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COMMENTARY

Why Should Mathematics Educators Care About Race and Culture?[1]

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Mathematics learning has traditionally been thought of as unrelated to matters of culture. It is also typically viewed as outside of the realm of race, aside from concerns about the mathematics "achievement gap." I argue, as do many others in emerging scholarship on race and mathematics learning (e.g., Martin, 2003, 2013; Nasir & Shah, 2011; Shah, 2013), that this long-held perception of the separation of mathematics learning from issues of race and culture is a fallacy. To be effective, mathematics educators and the field of mathematics education in general must be centrally concerned with these issues. Race and culture are not only core to the learning process but also they are central forces that organize our society and determine access to high-quality mathematics instruction.

In this commentary, I build the case for why the aforementioned statement is of critical importance. I begin by considering why the field of mathematics education (most often) does *not* attend to issues of race and culture. I then offer three critical reasons why mathematics educators should consider race and culture. As I do so, I describe findings from several studies. Specifically, I focus on two lines of inquiry: (a) a set of studies on students' understandings about and management of racial stereotypes; and (b) a case study of one high school mathematics department, referred to as "Railside High," that successfully enacted an equity pedagogy in mathematics. I close with a few thoughts about why these issues are so critical in this historical moment in our schools and in our nation.

Why Mathematics Education Does Not Attend to Race and Culture

There is a long history in mathematics education of seeing race and culture as outside of the purview of the discipline of mathematics, and the myth that race and culture do not matter for mathematics teaching and learning continues to perpetuate. This position is often justified by a set of assumptions that are blatantly false,

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but which we as a society are deeply invested. They include ideas about the nature of mathematics thinking and learning, such as that mathematics is racially and culturally neutral, and that we should focus on developing "universal" approaches to instruction, rather than culturally specific ones.

Contemporary theories of learning, particularly theories from sociocultural or ecological perspectives, however, do not support these assumptions (Cole, 1996; Gutiérrez & Rogoff, 2003; Howard, 2010; Lee, 2007; Nasir, 2002; Rogoff, 2003; Saxe, 1999, 2002; Wenger, 1998). Instead, these theories view learning as an inherently cultural endeavor that occurs in the context of cultural practices, which happen in relation to cultural artifacts and social interactions carried out to achieve socially and culturally defined goals. Not only is learning inherently cultural in nature, but schools, themselves, are cultural institutions. Schools are culturally lived and experienced; in that, they are culturally organized, guided by norms, conventions, artifacts, and involve social interaction. They are also potential spaces of empowerment, marginalization, and identity building (i.e., spaces where cultural and identity trajectories are offered and taken up). Thus, schooling institutions house complex ecologies and sets of cultural practices and agentic actors.

Another reason mathematics education does not attend to issues of race and culture is that we live in a society that holds problematic and unrealistic ideas about race (Bonilla-Silva, 2010; Lopez, 2013). These ideas include the belief that when we focus on race, we call attention to it, and thus exacerbating (or creating) race as an issue in schools. This belief is oftentimes connected to the notion that we are in a "post-racial" era, and that racism is a thing of the past, or the notion that when we account for race it is akin to providing "special treatment" (e.g., affirmative action), and that people should be able to achieve on their own merit.

Although these prevailing "common-sense" notions are powerful, scholarship on race and racism do not support them. Sociologists suggest that the very purpose of race as a construct is to provide differential access to resources for the intention of maintaining the social order (Massey, 2007; Omi & Winant, 1994). Social stratification, or the process by which differential access is provided to different social groups, involves two mechanisms: allocating people to social categories, and institutionalizing practices that allocate resources unequally between the groups (Massey, 2007). Key in this process is creating narratives (stereotypes) about social groups (including racial and ethnic groups) to justify the unequal allocation of resources.

Obviously, most teachers and administrators are not, and do not, consider themselves to be racist. Most are well intentioned, and want the best for all students. If that is true, then how do practices of racism persist in school? One of the ways Bonilla-Silva (2010) argues that racism persists is through how we frame our conversations and ideas about race. He contends, "a new powerful ideology has emerged to defend the contemporary racial order: The ideology of color-blind rac-

ism" (p. 25). Color-blind racism refers to the core ideas deeply held in our society that appear not to be about race but in fact are, which, in turn, perpetuate racial ideology.

The central component of any racial ideology is its frames for interpreting information. According to Bonilla-Silva (2010), there are four key frames that allow racism to be perpetuated without anyone appearing racist. The first is *naturalization*, which refers to situations when people make sense of racial phenomena as natural occurrences. An example is assuming that neighborhood segregation reflects the preferences of racial (or ethnic) groups to live near people like them, rather than reflecting a set of institutionalized practices of real estate or lending practices (e.g., redlining). The second is *cultural racism*, which refers to the use of culturally based arguments to explain the social standing of minorities. For example, the idea that Blacks underachieve in school because they hold a cultural belief that school is not important. The third frame is *minimization of racism*; people assume that discrimination is no longer a central factor, and thus minimize the proposed effects of race in their explanations or understandings. And the final frame of color-blind racism is *abstract liberalism*. This frame is a bit more complicated. Bonilla-Silva writes:

> By framing race-related issues in the language of liberalism, whites can appear to be "reasonable" or even "moral" while opposing almost all practical approaches to deal with de facto racial inequality. For instance, the principle of equal opportunity, central to the agenda of the civil rights movement and whose extension to people of color was vehemently opposed by most whites, is invoked by whites today to oppose affirmative-action policies because they supposedly represent the "preferential treatment" of certain groups. The claim necessitates ignoring the fact that people of color are *severely* underrepresented in most good jobs, schools, and universities, and hence, it is an abstract utilization of the idea of "equal opportunity." (p. 28, emphasis in original)

Thus, abstract liberalism refers to the set of ideas about meritocracy and equality in the abstract, and thus, does not consider how these ideals play out in a highly racially stratified society. Taken together, these four frames function to allow racism to be perpetuated, without ever acknowledging its presence. Throughout this remainder of this commentary, I return to Bonilla-Silva's frames as I elaborate why it is of critical importance for mathematics educators to care about race and culture.

Three Reasons Why Mathematics Educators Should Care about Race and Culture

Bonilla-Silva's (2010) work underscores the idea that race is operating even when we do not (or choose not to) see it. This color-blindness (and cultural blindness) is certainly true in mathematics teaching and learning. I argue, however, that

there are (at least) three key reasons why mathematics educators should attend to issues of race and culture. They are:

1. Our society is racially stratified and students experience access to high-quality mathematics instruction by virtue of race.
2. Racial stereotyping influences access to mathematical identities for students, and thus disrupts mathematics learning.
3. High-quality mathematics instruction (potentially) disrupts unequal access to mathematics learning for students from marginalized groups.

I discuss each of these reasons in turn, considering examples and data that support each assertion.

Reason #1: Our society is racially stratified and students experience access to high-quality mathematics instruction by virtue of race.

We know from research that in nearly every single life outcome, people from marginalized groups (African Americans, Latinas/os, Native Americans, and Asian Pacific Islanders), as well as poor people, have less desirable outcomes (Nasir, Scott, Trujillo, & Hernández, 2016). Our society in the United States is highly racially stratified (Carter, 2012) and this stratification plays out in specific ways in the educational arena (Carter & Welner, 2013; Kozol, 2005; Orfield, 2001; Reardon, 2011).

With respect to mathematics teaching and learning in particular, we see consistent and long-standing disparities by race in not only mathematics achievement but also in opportunities to learn on a wide range of dimensions. Test scores and course completion outcomes continue to show disparities by race and income level. Analysis of the 2005 National Assessment of Educational Progress (NAEP) scores in mathematics show that 39% of White eighth graders are proficient in mathematics, versus 9% of Black and 13% of Latina/o. By the end of high school, Black and Latina/o students' overall mathematics scores are not significantly different from those of White eighth graders (Haycock, 2001; Lubienski, 2002). With respect to course completion, 49% of Latina/o and 47% of Black students have taken algebra or pre-algebra, compared to 68% of White students, and as of 2000, 13% of students from poor families were "proficient" or "advanced," compared to 38% of students from non-poor families (Flores, 2007). While White students are overrepresented in "gifted," "honors," and "advanced placement" programs, Black and Latina/o students are severely underrepresented (Darling-Hammond, 2010; Oakes, 2005; Tyson, 2006). The situation for the English language learner (ELL) is similarly challenging. ELLs are also frequently blocked from higher-level tracks because of their English skills (Darling-Hammond, 2010).

Perhaps even more alarming is that though gaps between White, Black, and Latina/o students narrowed through the 1970s and 1980s, they have widened again in

recent decades (Darling-Hammond, 2010). This widening may be due, in part, to the increasing emphasis in schools on standardization and high-stakes accountability (e.g., No Child Left Behind Act of 2001), which exacerbated inequity by driving the schools that are least successful to focus on basic skills as a means of test preparation (abandoning a focus on critical thinking and problem solving). These schools also often pushed out students who are struggling and in need of support (Haney, 2000; McNeil, 2000; Mintrop, 2003; Pedulla et al., 2003).

These disparities in achievement gaps are often rooted in severe inequities in opportunities to learn mathematics. Students from marginalized groups are less likely to have well-trained teachers, and have less access to other resources as well, such as material supplies and technology (Darling-Hammond, 2010). In addition, disciplinary systems in schools operate in ways that disproportionately penalize Latino and African American male students (Gregory, Skiba, & Noguera, 2010; Monroe, 2005; Nasir, ross, McKinney de Royston, Givens, & Bryant, 2013; Noguera, 2003; Skiba, Michael, Nardo, & Peterson, 2002), which too often result in more out-of-class time (i.e., lessened opportunity to learn).

Perhaps the most critical access issue is that of access to high-quality mathematics instruction. Students from marginalized groups not only attend schools with fewer qualified teachers (Darling-Hammond, 2010) but also have less access to college preparatory pathways, and are more likely to be enrolled in a district that employs instructional practices that center on preparation for standardized tests (Davis & Martin, 2008). Students who are English learners are often incorrectly placed in lower-track courses, as counselors and teachers may not realize that they had already studied the material in their home country (Gutiérrez, 2002).

Despite these documented inequities, as a society, we maintain the narrative that all students have an equal chance to learn. Our general unwillingness to acknowledge the reality of stratification in access to opportunities to learn is related to the frame of minimization of racism. In other words, while we note the achievement gaps, we rarely acknowledge the extent of racial difference in educational access. Our unwillingness to center these opportunity gaps is also related to the abstract liberalism frame; in that, we ascribe to the idea that our job is to provide "equal opportunity" through sameness, even while students face very different levels of multiple kinds of challenges by virtue of race and class in school and in society. This idea of equal opportunity through sameness leaves us unable to redress the myriad inequalities students and communities are forever facing.

Reason #2: Racial stereotyping influences access to mathematical identities for students, and thus disrupts mathematics learning.

The second reason mathematics educators should care about race and culture is that students experience mathematics classrooms as racialized spaces, where Black and Latina/o students are subject to negative stereotypes about their ability to do

mathematics (Martin, 2013; Shah, 2013). In my own work, I have come to think about these stereotypes as "racial storylines" that are, themselves, cultural artifacts, as they are the way that we collectively make sense of (and reproduce) achievement patterns (Nasir, 2011; Nasir, Snyder, Shah, & Ross, 2013).

The extent to which students saw mathematics achievement as racialized and were aware of societal storylines about who could be good at mathematics was the subject of a study that my colleagues and I carried out with upper elementary and middle school students (Nasir, O'Conner, Wischnia, & McKinney de Royston, forthcoming). The research team surveyed over 150 fourth through seventh graders, and interviewed and observed 12 case study students to explore (a) the extent to which students understood that racial stereotypes about mathematics achievement exists, and (b) the extent to which they believed such stereotypes. The results were sobering. The students we surveyed overwhelmingly reported that they were aware of racial stereotypes which purported that Asian students were the smartest at mathematics, followed by White students, followed by Latina/o students, and lastly by Black students. What is perhaps even more alarming is that this awareness intensified by the time students were in middle school. The pattern was the same for students' reporting that they believed the stereotypes.

Perhaps even more striking is that when the research team looked at these data by race, we found that African American and Latina/o students were more likely to be aware of negative racial stereotypes about school than Asian and White students. They, however, were also less likely to say that they themselves believed such stereotypes. This reported awareness seemed to leave these students in a bit of a quandary. They were both highly aware that others thought that people like them were not good at school, yet they did not believe it. Thus, these middle school students had to cognitively and emotionally process the difference between how others thought about their school and mathematics ability, and how they thought about their ability.

Observations of case study students revealed that students took different approaches to the interpretation and management of identity and stereotypes, with different consequences on student achievement and engagement in class. These included: (a) students who were simply unaware of racial stereotypes about school and did quite well academically; (b) students who took up the negative stereotypes and found their academic achievement negatively impacted; (c) students who endorsed the stereotypes about their own group in the abstract, but who saw themselves as the exception (these students had mixed academic outcomes); and (d) students who overtly resisted the stereotypes and had strong academic outcomes. These findings make salient the deep ways that students are impacted by racial stereotypes, and the power of negative stereotypes in their lives.

Bonilla-Silva's (2010) frame of cultural racism may explain why while students articulate the power of these stereotypes in their academic lives, our schools

rarely attend to supporting students in managing the negative racial stereotypes about schools that are thrust upon them. Invoking the cultural racism frame would imply that our society may make sense of racial differences in achievement outcomes as a product of different sets of values about school, and thus not take seriously the impact of the stereotypes on children's lives in school.

Reason #3: High-quality mathematics instruction (potentially) disrupts unequal access to mathematics learning for students from marginalized groups.

The third reason mathematics educators should care about issues of race and culture is that the way we teach mathematics has incredible power to disrupt the troubling opportunity gaps and the negative processes of stereotyping and racialization that have been discussed so far. This power to disrupt is profoundly illustrated by the work of teachers at a school called "Railside High School" in the research literature (see, e.g., Nasir, Cabana, Shreve, Woodbury, & Louie, 2013). The mathematics department at Railside has been touted nationally not only for being successful in achieving strong learning outcomes in mathematics with a diverse student population but also for developing an extraordinary teacher professional community in the mathematics department that embraced mathematically rigorous reform-minded curriculum and institutional and instructional practices (Boaler, 2006, 2008; Boaler & Staples, 2008; Hand, 2003; Horn, 2005, 2007, 2012; Horn & Little, 2010; Jilk, 2007; Little, 2002; Little & Horn, 2007; Nasir et al., 2013). With respect to learning outcomes in mathematics, Boaler's (Boaler & Staples, 2008) team conducted a 4-year study that involved over 400 students and found that when compared to two other comparison schools, Railside students were slightly more likely to score "basic" or better on the California standardized test (49% vs. 41%), take advanced mathematics courses (e.g., calculus and pre-calculus) as seniors (41% vs. 27%), report that they "like math" (74% vs. 54%), and demonstrate interest in mathematics-related careers (39% vs. 5%).

These results are particularly striking given that Railside is an urban, comprehensive high school in Northern California with a student population (at the time of the study) that was 54% Latina/o, 21% Black, 17% Asian, 30% qualified for free or reduced-price meals, and 25% ELLs (i.e., unfortunately, too many believe such demographics prevent school success.) One of the hallmarks of the mathematics instruction is that the department ran completely de-tracked classes; utilized a multi-ability, project-based curriculum; and supported the success of all learners to engage in complex mathematics. The work of using the power of high-quality mathematics instruction to disrupt not only stereotypical narratives and achievement outcomes but also unequal access to mathematics learning at Railside was undergirded by a set of practices as well as a key set of beliefs and values.

Practices. The Railside approach toward teaching and learning included institutional practices at the level of the department and school as well as instructional

practices at the level of the classroom (Nasir et al., 2013). The approach was developed over a 20-year period of working together as a department. Core elements included, first and foremost, a commitment to equity. Teachers in the Railside mathematics department collectively decided that one of the most important goals they had was to serve all of their students well, and to teach high-quality mathematics to all of their students, including those from marginalized groups. Equity, then, was viewed as the opportunity for all students to have access to high-quality mathematics teaching. This commitment to equity was reflected in the ways that mathematics teaching and learning were structured at the institutional level at Railside. These institutional practices included block scheduling, so that mathematics courses ran for 90 minutes daily and were a semester long, which allowed for in class time to do extended projects and made it possible for students to take more mathematics courses during high school. Another institutional practice was the building and maintenance of the teacher professional community. This professional community was centered on discussing problems of practice together, and providing a supportive environment to help one another maintain challenging instructional practices by working together.

With respect to instructional practices, mathematics teaching at Railside was guided by a commitment to Complex Instruction (Cohen & Lotan, 1997) and group work. Complex Instruction is a pedagogical approach that emphasizes teaching in a way that attends to power and status issues in a classroom, and has the goal of equalizing status among students by providing mathematical problems that require deep thought and collaborative problem solving—what Cohen and Lotan call "group-worthy" tasks. Group-worthy tasks have to meet several design criteria: focus on core mathematical ideas, offer multiple solution paths or entail multiple representations, and require (more times than not) the collective resources of the group. Thus, group-worthy problems lend themselves to opening up the opportunity for complex mathematical thinking for all students.

The Railside approach to mathematics teaching also involved key practices, such as utilizing multiple representations (numerical, linear, graphical, etc.), focusing on big mathematical ideas (rather than procedures), asking students to justify and explain their work, and having students present their thinking and problem solving in front of the class. This focus on presenting student work had the goal of making students' thinking public and valued through presentations at the overhead.

Beliefs and values. These institutional and instructional practices were undergirded by a set of beliefs and values that were held and reinforced within the teacher professional community. These beliefs included: (a) acknowledging both teachers and students as learners, (b) working from strengths and making space for vulnerability, (c) redefining "smart," (d) rethinking what it means to do mathematics in school, and (e) valuing relationships. Taken together these beliefs convey a key set of interrelated values and assumptions. The acknowledgment that all teachers and

students are learners meant that teachers viewed themselves as learners alongside their students, and saw the work of learning to teach and of getting to know their students as a part of what it meant to teach at Railside. This belief connected to the second belief: the goal in the classroom was to emphasize students' strengths, while creating a classroom space where students (and the teacher) could be vulnerable. The vulnerability was made possible by redefining what it meant to be smart, as well as what it meant to do mathematics—both involved working through difficult problems collaboratively and putting forth effort when things seem difficult. All of these processes were undergirded by a value on relationships—between teachers and students and among students. Building trusting and caring relationships with students was important so that they were willing and able to take the significant emotional risks the department was asking them to take in the classroom.

Interestingly, the disruption of racialized patterns of engagement and achievement at Railside was accomplished through increased access to instruction that fostered deep mathematical thinking, and not through explicit discussion about race. This differs from approaches that other efforts have taken (see Nasir, ross, McKinney de Royston, Givens, & Bryant, 2013, and Givens, Nasir, ross, & McKinney de Royston, 2016, for an example of explicitly racialized approaches). One way to think about this is that at Railside, the negative stereotypes were disrupted and reframed by the outcome of having a large number of potentially stereotyped (i.e., African American and Latina/o) students being successful in mathematics and developing strong identities as mathematics learners.

Closing Thoughts

In this commentary, I have made the argument that taking up issues of race and culture is imperative for mathematics educators and the mathematics education community. It is imperative because racial and cultural dynamics operate even when we are not paying attention to them, and are especially dangerous when they go unnoticed and unacknowledged. Specific to mathematics education, the racialized and cultured nature of schools and of the teaching and learning of mathematics have continued to exert an influence on learning and achievement outcomes, outcomes that get identified as issues of individual achievement or individual difference. This influence is exerted both through the unequal access to high-quality mathematics instruction, and the existence of persistent racial stereotypes about mathematics "ability." Perhaps never has the imperative to make explicit the racialized and cultured nature of mathematics learning been more relevant than in today's political and educational climate, where racial disparities in policing and in access to higher education make the daily news. To not discuss or address issues of race, culture, and inequality is to accept the current patterns of inequality and marginali-

zation. As Robert Moses (Moses & Cobb, 2001) contends, access to high-quality mathematics instruction is one of the key civil rights issues of our time.

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