, 2008). This invisibility can contrast with the hypervisibility (Higginbotham, 2001) when students feel as though they are asked to speak for their race or when teachers hyper-focus on the “misbehavior” of students of color. Aligned with visibility, charts about acceptable behavior can be racialized ways of controlling students. For instance, behavioral norms that promote militaristic rules of order, zero-tolerance policies, and student “uniforms” are clear messages that the school sees students as needing to be controlled. Repeated school slogans in schools such as “I’m smart! I know that I’m smart” found in Kozol’s (2005, p. 36) work communicate just the opposite. If students were assumed to be smart, there would be no need to repeat these types of mantras. Similarly, the lack of these messages in predominantly White contexts is an implicit transmission that students are expected to be intelligent and under control or that these students do not need to see representations of current and historical figures that do not look like them. Such transmissions are also a way to perpetuate whiteness; communicating that there is such a limited number of significant African Americans or Latin@s that White students do not need to know about them.

Rubel, Lim, Hall-Wieckert, and Sullivan’s (2016) research also considers physical space from the perspective of mapping communities and place-based education. Building on Soja’s (2010) concept of spatial justice, Rubel and colleagues connect this work to discuss the ways “unjust geographies” can be researched in mathematics education:

Injustice leads to the production of “unjust geographies” which can manifest at a microlevel as intersections of the body by unequal politics (e.g., police stop and frisk policies) or at a broader spatial scale as inequitable distributions of resources (Soja, 2010). (p. 6)

This claim illustrates how ideologies impact space at multiple levels in mathematics education such as treatment of physical bodies, physical representations inside and outside of schools, distribution of resources, the positioning of various educational participants in physical space, and the positioning of communities in a broader geographical sense. These physical representations are material manifestations of specific ideologies and serve to reify racism.

History. Schools have histories that are inseparable from issues of exclusion, segregation, and differential resources in the United States (e.g., ignoring tax policies on capital gains discussed earlier). With a history of racially constructed access to jobs and wealth in the United States, raising sales taxes while lowering capital gains taxes have no other option but to oppress and advantage various groups.

These historical issues contribute to current educational inequality. For instance, a school may have originally been segregated followed by the bussing of African American students, only to see White flight result in home prices dropping and the tax base that determines school funding collapsing. History of inclusion or exclusion, therefore, has an impact on teacher retention, school demographics, and school funding. For example, Rousseau Anderson and Powell (2009) examine the interrelationship between a rural and urban school district. They explore how history influences demographics, economic development, and changes in zoning ordinances to transform the landscape of education in one metropolitan context. In effect, they document how race was central in this history to effect opportunities to learn.

The historical context of mathematics education also impacts curricula. Curricula present who and which groups have been involved in constructing history. The inclusion or exclusion of groups within curricula communicates to students whose perspectives matter and who is important. In predominantly White settings, teachers and students may feel that multiculturalism does not apply to them and thus result in colorblind curricula (Lewis, 2001). The perspective within curricula communicates notions of exclusion, assimilation, resistance, or valuing regarding different cultures and values. Martin (2008), for example, describes how the National Mathematics Advisory Panel's curricular recommendations focused on algebra and other mathematical content to advance White elites' agenda of international competitiveness. And to connect history with ideologies, one can examine curricula for presentations of mathematics as neutral or cultureless as well. Therefore, taking a historical perspective on mathematics education affords many insights into how whiteness preserves privilege, distributes resources, and maintains the status quo.

Organizational logic. Acker (2000) states: "Organizational hierarchies constitute and replicate dominance-subordination relations that are characteristic of class" (p. 196). She goes on to make the case around race as well, namely that structures of slavery, segregation, and the exclusion of historically marginalized people of color from certain jobs are still present today in the organizational logic that constructs hierarchies within institutions. These hierarchies can be seen in the distribution of power in a school; for example, who is administering, teaching, as well as whether parents are seen as influential participants. Schools are organizations that situate people in different ways and distribute power and decision-making accordingly. How that power is distributed and to whom it is distributed matters.

For instance, parents who are viewed as over-involved can influence or determine curriculum. This influence positions them as having power in contrast to those framed as oppositional in defending their children, uninvolved, or not caring. In these differing logics, parents are granted varied power in schools. The same can be true for teachers and students. Organizational logic is what determines who has power, who does what work, and who evaluates whom (Acker, 1990). In this distri-

bution of power, there is the potential to have different races in more privileged and more subservient roles leading to inequitable racial representation in positions of power. This distribution determines different forms of labor, including the labor that is required of students and the extent to which this labor prepares them for future success. Along these lines, organizational logic can be seen through the rules that guide behavior, what counts as appropriate emotions, and sanctioned responses. For example, Lewis (2004) discusses how predominantly White schools frame anger as inappropriate for responding to discrimination. The sanctioning of “appropriate” responses then goes on to produce more emotional labor for students of color. The organizational logic, therefore, constructs the hierarchies and assumed ways of being that distribute differential forms of labor.

Labor

How labor is divided can reflect the influence of whiteness. As noted earlier, we draw heavily on Acker’s (1990) and Moore’s (2008) work in documenting the different labor required of Whites versus those positioned as less powerful in systems. Moore’s (2008) research particularly documents how law schools, operating as White institutional spaces, function to require more emotional labor of students of color as they manage microaggressions doled out by administrators, professors, and fellow students. It is this notion of whiteness producing interpersonal dynamics that requires different kinds of labor among students that we want to highlight here. Normative expectations of emotional and behavioral work can restrict students to being certain types of students—controlling them to fit unquestioned cultural expectations. Administrators and teachers may form a passive collective, not consciously or daily identifying as White, which only further maintains these expectations as “neutral.” When forms of labor are restricted in such a way that the contributions and behaviors of students of color are not seen as valid, and thus have to put in additional work in managing their emotions and behavior, it can be a sign that whiteness is operating in this context. This then is a way to expose the non-neutrality of the labor in the classroom and other spaces within mathematics education. We use three elements of labor to detail how whiteness can operate: cognitive, emotional, and behavioral (see Table 3).

Cognitive. Cognition is interpersonal in the sense that the kinds of mathematical work students are asked to do communicates expectations and messages about what students are capable of doing. The literature on African American and Latin@ students is replete with classroom settings that only ask students to replicate procedures, follow worksheets page by page, and that lack the opportunity to engage in cognitive depth (Ladson-Billings, 1997; Lubienski, 2002). Teachers and schools that frame these pedagogical choices as the only cognitive work necessary for students subjugates students with respect to a White ideal. Additionally, how authority is distributed, both for classroom procedures and the mathematics, also speaks to

whether a teacher holds expectations that students can self-monitor their behavior and gain command of the mathematics (Nasir, Hand, & Taylor, 2008). If these ways of parsing classroom cognition are coupled with ideologies of a racialized hierarchy of mathematics ability, then they are signs that whiteness is operating. But it is also more complex than this. For instance, even in a mostly African American classroom, some students may have more access to content and authority than others. If the students who are seen as more capable fit norms of White participation, then whiteness is still central. Patterns as to which students have access to cognitively demanding tasks can be quite telling.

Table 3
Labor Elements with Indicators

| Dimension | Element | Indicator |
|-----------|------------|--|
| Labor | Cognitive | <ul style="list-style-type: none"> Differential cognitive demand Distribution of mathematics authority Academic expectations Stereotype threat |
| | Emotional | <ul style="list-style-type: none"> Management of emotional experiences Regulation of emotion Range of emotional experiences allowed |
| | Behavioral | <ul style="list-style-type: none"> Discipline Management of behavior Language norms Teacher praise/acknowledgment |

Steele and Aronson's (1995) work on stereotype threat can also be seen as the result of added cognitive labor due to being in situations where stereotypes are applied. Some of the work around stereotype threat examines when racial stereotypes are primed, or explicitly accessed, and the effect can be seen on test scores. But their work also means that even when discourses such as a racial hierarchy of mathematics ability are passively acting in an environment, Latin@s, African Americans, and Native Americans must manage additional cognitive load while engaged in completing mathematical tasks. Steele (1997) also found that this additional load may cause disidentification with school altogether (discussed later in the identity dimension of the framework). Monitoring the cognitive demand provided by the teacher and the cognitive load managed by students provides evidence about the extent to which whiteness is constricting the classroom environment. Teachers who are enacting microaggressions or providing tasks of low cognitive demand are reproducing the racial hierarchy of mathematics ability, and thus positioning underserved students at the bottom.

Emotional. Coping with discrimination and racism in everyday experience requires significant emotional labor in terms of sadness, frustration, and anger

(Moore, 2008). This emotional labor is intertwined with undue cognitive burden on students as well. Dovidio (2001) found that when solving mathematics problems, African American students working with White students whose racial bias was implicit performed slower on the tasks than those working with White students who were unbiased (the fastest groups), and even slower than African Americans in groups with White students whose racial bias was explicit (second fastest groups). These findings demonstrate the impact of emotionally processing racial interactions, particularly those that are ambiguous, but even explicitly racial interactions. In addition, this emotional labor is connected to slowing students' cognitive mathematical engagement as well.

Schools and classrooms often do not provide the time, space, or support for students to process these racial experiences and emotions. When students do process or exhibit these emotions, they can be seen as angry, aggressive, or violent rather than struggling with a complex and unfair world. Moore (2008) discusses how law schools ignore and undervalue this emotional labor:

Coping with everyday racism in the law school frequently produces frustration, anger, or sadness, but the institutional logic of the law school does not recognize expressions of these emotions as legitimate. Students are thus forced to manage their emotion in order to avoid further marginalization. . . . This demands that students of color perform invisible and emotional labor that their white counterparts are not required to perform. Both in the law school and in the profession of law, this labor is expected of law students of color, yet it goes unrecognized and unrewarded. (p. 31)

Additionally, students must manage the ways in which they express emotions to avoid deficit discourses about being perceived as argumentative, angry, aggressive, and a multitude of other negative associations. When students of color are expected to handle experiences that they consider unfair in a calm, dispassionate, and disconnected way, whiteness is restricting acceptable ways of grappling with the emotions of discrimination and racism (Moore, 2008).

McGee and Martin's (2011) work is also illustrative here. They discuss the impact of dealing with daily hassles and stereotype management in mathematics education. Even for students achieving mathematical success, students still found the management of hostile environments to be emotionally debilitating. Whether it was the effort to prove a stereotype wrong or "fronting" to project conformity, the students experienced emotional distress and exhaustion. Therefore, more racially hostile environments produce more emotional labor from racism. Again, we want to highlight the complex ways in which emotional labor impacts cognitive functioning and how overlapping these elements are across this research.

Behavioral. One way in which labor is handled is by deeming certain student behaviors appropriate and others inappropriate. This *mishandling* has immense consequences in classrooms as harsh and recurrent discipline has been found to fre-

quently lead to missed instructional time and expulsion from school for male African Americans and Latin@s in particular (Gregory, Skiba, & Noguera, 2010). African American students, in particular, are two to four times more likely to be referred to the office for disciplinary reasons than their White peers as well as being punished more severely for their behavior (Skiba et al., 2011). Additionally, due in part to “behavioral reasons,” African Americans are over-identified for special education and placed in comparatively more restrictive learning environments, excluding them from access to mainstream instruction (Skiba, Poloni-Staudinger, Gallini, Simmons, & Feggins-Azziz, 2006).

Within mathematics, this can take the form of deeming certain ways of language use as inappropriate for mathematical argumentation or by requiring students to sit still in seats in regimented ways (Battey, 2013b). Furthermore, whiteness can function by valuing behaviors of White students over others in subtle ways, resulting in the implicit communication that White students’ language and behavior are deemed more appropriate within the mathematics classroom. When students align with White ideals of classroom behavior, their actions will more likely be praised. Additionally, when White boys and youth, for instance, act out, it is often seen as instances of immaturity and playfulness, but certainly not aggression or violence, leading to less severe punishment and discipline (Ferguson, 2000). When African American and Latin@ students do not align with White norms of behavior, maybe through being too argumentative, too quiet, too excited, or abrasive, we would expect to see behavior being called out, positive behaviors going unnoticed, and a hyper-focus on misbehavior, leading to increased discipline and eventually suspensions and expulsions (Skiba et al., 2011). In classrooms that employ such behavioral control, despite substantive mathematical contributions from students of color (see Battey, 2013b), it is evidence that a broader racial ideology is at play. The ideology is enacted through the positioning of students cognitively, emotionally, and behaviorally in classrooms and thus influences their identities—namely, the extent to which they see themselves as legitimate mathematical participants.

Identity

Martin (2009) defines mathematics identities as “dispositions and deeply held beliefs that individuals develop about their ability to participate and perform effectively in mathematical contexts and to use mathematics to change the condition of their lives” (p. 326). The construction of mathematics identities, however, is not a strictly personal, internal process as it is constantly negotiated with ideologies, institutions, and interpersonal encounters. The organizing White frame too often relegates African Americans, Latin@s, and other non-Whites as incapable and thus grants unquestioned legitimacy to Whites in educational spaces (Moore, 2008). This organizing frame aligns with Martin’s (2009) concept *mathematics as a racialized form of experience*. The social construction of whiteness as a privileged

identity in everyday society is maintained in classrooms and other mathematics spaces through inequitable learning opportunities as well as feelings and experiences of academic de-legitimization experienced by historically underserved students of color. As a result, a racialized hierarchy of ability is constructed in mathematics education (as discussed in the institutional section) that shapes students' identities in seeing themselves as doers of mathematics.

Table 4
Identity Elements with Indicators

| Dimension | Element | Indicator |
|-----------|------------------------------------|--|
| Identity | <i>Academic (De)Legitimization</i> | <ul style="list-style-type: none"> • Identification with mathematics • Legitimacy of intellectual ability |
| | <i>Co-construction of Meaning</i> | <ul style="list-style-type: none"> • Hierarchy of mathematics ability • Peer perceptions of each other • Hypervisibility/invisibility |
| | <i>Agency and Resistance</i> | <ul style="list-style-type: none"> • Relationship with deficit discourses • Forms of (dis)engagement • Association with peer group |

Academic (de)legitimization. Mathematics contexts that function as White institutional spaces require students to negotiate academic legitimacy with a racialized hierarchy of mathematics ability based on White norms and values. Understanding mathematics identities, therefore, can only be attained by detailing processes of negotiation with racialized discourses as opposed to traditional analyses of achievement gaps between different races (Martin, 2009). With Whites and Asian Americans—considered “honorary Whites” (see Bonilla-Silva, 2003)—at the top of the hierarchy of mathematics ability, whiteness in mathematics classrooms operates in ways that Whites are assumed or assume themselves to be innately intelligent in mathematics. Conversely, the legitimacy of historically marginalized students of color is always under question so that they may feel the need to prove themselves mathematically capable with respect to White views of success, which structure the academic spaces. Even with past success, their ability will still most likely be questioned (Leyva, 2016, this issue). Deficit perspectives of students of color and their mathematics ability stem from ideological discourses; in turn, these discourses position students as illegitimate members of mathematics classrooms resulting in poor relationships with teachers, lower-quality instructional experiences, and at times disidentification with mathematics (Oppland-Cordell, 2014; Spencer, 2009). Therefore, whiteness constructs spaces where some are assumed to be legitimate participants and others are delegitimized.

Likewise, when the behaviors, language, and other presentations of self among students of color are aligned with the ways that Whites and honorary Whites do mathematics, we would expect them to be more welcomed into the mathematics

classroom, although this could still be contested at any moment. This uncertainty can pit African American and Latin@ students against one another such that students might position each other as less Latin@ or less African American if they do succeed mathematically (Leyva, 2016). It is important to note that it is the White institutional space constructing this positioning that can play out between peers. The alternative is a classroom that promotes multiple ways of being successful mathematically and does not pit certain students as more or less legitimate in the way that they engage with mathematics (Featherstone et al., 2011).

Co-construction of meaning. Students construct identities through relations with other people and the institutions in which they participate. Moore (2008) discusses peer perceptions of academic support programs in law schools where some White students thought that students of color were admitted to the school solely based on race rather than earning it by merit. This anti-historical view ignores the reasons for programs that remedy institutional racism. It also perpetuates whiteness by not recognizing the material racism that produced and continues to produce differential access to educational quality. However, as institutions leave these ideologies and material racism unaddressed, they participate in limiting spaces for students of color to construct identities that counter the racial hierarchies contained by whiteness. The ways in which ideologies are enacted have direct consequences for schools. The explicit and implicit ways in which people and institutions pass on such messages are critical for how students develop their mathematics identities.

For instance, ability grouping or tracking along racial lines creates a material manifestation of racism that sends messages to students about the racial hierarchy of ability (Lewis, 2004). As students are placed in these structures, they act in relation to the position to which they are assigned. Similarly, teacher comments about low and high students or needing to learn the “basics” pass on messages more overtly (Battey & Franke, 2015). Whether tracking, ability grouping, or overt comments from teachers, schools construct what being “good” at mathematics means and place students along a continuum of ability. Recent work has explored how students are positioned with peers and in terms of the whole class to better understand how advantaged and disadvantaged roles are constructed (Engle, Langer-Osuna, & McKinney de Royston, 2014; Esmonde, 2014; Langer-Osuna, 2015). For example, White students may query an African American student if they are in the right place when they attend an AP mathematics class, relaying the message that they do not expect success from African Americans in mathematics. Students, however, are not naïve to the ways in which they are positioned institutionally and interpersonally. Understanding how students react to being constructed as certain kinds of mathematical doers speaks to the ways in which students are positioned. They develop identities in relation to these positions and decide how to reposition themselves in response.

Agency and resistance. Such racialized experiences in mathematics include the positioning of historically marginalized students of color as both invisible (Feagin & Sikes, 1994) and contradictorily hypervisible (Higginbotham, 2001). Students are invisible because their perspectives, experiences, and history are not represented, but hypervisible because there may be so few students of color in academic spaces, which runs the risk of tokenism, essentialism, and having to represent their race (Moore, 2008). Examining both the invisibility and hypervisibility of students of color in mathematics spaces with respect to being successful in higher-tracked mathematics courses, for example, shows whiteness systemically acting within educational institutions.

What is just as important to note are students' responses to these forms of positioning in mathematics. For instance, students can respond by objectifying or rejecting their racial selves, thus removing their experiences and histories from discourse (Moore, 2008). Responses can also come in the form of seeing oneself as an exception to racial hierarchies (Leyva, 2016). Students can be strategic with peers in downplaying their academic success or purposefully disengaging in academic settings (Moore, 2008). Unfortunately, these responses tend to reproduce white institutional spaces and accompanying ideologies. However, it is in noting the need for these responses to broad discourses that we as a field can document how whiteness is operating.

Another option in response to whiteness is to fight ongoing battles with White racial norms. McGee and Martin (2011) call this option stereotype management. In their analysis, they found that successful Black mathematics and engineering students were constantly aware that their racial selves were undervalued and moved from proving stereotypes wrong to more internal motivation in achieving academic success. This "proving" can be exhausting and is often done more collectively. Racial groupings, thus, provide a space for emotional coping and support in navigating White spaces (Tatum, 1997). These racial groupings, in turn, allow students to build collective consciousness and resist the internalization of an ideology of whiteness (Feagin, 2006). Confronting White institutional spaces collectively allows students to build a shared narrative to view their individual experiences as a broader structural problem (Moore, 2008). Moore (2008) also states, "However, it also adds to the pain of racism experienced by these students because they become aware of how frequent and common racism is in the law school when they learn of the stories of their peers" (p. 131). While building collective consciousness can be a racial support, the fact that it is needed at all signifies that racialized discourses are being perpetuated in the context. Unchallenged racial discourses keep individual experiences of race internal for both Whites and students of color. However, for students of color, doing so can be detrimental. When racial discourses are unchallenged, student of color may disassociate from their race, community, and history to succeed mathematically, or internalize the discourse.

Discussion

We wish to illustrate two ways of using this framework in different contexts. The first is in the context of a predominantly White school. Naming race as operating in White contexts can be difficult given that Whites often avoid the mention of race. Nevertheless, markers of whiteness can be key in these settings in terms of privileging some and devaluing others. Markers that link even White students to less status in terms of sex, gender, SES, or geographical accents (e.g., rural vs. urban) serve to differentiate privileges. This differentiation is built on whiteness setting particular norms of what it means to be White based on middle- and upper-class, male standards. Institutionally, examining the distribution of students across the school and the ways in which teachers and administrators engage with lower-status White students or the few students of color attending the school can be quite enlightening. For instance, tracking might place these students in lower mathematics courses showing the organizational logic of the school. Additionally, the lack of attending to race and the invisibility of perspectives and histories of people of color may be evident in ways such as parents of color not being on the parent-teacher association (organizational logic), no images other than Martin Luther King, Jr. present on the school walls (physical space), and curricula that do not represent anything but White problem contexts (history).

Specifically, with respect to the labor of mathematics in classrooms, whiteness would force teachers to hyper-focus on the behavior of lower-status White students or students of color, while their mathematical thinking remains invisible. Additionally, those lower-status White students who are doing well would need to constrain themselves to White norms of behavior such as sitting quietly and only talking when called on as well as exhibiting speed and accuracy to be perceived as mathematically intelligent. The same would be true of students of color in this context. Teachers and White peers may frame students of color as not belonging in mathematics classrooms (academic delegitimization), or are surprised when they are present. This framing prompts students of color to respond by forming collectives (agency), feeling the need to prove themselves (emotional labor), disidentifying from their race (identity), or rejecting mathematics (resistance). The point of this framework is to identify these behaviors not individually among specific students, but as responses to whiteness and institutional racism operating in mathematics education. We use this example to illustrate the need for mathematics education researchers to document the presence of race within predominantly White spaces.

Additionally, whiteness can be viewed within predominantly African American and Latin@ contexts. In this case, we consider a historically White immigrant community; White immigrants who moved out when historically marginalized people of color began moving into the area. Institutionally, with the influx of African Americans, housing prices have been reduced, which has limited school resources

as well. Simply looking at the demographics of the teachers and administrators versus the students is one sign of who has the power in the school (organizational logic). There is an African American principal, for example, but half of the teachers are White in a school in which the student body is 100% African American and Latin@. Students are required to wear uniforms, an act of controlling physical expression (physical space). Similar to the predominantly White context, regardless of the race of the administrators and teachers, if students are succeeding by aligning with White norms of intelligence and behavior (labor), then whiteness is present here as well. While a racial match between the teacher and student can be beneficial to students (Gershenson, Holt, & Papageorge, 2016), teachers of color can also perpetuate the same White norms as well. Discourses of “acting White” (Fordham & Ogbu, 1986; Stinson, 2011), which are intended to narrow the diverse ways in which African Americans and Latin@s can act, are a form of whiteness constraining ways of being (co-construction of meaning). The predominant mathematics pedagogy is “back to the basics” (ideology), where students must know the basics before moving onto more complex mathematics and problem solving in meaningful contexts. As a result, the students rarely if ever get access to meaningful mathematics (cognitive labor). Finally, the majority of teachers perceive parents of color as either absent or aggressively fighting the school (ideology), and are too often excluded from participating (organizational logic). The point here is that if whiteness is systemic, it does not depend on White actors or villains. It can be internalized and reproduced by even those who do not intend to perpetuate racism.

While these are two brief examples to illustrate some approaches to using the framework, we want to highlight that entering an analysis through any of the framework dimensions would suffice. Certainly, interview studies can show the discourses that students are navigating and the labor that they have to employ to succeed in mathematics classrooms. Likewise, researching at the classroom level can show not only the interpersonal interactions but also the types of identities evident as well as the physical space and discourses that are accessed by teachers and students. Or a researcher could look at documents, policies, and the community in detailing whiteness at play in a particular context. There are many ways to do this work, but we need to begin attending to the dynamics of racism by foregrounding the operation of whiteness across contexts within mathematics education.

Conclusion

At the beginning of this article, we cited Martin (2009) calling for desilencing race in mathematics. For us, this entails destabilizing the racial neutrality of whiteness, something that has received little attention to this point. Doing so, however, does come with some cautions. In many ways, Whites are already centered in conversations around race as the racial norm or standard-bearer. This cen-

tering is implicit in talking about other groups having deficits or gaps in comparison to White standards. In making some of these comparisons explicit, there is a danger in re-centering whiteness. That is why discussions of whiteness must go beyond simply discussions about White privilege so as to name and to counteract the mechanisms and institutional ways in which White supremacy in mathematics education reproduces subordination and advantage. The framework presented here is intended to support researchers and teachers to document the operation of institutional White supremacy in mathematics, through ideologies, physical space, interactions, and students' agency and resistance. Our hope is that as this work continues, this framework will become more detailed and targeted toward the ways that privilege and oppression get reproduced in mathematics education. Additionally, as we gain a better understanding of whiteness in mathematics education, this understanding could serve the field in counteracting its effects among historically marginalized students of color. We think Moore's (2008) call in law schools is pertinent for mathematics educators as well: "Deconstructing the white institutional space will require that we discard this constraining white frame and center the experiences and voices of students of color in the project of identifying and eliminating the structural remnants of our white racist past" (p. 163). The framework detailed here is an attempt to support mathematics educators in deconstructing and discarding the white frame of mathematics education.

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