

DEVELOPING A FRAMEWORK FOR ASSESSING THE IMPACT OF WHITENESS IN MATHEMATICS EDUCATION

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The ideology of whiteness has received little attention in mathematics education. In this paper, we develop a framework for documenting how whiteness shapes mathematics education as a racialized space. Drawing on the sociological concept of “white institutional space” (Feagin, Vera, & Imani, 1996; Moore, 2008), the framework examines mathematics education across institutional, interpersonal, and individual levels of analysis. The authors argue that this framework captures how ideological discourses of whiteness and colorblindness (Lewis, 2004) and racialized hierarchies of mathematics ability (Martin, 2009) are perpetuated through institutional structures and interpersonal relations in mathematics education.

Keywords: Equity and Diversity; Instructional Activities and Practices; Learning Theory

Introduction

Lipsitz (1995) states that “a fictive identity of whiteness” appeared in law as an abstraction and became actualized in everyday life. Much like ‘black’ is a cultural construction based on skin color, not biology, whiteness developed out of the reality of slavery and segregation, giving groups unequal access to citizenship, immigration, 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 entitled to certain privileges from those whose exploitation is justified by not being white. However, the boundaries of whiteness have shifted substantially over time (see Brodtkin, 1998).

Recently, the ideology of whiteness and its material benefits has been sustained more covertly. Whiteness is supported by a colorblind ideology, a form of maintaining the social order, covertly, 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, but the more recent avoidance of explicit racial discourses signifies colorblind racism, the dominant racial ideology since the civil rights movement (Bonilla-Silva & Forman, 2000).

Under colorblindness, it does not matter whether whites are racially conscious. Whites benefit from an external reading of themselves as white (Lewis, 2004), whether or not they identify as white. In other words, whites benefit not from their own realization of being white, but by others treating them as white. This distinction is important in understanding whiteness as an ideology rather than an identity. Therefore, a felt identity is not a prerequisite to reap unearned privileges. Whiteness functions within structures, deciding how resources, labor, and space will be distributed by means of housing segregation and educational and financial stratification. These structures are in place to benefit future generations, whether those generations adopt an intentional white identity. The point is not that all whites benefit the same, as this would be essentializing a very diverse group of people, but that one’s racial position is constructed in relation to a racial history that has distributed space, resources and labor, and reproduced racist discourses (Lewis, 2004).

Connecting Whiteness to Mathematics Education

Whiteness plays out in very real ways through the divvying up of resources such as earnings, homes, wealth, and health (Lipsitz, 1995). Sewell (1992) and Lewis (2004) discuss racism both

ideologically and concretely through considering its dual nature: symbolic (ideological) and material (structural resources) (Sewell, 1992; Lewis, 2004). Whiteness and colorblindness produce symbolic and material consequences within mathematics education (Battey, 2013a).

There are common *symbolic* narratives about who is better mathematically – whites and Asians. These perceptions are then made *materially* real in terms of how African American and Latin@s are treated in mathematics classrooms, the forms of instruction available, and course offerings, which in turn lead to different testing outcomes or “achievement gaps.” Through impoverished instruction quality, tracking, and reduced funding, society makes the racial ideologies concrete. Therefore, “achievement gaps” in mathematics education reify the idea that whites and Asians are better at math, and African Americans and Latin@s are innately inferior.

Martin (2009) acknowledges the need for further research on race in mathematics education as a social construction shaped by existing sociopolitical contexts. 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 (Feagin, Vera, & Imani, 1996; Moore, 2008) informs Martin’s (2008, 2009, 2013) 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)

Using these tenets, Martin (2008) highlights how the National Math Advisory Panel is an example of mathematics education policy as white institutional space resulting in “e(race)sure” – the exclusion or ignoring of race – that perpetuate notions of whiteness and white supremacy in mathematics. We similarly draw upon these four tenets in the next section to propose a framework that assesses the extent to which mathematics education is a white institutional space.

Theoretical Framework

Our framework in assessing the impact of whiteness on mathematics education presented in Table 1 considers three dimensions: institutional, interpersonal, and identity. Martin’s four tenets cut across these three dimensions. The first tenet of white institutional space, racialized patterns of representation, aligns with parts of both division of labor and physical space. This directly relates to distribution of power, but also the representations of images symbols, and behaviors presented in schools. Therefore, it is not only about the distribution of people, but of the distribution of valuing and devaluing various ways of being as well. The second tenet also aligns with ideology and division of labor, but more in terms of the organizational structure. The organizational structure of the school determines behavioral sanctions and classroom norms that then shape interpersonal interactions and identity construction. The organizational structure also legitimizes certain ideologies over others, such as tracking supporting a fixed notion of mathematical intelligence. The third tenet of historically white curricular models is aligned with the section on history, but as students respond to this history, they take on varying identities in relation to the mathematics and schooling. Finally, the fourth tenet of white institutional space corresponds with how ideological discourses in mathematics differentially shape whites and students of color’s mathematics experiences. This, in turn, structures notions of competence and legitimacy in students’ negotiations of their mathematics identities including what it means to be “good” at mathematics. These four tenets are threaded throughout the framework.

Bartell, T. G., Bieda, K. N., Putnam, R. T., Bradfield, K., & Dominguez, H. (Eds.). (2015). *Proceedings of the 37th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. East Lansing, MI: Michigan State University.

Table 1: Framework to Assess Whiteness in Mathematics Education

Institutional	Ideological Discourses	<ul style="list-style-type: none"> • Racial hierarchy of math ability • Innateness of mathematics ability • Mathematics as neutral • Abstract individualism • Meritocracy
	History	<ul style="list-style-type: none"> • Histories of schools • Patterns of inclusion and exclusion • Curricular perspectives • Multiple perspectives
	Organizational Logic	<ul style="list-style-type: none"> • Distribution of power and work • Organizational structure • Positioning of Stakeholders
	Physical Space	<ul style="list-style-type: none"> • Physical representations • School messages • Visibility of students • Control of physical expression
Labor	Cognition	<ul style="list-style-type: none"> • Differential cognitive demand • Distribution of classroom and mathematical authority • Academic expectations
	Emotion	<ul style="list-style-type: none"> • Management of emotional experiences • Regulation of emotion • Range of emotional experiences allowed
	Behavior	<ul style="list-style-type: none"> • Discipline • Management of Behavior • Language Norms • Teacher praise/acknowledgment
Identity	Academic (De)Legitimization	<ul style="list-style-type: none"> • Identification with mathematics • Legitimacy of intellectual ability
	Co-Construction of Meaning	<ul style="list-style-type: none"> • Hierarchy of mathematics ability • Peer perceptions of each other • Hypervisibility/invisibility
	Agency and Resistance	<ul style="list-style-type: none"> • Relationship with deficit discourses • Forms of (dis)engagement • Association with peer group

Institutional

Institutional spaces constrain or afford different access to people, resources, and work. In distributing this access, they legitimize certain ideologies through the physical space, positioning of different groups, and presentation of history. The institutional level is responsible for framing the

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levels of labor and identity since it is responsible for the organization of labor and determines the ideologies and people in which individuals will develop relationships.

Ideological Discourses. As noted in the introduction, broad discourses such as colorblindness and abstract individualism often accompany whiteness. Within mathematics education, whiteness takes the form of racial hierarchies of mathematics ability (Martin, 2009) as well as the innateness of mathematics ability (Ernest, 1991). The racial hierarchy of mathematics ability benefits the identities that white and Asian American students can construct with the domain, but accompanying discourse around the innateness of ability makes the racial hierarchy stable. Evidence for these discourses come 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. In terms of privilege, the discourses are evidenced by the automatic attribution of Asian Americans and whites as being good at mathematics and/or surprise when these student struggles.

History. Schools have histories that are inseparable from issues of exclusion, segregation, and differential resources in the United States. These historical issues contribute to current educational inequality. For instance, a school may have been segregated, then bussed in African American students, only to see white flight result in home prices dropping and the tax base that determines school funding collapse. Therefore, a history of inclusion or exclusion has an impact on teacher retention, school demographics, and school funding. Curricula also present who has been involved in constructing history. The inclusion or exclusion of groups within curricula communicates to students whose perspectives matter and who is important. Finally, 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 Math Advisory Panel's curricula recommendations focused on algebra and other mathematical content to advance white elites' agenda of international competitiveness.

Organizational Logic. Schools are organizations that situate people in different ways and distribute power accordingly. How that power is distributed and who it is distributed to matters. The power distribution between administrators, teachers, parents, and students says a lot about who is included and valued within schools. For instance, parents who are viewed as over-involved with the influence to determine curriculum, 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. 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. In this distribution 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 prepares them for future success.

Physical Space. Images, charts, symbols, and objects are concrete representations that communicate central aspects of institutions. Pictures that designate notable people in history, student recognition, and school history pass on messages about who is accepted, welcomed, and who can excel academically. Images, histories, and perspectives of African American and Latin@ students can be invisible at times (Moore, 2008). This can contrast with the hypervisibility (Higginbotham, 2001) when students are asked to speak for their race or teachers hyper focus on the misbehavior of students of color. Aligned with this, charts about acceptable behavior can be ways of controlling students. For instance, behavioral norms that promote militaristic rules of order or 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

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is an implicit transmission that students are expected to be intelligent, under control, or that these students do not need to see representations of current and historical figures that do not look like them. This is also a way to perpetuate whiteness, by communicating that there are such a limited number of significant African Americans or Latin@s that white students do not need to know about them.

Labor

How labor is divided in classrooms can reflect the presence of whiteness. Normative expectations of emotional and behavioral work can restrict students to being certain types of students - controlling them to fit unquestioned cultural expectations. When forms of labor are restricted in such a way that students of color's contributions and behaviors are not seen as valid, it can be a sign that whiteness is operating in a context. We use three dimensions of labor to detail how whiteness can operate within classrooms: cognition, behavior, and emotion.

Cognition. Cognition is interpersonal in the sense that the kinds of mathematical work students are asked to do sends messages about what students are capable of. A number of researchers have documented the lower levels of work that African American and Latin@ students are asked to do in classrooms. Classroom settings that only ask students to replicate procedures, follow worksheets page by page, and lack the opportunity to engage in cognitive depth permeate the literature for African American and Latin@ students (Ladson-Billings, 1997; Lubienski, 2002). 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. If these ways of parsing classroom cognition are coupled with ideologies of a racialized hierarchy of mathematical ability, then they are signs that whiteness is at play. 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 for white behavior, then whiteness is still at play. Patterns as to which students have access to which cognitive tasks can be quite telling.

Emotional. Coping with discrimination and racism in everyday experience requires significant emotional labor in terms of sadness, frustration, and anger (Moore, 2008). However, schools and classrooms often do not provide the time, space, or support for students to process these 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 continue to 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 multiple of other negative associations. When students of color are expected to relate experiences they consider unfair in a calm, dispassionate, and disconnected way, then whiteness is restricting acceptable ways of grappling with the emotions of discrimination and racism (Moore, 2008). Finally, this emotional labor places an undue cognitive burden on students as well. Dovidio and Gaertner (2008) found that when solving mathematics problems, African American students within groups that made them

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process emotions related to discrimination more, performed work slower when compared to those who did not. Steele and Aronson's (1995) work on stereotype threat can also be seen as the result of the added emotional labor due to priming race during cognitive tasks.

Behavior. One way in which labor is handled is by deeming certain student behaviors appropriate and others not. This has immense consequences in classrooms as harsh and frequent discipline has been found to frequently lead to missed instructional time and expulsion from school for African American and Latin@ males in particular (Gregory, Noguera, & Skiba, 2010). 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). Further, whiteness can function by valuing behaviors of white students over others in subtle ways of how language and behavior are perceived to align with understandings of appropriate classroom actions. When students align with white ideals about behavior, their actions will likely be praised or sanctioned. When students do not align, maybe through being too argumentative, too quiet, too excited, or abrasive, we would expect to see behavior to be called out, positive behaviors to go unnoticed and a hyper-focus on misbehavior leading to increasing discipline and eventually suspensions and expulsions. When teachers employ such behavioral control despite substantive mathematical contributions in classrooms (see Battey, 2013b), it is evidence that a broader ideology is at play.

Identity

Martin (2009) defines *mathematical 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 mathematical identities, however, is not a strictly personal, internal process as it is constantly negotiated with institutional influences and interpersonal encounters. More specifically, the organizing white frame relegates African Americans and Latin@s as mathematically incapable and innumerate and thus grants unquestioned legitimacy to whites in mathematics education spaces. This aligns with Martin's (2009) notion of mathematics as a racialized such that the social construction of whiteness is maintained in mathematics classrooms through the inequitable learning opportunities and academic de-legitimization experienced of marginalized students.

Academic (De)Legitimization. Mathematics classrooms that function as white institutional spaces require students to negotiate academic legitimacy across a racialized hierarchy of ability based on white norms and values. Understanding mathematical identities, therefore, can only be attained by detailing processes of negotiation within 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 they are assumed or assume themselves that they are mathematically intelligent. Conversely, students of color's legitimacy is always under question so that they need to prove themselves mathematically capable by subscribing to white views of success that structure the academic spaces. Deficit perspectives on students of color's mathematics ability stem from these ideological discourses and in turn position these students as illegitimate members of mathematics classrooms resulting in poor relationships with teachers, lower-quality instructional experiences, and expressed disidentification with the mathematics subject (Spencer, 2009). Therefore, whiteness can be seen in students' stable identification or dissociations with the mathematics domain, consistent with racial hierarchies.

Co-Construction of Meaning. Students construct mathematical identities in relation to the people and the institutions in which they participate. Therefore, the explicit and implicit ways in

which people and institutions pass on messages are critical for how students develop mathematical identities. For instance, ability grouping or tracking along racial lines send messages to students about the racial hierarchy of ability (Lewis, 2004). Teacher comments about low and high students or needing to learn the “basics” pass on messages more overtly (Battey & Fanke, 2015). Within school contexts, students construct what being good at mathematics means. Maybe being good means the student who finishes first, but cannot explain their thinking. Additionally, Moore (2008) discusses peer perceptions of academic support programs in law schools such that some students think that students of color in the programs were admitted to the school based on race rather than earning it. This anti-historical view ignores the reasons for programs that remedy institutional racism. This view 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 perspectives, programs, and racism unaddressed, they participate in limiting spaces for students to construct identities that counter the racial hierarchies contained by whiteness.

Agency and Resistance. Despite racial oppression, it is important to also consider African Americans and Latin@s agency in negotiating their racial identities and mathematics success. Although Martin (2009) uses African Americans’ experiences to illustrate racial struggles in mathematics, his discussion can be extended to other marginalized student populations as they “negotiate and resist the racialization processes that attempt to position and confine [them] within an existing racial hierarchy” (Martin, 2009, p. 325). This illustrates the importance of inclusion of the voices and experiences of those marginalized. Martin (2009, p. 315) states:

Moreover, because little attention has been given to resistance, contestation, and negotiation of these meanings, disparities in mathematics achievement and persistence are often inadequately framed as reflecting race effects rather than as the consequences of the *racialized* nature of students’ mathematical experiences [emphasis in original].

Therefore, examining unchallenged racialized discourses in mathematics classrooms is making plain whiteness as taken for granted. Unchallenged racial discourses keep individual experiences of race internal for both whites and students of color. However, for students of color, this is more detrimental because unchallenged, they may either disassociate from their race, community, and history to succeed mathematically, or internalize the discourse. For mathematically successful African American students then, they may disassociate from peers or downplay their success. For mathematically unsuccessful Latin@ students, they may disassociate from mathematics or schooling through resistance by active challenging of educators views of students, purposeful disengagement, or dropping out.

Conclusion

Whiteness is a widespread ideology in society. While it is getting more attention in the broader education literature, mathematics educators have been slow to research it’s impact on African American and Latin@ students (Battey, 2013a). However, its impact on white students is just as important in making unearned privileges visible to the field. We hope this framework supports the field in identifying the effects of whiteness at different levels of the educational system. The goal for us it to support the development of a mathematics space that builds collective consciousness of racism in order to prevent students of color from internalizing deficit ideologies (Feagin, 2006; Moore, 2008). This in turn would open more space for student identities that challenge existing racial hierarchies.

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