EXPLAINING HOW RACISM CAN BE LOCALLY DISRUPTED IN A MATHEMATICS CLASSROOM

EXPLICANDO COMO O RACISMO PODE SER LOCALMENTE ROMPIDO EM UMA SALA DE AULA DE MATEMÁTICA

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ABSTRACT

In this paper I apply critical realism to investigate the relationship between a mathematics classroom and the broader social context in which it is inserted. Critical realism is combined with critical race theory to understand how mathematical instructional practices can locally challenge and/or disrupt racism. The data are from a mathematics "laboratory classroom" and are interpreted using the critical realist concept of "norm circles". Results explain how three Black girls access mathematical knowledge, and how these girls participate in the distribution of authority in this classroom.

Keywords: Critical Realism; Norm Circles; Critical Race Theory; Teaching Practices.

RESUMO

Neste artigo, utilizo o realismo crítico para investigar a relação entre uma sala de aula de matemática e o contexto social mais amplo em que está inserida. O realismo crítico é combinado com a teoria crítica de raça, para entender como as práticas docentes de matemática podem desafiar e/ou romper o racismo localmente. Os dados são de uma "aula-laboratório" de matemática e são interpretados através do conceito realista crítico de "círculos normativos". Os resultados explicam como três meninas negras acessam conhecimento matemático, e como elas participam da distribuição de autoridade nesta sala de aula.

Palavras-chave: Realismo crítico; Círculos normativos; Teoria crítica de raça; Práticas docentes.

1. Introduction

This study starts from a perspective that education plays a role in our society that can serve both to reproduce dominant social structures or to challenge them (Freire, 2015). It is accepted that our social world is unequal and unjust, and under such a view, education is frequently seen to exacerbate social inequalities. Still, some look to education to disrupt these hierarchies of privilege and power. Mathematics brings specific nuances to the problem because of how mathematics is positioned in our

current technological society. Students of color have been excluded from and persistently underrepresented in highly specialized jobs (Moses & Cobb, 2001). It is thus important to educational research–mathematics education–research in particular, to better understand the relationships between practices of education and schooling and the broader social context in which they are situated.

In this study, I focus in closely on the microdynamics of classrooms and investigate how mathematics instructional practices can challenge systems of inequalities. I investigate the relationship between racism in the United States and mathematics instructional practices that teachers carry out in a mathematics classroom, such as leading a class discussion or managing small group work. The main purpose of this paper is to report on an application of critical realism as a tool to offer new possibilities to understand this relationship.

Critical realism is a philosophy of science that starts from the assumption that the world is made by real things and that scientific laws of cause-and-effect describe tendencies rather than certainty, particularly in the social world (Bhaskar, 2008). Because it supports the interpretation of actions of individuals who live under normative (racist) practices, a critical realist lens can help to illuminate how racism occurs within classroom interactions. Specifically, this study asks: *How can mathematics instructional practices lead to local disruption of racism?* To answer this question, I combine critical realism with critical race theory, a theory that emerged from critical legal studies to investigate the racial inequality in law and that was later brought to the field of education to investigate racial inequality in education (Ladson-Billings, 1999). I analyze a set of episodes of mathematics instruction in order to articulate the connection between critical realism and critical race theory. I explore how these two theories can work in complement to improve explanations of the mechanisms of (re)production and disruption of racism.

I begin by presenting a conceptual framework, describing a few core concepts of critical realism (CR) and critical race theory (CRT) and how they are situated within a particular representation of instruction. Data selection and analysis are discussed in the methods section. Then I examine episodes of mathematics instruction and investigate in each how racism is being what I call “locally disrupted”.

2. Conceptual Framework

Over the last two decades (Valero, 2004; Gutiérrez, 2013; Martin, 2013), mathematics education research has focused increasingly on the social and political dimensions of mathematics and education. To better understand these dimensions, some researchers are now foregrounding power relationships and using a variety of critical perspectives and methods (Gutiérrez, 2013) This study is anchored in both critical race theory (CRT), one of the perspectives discussed by Gutiérrez (2013), and in critical realism (CR), a philosophy of science that seeks to create better social science theories to explain the social world.

CRT starts from the perspective that racism is the norm in U.S. society (Ladson-Billings, 1999). Moreover, critical race scholars claim that racism continues to sustain White privilege while reproducing a discourse that racism does not exist anymore, in what is called colorblind racism (Bonilla-Silva, 2006). For example, in education, Brown vs. Board of Education (1954) marks the end of segregation in schools (Dixson

& Rousseau, 2006, p. 42). Still, the common practice of "tracking" has reinforced racial segregation among and within schools, and is usually justified by a discourse that regards it as a socially neutral practice that separates students according to their abilities with a goal of tailoring teaching to meet more homogeneous groups' needs (Oakes, 1995; Solórzano, & Ornelas, 2002).

I view mathematics classrooms embedded in the broader society, hence a place where racist practices are normalized. One way racism permeates mathematics classrooms is by selecting who gets access to what mathematics. Current U.S. society is highly dependent on production of technology, and mathematics is often perceived as a highly specialized, complex domain of knowledge predominantly mastered by Whites. Thus, through a CRT lens, is often unfairly constructed and leveraged as "White property" in school classrooms, and in society at large (Moses & Cobb, 2001; Ladson-Billings, 1999). Mathematics is a means to sustain control over what is developed in technology and who can develop such technology (Apple, 1992). Any school will offer mathematics courses, but the kind of mathematics offered will be different to different groups of students. Highly valued mathematics promotes reasoning and conceptual understanding, dimensions needed for technological innovations. This is the kind of mathematics that is usually not accessible to socially marginalized students of color (Powell & Brantlinger, 2008).

This paper investigates how teaching practices can interfere with the distribution of mathematical knowledge in schools. For example, Ladson-Billings (1997) argues that normative teaching practices such as "giving information, asking questions, giving directions, making assignments, monitoring seatwork, reviewing assignments, giving tests, reviewing tests, assigning homework, reviewing homework, settling disputes, punishing noncompliance marking papers, and giving grades" supports the teaching of an impoverished version of mathematics, based on drill, rules, and repetition. What I am interested is whether and how mathematics teaching practices could deviate from a racist norm and actually disrupt racism. To accomplish this goal, I use critical realism (CR) as a complement to CRT.

The basic assumption of critical realism is that the world is made by real things that have real causal powers (Bhaskar, 2008). Phenomena are interpreted as outcomes of causal powers of real things, and causal mechanisms are the processes through which real things bring about outcomes. In the physical world, electricity has the power to turn an electronic device on. We can explain why and how electricity works based on physics laws. Turning on an electronic device (the outcome) is caused by the power of electricity, the mechanism by which the outcome occurs are described by physics laws.

In the social word, explanations of this kind are more challenging because of the complexity of human interaction in society. Consider, for example, that race has the power to segregate schools through tracking. Still, however, people can promote segregation or to resist it in ways that the electronic device cannot. CR is helpful to unpack the interactions between social individuals and the society they form, in this case, to unpack the relationship between actions of a teacher in a mathematics classroom and institutional colorblind racism. At this point I rephrase my research question to better capture the critical realist framework to: *What are the mechanisms through which mathematics instructional practices can be seen as locally challenging racism?*

Finally, I view instruction as a relational activity among teacher, students, and content (Lampert, 2001) embedded in social, political, historical, and cultural contexts (Cohen,

Raudenbush & Ball, 2003). In this section I will expand some concepts and ideas from critical race theory and critical realism, then I will elaborate one connection between both theories and how they complement each other in this study. Then I will describe my representation of mathematics instruction, which I am referring as the "relational aspect" of instruction, focusing on how racism and mathematics instruction are related.

3. Critical Race Theory

Critical race theory is a theoretical framework that foregrounds race, racism, and racialized experiences. To critical race scholars, race is a social construct that goes beyond the color of skin and citizenship (Ladson-Billings, 1999), and brings real consequences to people once they are identified as member of a racial group (Bonilla-Silva, 2006).

The notion that racism is permanent is the foremost premise of CRT. The *permanence of racism* principle suggests that racial inequality that privileges Whites over others is perennially present in all domains of U. S. society (DeCuir & Dixson, 2004, p. 27). *Interest convergence* speaks to the fact that many, if not all, civil rights people of color gain were achieved because Whites would also benefit from them (DeCuir & Dixson, 2004). *Counter-storytelling* is the main methodological strategy used by critical race scholars to challenge inequality and White privilege by "coloring" colorblind discourse. It consists in "telling the stories of those people whose experiences are not often told" (Solórzano & Yosso, 2002, p. 32), usually telling the stories of people of color.

Whiteness as property refers to the idea that Whiteness can be viewed as a set of social (privileged) possessions that can operate similarly as property in a capitalist society (DeCuir & Dixson, 2004). In the context of education, Whites control what is considered valuable knowledge and who gets access to it, which can be interpreted as a kind of intellectual property. Particularly, mathematical ability is embedded in the construction of Whiteness in different ways. For example, there are fewer advanced course offerings in schools that serve mostly students of color (Solórzano & Ornelas, 2002), or students of color are advised not to choose more advanced classes when they are offered in their school (Chapman, 2013; Berry, 2008). Moreover, in research, studies that emphasize achievement gap between Whites and students of color support the (re)production of deficit discourses toward marginalized populations (Gutiérrez, 2008).

Critique of liberalism is a direct critique to liberal ways of understanding and living in the world (DeCuir & Dixson, 2004). Critical race scholars argue that such liberal framings support colorblind racism (Bonilla-Silva, 2006). For example, Solomon, Portelli, Daniel, and Campbell (2005) report how the liberal idea that "if people work hard enough they will overcome the myriad obstacles" (p. 160) can prevent White teacher candidates to see systemic racial inequality. Within such a frame to view education, academic success and failure are explained in terms of individual effort, ignoring systemic differences in opportunities and erasing color from the picture.

Finally, CRT understands that people of color experience racial oppression differently based on their individual background and multiple identities and insists in a non-essentialist approach (Delgado & Stefanic, 2001). Critical race scholars particularly acknowledge the complexity generated by being in the intersection of multiple forms of subjugation such as race, gender, and social class. For example, Gholson and Martin (2014) discuss how the intersectionality of race, gender, and age plays out in the

mathematics learning of a group of Black girls. They report how different Black girls enact Black girlhood differently and argue that, "Black girlhood in our view is not to be perfected or achieved in a universal or developmental sense, but rather, to be seen as an elastic, eclectic, and useful construction for understanding the life experiences of Black girls." (p. 32)

4. Critical Realism

Critical realism starts from a realist conception of the world, which Elder-Vass (2012) concisely summarizes as "the belief that there are features of the world that are the way they are independent of how we think about them" (p. 6). Moreover, these are *the real things* that make the world and are viewed as structures and mechanisms, or, in other words, causal laws (Bhaskar, 2008). In this view, in spite of being socially constructed, race is real because it has causal powers; race brings real consequences for the lives of people (Bonilla-Silva, 2006).

In CR, phenomena cannot be completely determined by scientific laws, they are only influenced by scientific laws. The example cited by Bhaskar (2008) in p. 95 is that the path of his pen does not violate any law of physics, nevertheless it is also not determined by such laws. There is a limitation of what a pen can do that is described by the laws of physics, yet such laws do not determine what is being traced by the pen. What is important in these basic ideas is that the world, especially the social world, is made by real things; and that scientific laws, social laws in the social world, describe tendencies rather than determination. When I say that race causes segregation within schools through tracking I am describing a tendency to overrepresent Whites and Asian and to underrepresent African American and Latinx students in advanced classes, and over representing African American and Latinx while underrepresenting Whites and Asian in lower tracks (Oakes, 1995). Race influences but does not completely determine what is going to be a student placement.

One concept that is central for CR is the concept of emergence. Here, I am particularly adopting emergence as described by Elder-Vass (2010). In this version, the real things in the world can be combined in a way that, because of their structure and not only its individual properties put together, a new thing emerges in the world. Elder-Vass (2010) also refers to this new thing as an "entity" or whole, and it possesses "properties or capabilities that are not possessed by its parts." (p. 4) The idea is that the whole is not just the sum of its parts, but it is something else, with a new causal power that is, of course, derived from the individual properties of its parts, but not only this, the way the parts interact and relate with each other is also responsible for the emergence of the new thing. Water is a common example of emergence. It is composed of hydrogen and oxygen atoms, but it has properties not possessed by them. The boiling point of water is an emergent property because it is not possible to determine it based only in hydrogen and oxygen properties. The mass of water is not an emergent property because it can be determined by just adding the atomic masses of hydrogen and oxygen. The concept of emergence is what forms the layered or laminated view of the world under the critical realist perspective. A particular whole is said to be in a higher level or layer than its parts. The same whole, however, can be a part of another emergent structure; in this case the whole is in a lower level than the new emergent structure.

Before I apply the concept of emergence to interpret the social world, I will define some key terms and ideas. According to the Oxford Dictionary of Sociology (Scott &

Marshall, 2009), *social norms* are shared expectations of appropriate behavior; *social institutions* are clusters of norms; and *social structure* is the organization of society with respect to norms and actions, or, in other words, the combination of institutionalized expectations and actual individual actions. Social norms about going to a restaurant include waiting for the host or hostess to be seated, ordering drinks first, then ordering food when the server brings the drinks, giving a tip of about 20 percent of the bill to the server. Norms in a classroom can include daily routines, such as delivering homework; norms about discourse, such as disagreeing with ideas, not people; sociomathematical norms (Yackel & Cobb, 1996), such as what is considered a different solution to a problem; among others.

In this study, I am viewing an individual in the lowest level of the social world, the whole society as the highest level, with many intermediate levels in between, such as social institutions. The immediate higher level to an individual is, in Elder-Vass (2010) definition, a *norm circle*. The norm circle is defined by the group of individuals who hold a normative belief of endorsing a social norm (Elder-Vass, 2010). By endorsing, he means that each individual in the norm circle acts to reinforce the norm and discourage behavior that does not conform to the norm. Elder-Vass (2010) argues that the shared endorsement of a norm:

> when combined with these sorts of parts, provide a generative mechanism that gives the norm circle an emergent property or causal power: the tendency to increase conformity by its members to the norm. The property is the institution and the causal power is the capability that the group has to affect the behaviour of individuals. That causal power is implemented through the members of the group, although it is a power of the group, and when its members act in support of the norm, it is the group (as well as the member concerned) that acts. (p. 124)

With this argument, Elder-Vass (2010) explains why the norm circle is actually an emergent whole rather than only a group of people. He is pointing out what is the emergent causal power by showing the tendency it describes: to increase conformity to the norm. One usual norm in a mathematics classroom is assigning homework. Teachers develop the habit of assigning homework to their students and contribute to normalizing the taken-for-granted nature of homework. Were a teacher to not assign homework, parents and school supervisors would press the teacher to assign homework. All of this mostly goes unquestioned and is "normal." Teachers, teacher educators, educational researchers, parents, and school supervisors are members of such circle acting to enforce the norm of assigning homework.

It is important to consider that the causal power in CR is in reference to tendencies, so the fact that a norm circle enforces compliance with a particular norm indicates that someone in this norm circle will have the tendency to act in conformity to such norm, but this is not determined. Individuals have agency to act in conformity to a norm, resisting the norm, or even in another way. Moreover, there may exist contexts of complex normative intersectionality, in other words, there may be norm circles enforcing different norms about the same situation and such different norms might not be consistent at times. Individuals may be exposed to or even participate in these kind of circles, and have to decide what norm to follow in specific situations. Elder-Vass (2010) asserts that in this situation the final human action is difficult to anticipate.

5. Connecting CR and CRT through Permanence of Racism

Ladson-Billings (1999) says that racism is the norm in current U. S. society and "because it is so enmeshed in the fabric of our social order, it appears both normal and natural to people in this culture." (p. 12) This idea is the gist of *permanence of racism.* So, in a critical realist account of it, there must be a norm circle endorsing each racist practice.

One example of such a norm circle is the one endorsing the normative deficit discourse that positions African Americans (and other minority groups) as academically less than Whites (Gutiérrez, 2008). This circle emerged in the colonial period as a way to justify the slavery system (Douglass, 1892). Once the norm circle reinforcing such discourse had emerged, it started to operate downwards, constraining the individuals in the circle to act accordingly. The way the discourse is reinforced has changed throughout time. For example in the beginning of 20th century, IQ tests (Karier, 1986) helped to disseminate the idea that Blacks were less intelligent than Whites; and research reports such as Oakes (1995) reveals that African American students are less likely to be placed in higher track courses, in comparison to their White peers, even when their achievement is similar.

In a critical realist interpretation of this example, the norm being reinforced is that members of this circle can say (and believe) that African Americans are academically less than Whites, or equivalently, they cannot say that African Americans and Whites are equally good. The discursive norm circle regulates the content of what members of the circle express using language norms, there are normative practices that dictate what they can say and what they should not say (Elder-Vass, 2012). Such normative racism has a critical realist interpretation: race causes racial inequality through colorblind racism, thus is real.

6. The Relational Aspect of Instruction

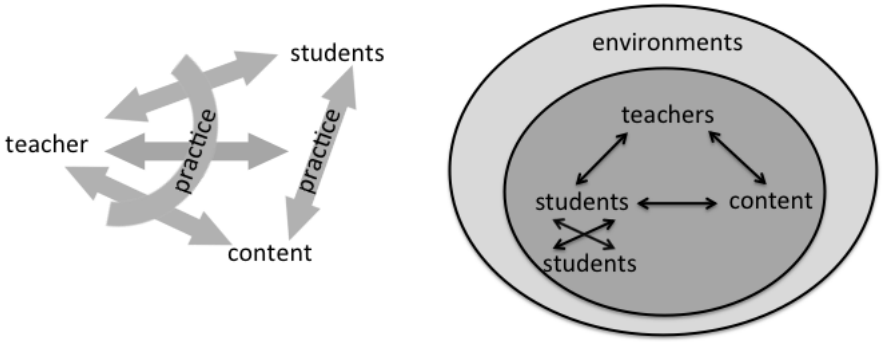
I anchor my perspective in two similar models of instruction, one from Lampert (2001) and one from Cohen, Raudenbush & Ball (2003). Lampert (2001) starts delineating basic relationships that take place in instructional episodes. One set of relationships is between teacher and students, another relationship is between teacher and content and a third one is between students and content. Lampert (2001) focuses her representation in the actions the teacher does in these relationships, actions she views as teaching practice. In any of these relationships, students, content, and the teacher can serve as resources but also as constraints for teaching practice. These teaching practices are not independent; they must be coordinated by the teacher in the moment of instruction. Instruction is then a complex relational activity because it involves multiple relationships that occur simultaneously and that need to be coordinated by the teacher in the moment (see Figure 1).

Cohen, Raudenbush, and Ball (2003) further attend to relations among students, as students interact with one another. Further, Cohen, Raudenbush, and Ball (2003) argue that instruction does not happen in a vacuum, but happens in social contexts that serve as resources or constraints for teaching and/or learning. They argue that instruction is situated in social contexts, or "environments," and that teachers have to manage instruction within such social contexts (see Figure 1), including the influences of families, school or district leaders, policy and local communities' cultures and ways of being. Cohen and his colleagues also view an instructional environment as the broader histories and society in which it instruction is situated. Individuals' actions in society

are usually viewed as constrained by social institutions and structures (Elder-Vass, 2010), so teaching actions would be as well. Moreover, individual actions tend to reproduce these same social institutions and structures, which is particularly problematic when a social structure is unequal and privileges some group of people over others. There are, however, opportunities to challenge and disrupt unequal social structures that promote social change towards a more socially just society. Freire (2015) claims that education can serve to both sustain and reproduce unjust social structures or to challenge them and promote change.

This paper is about the relationship between mathematics instructional practice and broader social structures such as racism and social class that privilege a group of people over others in social systems of inequality. I view instructional practices as mediating the relationships among teacher, content, and students, relationships among the students, and social oppressive structures, in particular racial inequality, permeating the instructional environment.

Figure 1 - The instruction representation in the left is from Lampert (2001) (p. 33) and the one in the right is from Cohen, Raudenbush, and Ball (2003) (p. 124)



7. Methods

This is a case study drawing on a secondary data analysis of a summer program held each summer at a large research university in the United States. In this program, an experienced teacher teaches lessons to a group of rising fifth grade students[1] in public—that is, while over 70 other educators observe. This summer program serves different purposes: one is to be a site of learning for practicing teachers and teacher educators, because of the nature of the public teaching and the professional development sessions that follows it; another is to be a site of research for both student learning and teaching practices. By secondary data analysis, I mean that the data analyzed was not collected specifically for the purposes of this study; nevertheless it provided useful information to investigate how mathematics instructional practices can disrupt racism.

The class comprises students from one school district in the midwest United States. The group is constructed to represent the demographic distribution of this district. The majority are African American and most come from low-income households. Only a few of them are White. The students have different levels of English proficiency; and the mathematical performance in this district tends to be low and "not meeting expectations" for proficiency as established by the state.

[1] Students who will start fifth grade in the following fall.

Data collected by the research team include video records of instruction, video records of pre-brief and de-brief meetings with learning teachers, copies of students notebooks, pictures of classroom records such as charts, lesson plans, class materials such as handouts for students, etc. Because I am analyzing data that were already collected, I did not engage in a relationship with the participants. I sought to observe and respect their voices the best way I can by triangulating different sources of data. I focus on the data produced during instruction time: video records of classroom interaction (approximately 2.5 hours per day across 10 days), detailed lesson plans for each class, copies of student work (notebooks, homework, and assessments), photos of every collective record produced in classroom (such as charts and white board records). The high-quality documentation of the laboratory classes allows detailed observation of classroom interaction often difficult in regular school settings. Also, the composition of the student body, the qualification and experience of the teacher, and the laboratory setting provide a fruitful environment for the presence of multiple norm circles operating in this same space.

I followed an analytic inductive approach (Erickson, 1986) to code and interpret the data. I watched the video records with a focus on interactions that involved students of color, produced fieldnotes and used these to identify episodes. I re-watched each episode and wrote better-detailed descriptions. I then analyzed and interpreted these episodes according to the conceptual framework. I investigated what was the counter-narrative being told in each episode with respect to Whiteness as property and/or liberalism, or, in other words, I investigated how the episode showed Whiteness as property and liberalism being challenged and/or disrupted. Then I investigated what were possible norms circles at play in each episode and how they could explain the outcome of racism being challenged and/or disrupted.

8. Selection of Episodes

The selection of episodes was based on the purpose of this study: to investigate norm circles created in the context of this classroom in relation with norm circles existing in the broader social context this classroom is inserted in. I was specifically interested in the social norms involved in teacher-student interactions or in student-student interactions mediated by the teacher. I wanted to identify the norm circles in which the teacher participated and how the teacher acted with respect to such norm circles. To do this, I needed to look at classroom interactions in which the teacher was participating.

Social norms at play can be difficult to track, particularly in contexts of complex normative intersectionality that are expected in this classroom. To reprocess the data so it can be analyzed, I decided to focus on the interactions of a subset of students that were mediated by the teacher. These interactions could be among themselves, with other students, or with the teacher. I also included interactions that were not directly mediated by the teacher but were provoked by a teaching move.

Three Black girls comprised the subset of students I am focusing on: Alex, La'rayne[2], and Miah[3,4]. These girls were doing mathematics in the summer program—that is, they were engaging in mathematical conversations, explaining their mathematical thinking,

[2] Pronounced La-rain'.
[3] Pronounced "Maya."
[4] These are the girls' actual names. The research consents and IRB approval permit us to use the children's real first names. Other identifying information (e.g., last names) are not used.

both verbally and in writing, and listening to others thinking and making sense of it. They were also observing classroom norms for participation, including sociomathematical norms (Yackel & Cobb, 1996). Moreover, they did not do mathematics in the same way, and their participation was perceived differently by the teacher and their peers at moments. Each of them could communicate about specific points central to what they were talking about. Miah could talk and write details about her mathematical thinking, Alex could publicly point specific things that are difficult for her in mathematics, La'rayne was able to publicly point specific aspects of social inequality in class. It is important to report on these girls not because they illustrate cases of "extraordinary" Black girls that could do math, but instead to choose three different Black girls in order to focus on their modes of doing mathematics "while Black" (Martin, 2012). Showing how Black girls engage in doing mathematics builds on the idea of "learning and doing mathematics while a Black girl" (Martin 2012, Gholson & Martin, 2014) and explores what does it look like to do mathematics while being a Black girl. This specificity in their modes of participation was helpful to illuminate the details needed to investigate how the teaching that happens in this classroom is influenced by or influences the norm circles in which these girls participate. Finally, I expect that some of those circles are shared by these girls and the teacher, and such are relevant to the focus of my study.

A total of eight episodes from two days of classes was selected, each of which centers on the participation of one of the three girls. Half of the episodes show one of the girls doing mathematics and half shows other types of participation that are related with enabling them to do mathematics. I analyzed these episodes with respect to two CRT themes: (1) Whiteness as property and (2) critique of liberalism. In all of them, I looked for what counter-narrative was embedded to challenge and/or disrupt Whiteness as property or liberalism. Finally, I specifically looked for norm circles related to those themes to unpack the mechanism that could explain how the interaction in the episode was challenging and/or disrupting racism.

9. Challenging Whiteness as Property

Ladson-Billings and Tate (1995), in their critical race theory seminal work, describe how the notion of Whiteness as property was historically constituted based on the capitalist concept of property. They argue that there is a set of social privileges that are tied to being White, so those who are White possess such privileges and those who are not, do not. This set of social privileges are derived from property over land, that was used to persecute and conquer Indigenous and immigrant populations, and property over people, in the case of slavery of African populations. Similarly, Annamma (2015), in her work about juvenile justice and education, briefly discusses how "being White" grants educational privileges that can be included in this notion of Whiteness as property. I want to specifically address educational privileges that can be interpreted as intellectual property. By intellectual property I mean mathematical ability usually attributed as a function of being White and how it limits who gets access to mathematical knowledge. Course offerings in public schools can constrain what kind of knowledge is accessible to students of color; instruction in classrooms can produce the same effect (Ladson-Bilings & Tate, 1995, Ladson-Billings, 1997). In this paper, I show how specific teaching practices can make mathematics accessible to students of color. I considered how the perpetuation of mathematical knowledge as being a form of

Whiteness as property can be challenged by teaching practices that cause students of color access this kind of mathematical knowledge. I show how three Black girls are accessing mathematical knowledge in this classroom. I seek to contribute to the understanding of this issue by unpacking the mechanisms through which these girls are accessing mathematical knowledge.

Additionally, their identities as girls bring additional layers to this study. Gender differences related to mathematics proficiency have been better documented in mathematics education than other equity-related groups such as social class or ethnicity, as Lubienski and Bowen (2000) report, even if these reports mostly emphasize "gap gazing" analysis (Gutiérrez, 2008) that focus on the deficit comparisons among groups. So these girls could be barred from serious participation in and creation of mathematical knowledge because they are Black, and because they are girls. Moreover, being a Black girl is not only about being Black and being a girl, the two labels put together usually ignores the intersectionality of being a Black girl. Gholson (2016) argues how the social construction of mathematics and mathematics education ignores and neglects Black girls and women. In her work, Gholson discusses how Black femininity is differently constructed than White femininity. Black girls and women are associated with characteristics usually attributed to men such as "being confident, assertive, or argumentative," (p. 291). These characteristics however, are not usually translated to positive attributes with respect to learning and doing mathematics as they are with men. These attributes in Black girls and women are seen negatively. For example, young women of color are usually seen as aggressive and "unnaturally" strong (Annamma, 2015). They are often read as simultaneously Black and girls but also not-Black, because they are not Black men, and not-girls, because they are not White women.

I turn now to look inside the classroom, examining six episodes of instruction. Each episode is numbered chronologically as they occurred. My focus is on the ways in which Black girls are accessing and participating in the construction of knowledge in the classroom. I seek to uncover and make explicit the ways these girls engage in the construction of knowledge. My analysis serves to illuminate how Whiteness as property can be challenged and/or disrupted in the context of everyday classroom interactions. Specifically, I expect that the ways these girls participate in this classroom and access mathematical knowledge can be helpful to understanding how mechanisms of local disruption of racism might look inside a mathematics classroom. Moreover, I expect to indicate instructional practices that are associated with such mechanisms, and how these practices are enacted.

Episode 1A: La'rayne Participating in a Discussion of Non-solutions of a Problem

The teacher is introducing the concept of "conditions of a problem" in the context of the "warm-up problem" of day three of the summer program: "Add three different numbers together to equal 9. The numbers you can choose from are 1, 2, 3, 4, 5, and 6. How many different three-number equations can you write like this?" The problem is displayed in the left white board, on a chart paper written by the teacher.

After reading and listing the conditions together, the teacher asks whether someone can give a *wrong* answer to the problem and clarifies it "In other words, give it… an… an answer that somebody might produce and explain after that why it's wrong. What's a wrong answer that doesn't follow the conditions?" The teacher asks for a *wrong* answer to help students make sense of the conditions of a problem and how they are related

with right and wrong answers for the problem. In this case, the "right" answer is in fact a wrong answer to the problem.

La'rayne seems not to be paying attention to what the teacher is talking, but raises her hand immediately when teacher first asks for a wrong answer. The teacher calls on La'rayne to share and she promptly and correctly offers an incorrect solution (2+3+1=6) that follows two, but not all three conditions of the problem. La'rayne speaks from her seat and the teacher writes her answer on the board on the left of the chart with the problem. The teacher also probes her, asking her which condition her solution did not follow:

> T: So now can you tell what condition it didn't follow up here [pointing to the chart].
> L: You're only supposed to use those numbers. Well, you used those numbers, but [pause]
> T: Did you use three different numbers?
> L: Yeah.
> T: Did you make an equation for nine?
> L: No.
> T: Did you use only these numbers [pointing to third condition]?
> L: Yes.
> T: This is the thing that your answer didn't follow [pointing to second condition], right?

In this case, La'rayne had been behaving in a way that could have been interpreted as if she was not listening to what the teacher was discussing about the conditions of a problem they were about to work on. She had not been looking at the teacher or at the board, and she seemed uninterested in what the teacher was speaking or writing and seemed to be paying attention only to her own pens, pencils, and other materials. She, however, promptly raised her hand when the teacher asked for a "wrong answer" and correctly shared a solution to the problem that violated one of the conditions, making it a wrong answer.

Episode 1B: Miah Participating in a Discussion of Non-solutions of a Problem

In the sequence of the discussion in episode 1A, the teacher asks Olivia to share another wrong answer, an answer that violates a different condition (indicating that an answer that violated a different condition constituted a different wrong answer). As before, Olivia speaks from her seat and the teacher writes the answer on the board below La'rayne's. Olivia gives an answer that violates both conditions number 1 and number 2 (1+1+3=5). The teacher asks the class, "Which condition did she not use?" and calls on Miah to answer. She promptly says, "Number one, use three different numbers." This answer is worthy of notice because Olivia's answer violated two conditions: condition number 2 that La'rayne's solution also violated, and condition number one. Both conditions were correct answers to the teacher question, "Which condition did she not use?" but Miah's choice of condition number one shows that she had understood the teacher was actually looking for the condition that was different from La'rayne's solution. If Miah had answered condition number two, the teacher could ask follow up questions to get the desired answer, but she did not need to do so. Miah's answer is evidence of her accessing mathematical content.

Episode 2: La'rayne Participating in the Teacher Contract Discussion

In the first day of class, the students had been presented to the student contract. This contract is about the expectations the teacher had for the students so they could have a productive learning experience. The teacher and students had had a discussion about what this contract meant and why it mattered. The teacher contract represented the other part of this agreement, what the students expected the teacher to do to support they in their learning. When discussing the teacher contract on the third day of classes, the teacher wanted to collect students' ideas, and find agreement among the students about their expectations from her, so she could write a proper contract to show in the next day, and make her part of the commitment to them.

In this episode, the teacher launches a discussion about the teacher contract prompting students to present one idea about what the teacher should do to help they learn a lot: "Who has an idea for the teacher contract? Something that a … that a good teacher does to help you to succeed in the Elementary Math Program?". Serenity, a White girl, says "to give harder homework." Other students loudly complain, indicating they do not want the homework to be harder. Teacher then discusses how the class should respond whenever someone share ideas, particularly when you do not agree with the ideas being shared. She asks Serenity to explain her ideas. Serenity says homework was too easy. La'rayne agrees saying "way too easy" (not explicitly to the whole class, but possibly loud enough so others could hear, her speech was recorded loudly and clearly, she even responds to someone "yes it is!", emphasizing that homework was easy for her). By agreeing with Serenity, La'rayne makes visible that Black girls can be interested in mathematics. The teacher then says that "super easy homework would be boring" and asks for other suggestions for the homework. The teacher records all ideas in a chart posted in the right white board. The class then discusses all the suggestions and agrees about a balance between hard and easy tasks, making it more interesting, and doing part of it during the summer program off-class time. The coordination of homework norms by the teacher was key in this episode. First, it entailed dealing with different norms about who decide how the homework should be, and how such decision should be made. Second, it involved negotiating overlapping circles with respect to homework norms decision-making and the role of homework in students' mathematics learning.

Episode 5: Alex Talking About Her Mother's Concern

Every class the students had homework to complete that they were expected to turn in at the beginning of next class. There was a table on the side of the room with a specific space to put the homework sheet. The teacher usually stood beside the table greeting each student individually, while they turned in their homework. In the beginning of the fifth day, when she greets Alex, complimenting her shirt, Alex tells the teacher that her mom wants the teacher to grade her homework, which launches a brief discussion between Alex and the teacher about how the teacher and Alex's mother used her homework to track her progress in the program:

T: How are you?
A: (inaudible)
T: Good. I really like that shirt.
A: Thanks. My mom says you have to key my homework 'cause she thinks I didn't turn them in.
T: She what? Say that again.
A: She thinks that I don't turn them in.
T: You do turn in your homework.
A: Yeah, but she doesn't [pause] she doesn't think that.

T: Doesn't you had a (inaudible) comment? Didn't you showed it to her?
A: [nods]
T: But I wrote great on it. Yesterday.
A: I know. I saw [pause] I was very [pause] I very appreciated it [pause]
T: You did a great work!
A: But she [pause] she [pause] she doesn't see it and she thought [pause]
T: You want me to write more of a note so she knows I read it?
A: [nods]
T: OK. Can you remind me before you go home today?

The interaction begun with Alex asking the teacher to key her homework because her mom had thought she was not turning it in. As the interaction developed, the teacher interpreted that Alex's mother wanted proof that the teacher was reading (and possibly evaluating) Alex's homework. Only writing "great" in the front page, which would have been sufficient confirmation that Alex was indeed turning in her homework, was not enough. This brief exchange between Alex and the teacher suggest that Alex's mother was using the homework to track Alex's progress in the summer program, and that she wanted to know how well Alex was doing in her homework, she was interested in Alex's learning.

Episode 6: Miah Sharing Her Work on Notebook

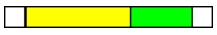
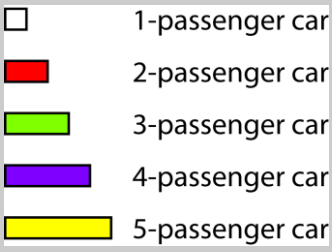
This episode occurred in the context of the work on notebooks, that is done during the summer program with the goal of helping students in learning how to use and using their notebook to support their own learning and development. In this particular instance, the teacher is focusing in writing mathematical records and calls on Miah to share her notebook. The teacher asks her to show what she had written and explain what she was thinking when she was doing it. The teacher asks her to show (using the document projector) specifically the question that asked if the train  could be a train for Ms. McDuff (according to the following two-part train problem they were working over the summer program depicted in Figure 2.). The question also asked to explain "how you know".

Figure 2 - Summer program train problem

The Train Problem

The SP Train Company has five different-sized train cars: a 1-passenger car, a 2-passenger car, a 3-passenger car, a 4-passenger car, and a 5-passenger car. These cars can be connected to form trains that hold different numbers of people.



Part 1

You can use only these five types of cars to build trains, and you can use at most one of each type of car in each train.
What are the different numbers of people that the SP Train Company can build trains to hold?

Part 2

Ms. McDuff wants to order a special 5-car train that uses exactly one of each of the different-sized cars. Ms. McDuff wants to be able to break apart the 5-car train to form smaller trains that hold exactly each number of people from 1 to 15. The customer wants to be able to build these smaller trains using cars that are next to each other in the 5-car train.
Can the SP Train Company build Ms. McDuff's order? Explain how you know.

Miah answers NO and explains: “it couldn’t be because this train doesn’t follow all the conditions.” When verbally explaining, she actually names which condition was not being followed (using one car of each, there are two whites):

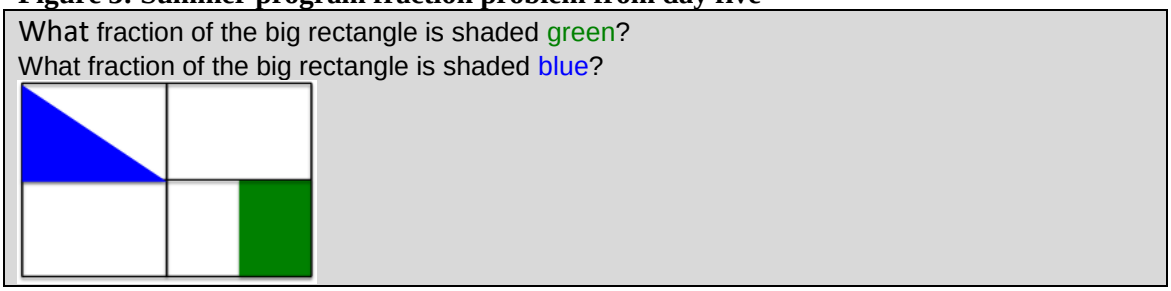
> M: I thought it couldn’t be because we’re suppose to [pause] uh [pause] use only one of [pause] uh [pause] each cart [pause] and use [pause]
> [Some students were talking and not listening to what Miah was sharing.]
> T: [to Miah] One second.
> T: [to class] Could everyone stop for a moment. I don’t [pause] I only see about half of the people looking at Miah right now. What Miah is showing you will help you with your notebook and help you with the train problem today. Dior, I’d like you to look up at Miah’s notebook. Jeremiah, are you looking up here?
> [to class] OK, so she was explaining why the second train doesn’t fit the new train problem.” [the train problem part 2 is the new train problem]
> [to Miah] “Why not?”
> M: Because [pause] uh [pause] the train problem you’re supposed to only use one of each color and there’s two whites and [pause]
> T: So what did you write?
> M: I wrote [reads her answer out loud fluently]

The teacher asks others what was good about Miah’s work on notebook. Ala says she used the word “condition.” Jerone says she wrote clearly and writing clear makes it easier to understand. The teacher highlighted Miah’s contribution by adding to Jerone that she wrote a complete sentence. This way, the teacher emphasized the mathematical practice of *writing complete sentences*. This emphasis indicates that such practice is important in mathematics and that Miah was doing it well. In this episode, not only Miah was doing mathematics, but the teacher acknowledged it publicly to her peers. There were many students not paying attention to Miah at all in the beginning of the episode. The teacher, however, shifted knowledge authority in class by showing that Miah was doing mathematics and that they could all learn from her.

Episode 7: Alex Asking a Question About a Mathematical Explanation

In the fifth day of the summer program, the students are working on the following fraction problem (Figure 3), that is displayed on a chart at the board. The students have copies of the pictures to use to explain their thinking that can be posted on the board, as well as copies of the blue triangle and green rectangles that can be cut and posted over the picture.

Figure 3: Summer program fraction problem from day five



At some point in the discussion of the solution to the problem, Kassim had showed his thinking to prove that the blue rectangle represented the same fraction as the big rectangle by showing how 8 blue triangles cover the big rectangle the same way 8 green rectangles did. The episode starts when Layla shares a different way to show that green and blue represent the same fraction, she cuts the blue triangle in two pieces and rearranges them so they look alike. Michio revoices Layla's idea then shares a third strategy, showing that two blue cover the same area of two green. He did not use these exact words, and his language is somewhat mathematically inaccurate, but the way he talked, represented, and gesticulated made clear to his peers what he was trying to convey. He represents his strategy as in figure 4.

The teacher asks what Alex though about it. She says it's hard for her to see they are because they are diagonal to each other:

> A: Uh, I think they're saying [pause] but it's really hard for me, uh [pause] see [pause] uh [pause]
> [Jerone, who is sitting right beside Alex, asks her in the middle of her pause] "So then how do you see?"
> A: [continues her speech] these are both matched up, because they're diagonal to each other [pause] and [pause] I can't match them up.

Michio says "I see" and starts to change his representation right away. While he is working, the teacher says Alex's comment was a good one, because when you're seeing someone explaining it could help who is explaining to show it to you so you can understand it better. Michio, says "Here. Look," and shows Alex the second representation in figure 4. He asks Alex, pointing to the blue and green rectangles next to each other, if Alex could see it better this way. She agrees.

Figure 4: Michio's first and second representation of solution to the fraction problem

This episode shows Alex being brave enough to share a difficulty she had in front of the whole class. What is more interesting though is how she did it: she was very specific about what was difficult for her, which was what helped Michio respond to her. Mathematical proofs are usually written by mathematicians to convince other mathematician about a mathematical fact, theorem, or result. Alex asked a question that made Michio refine his argument that then convinced her. Both students were doing mathematics together.

10. Publicly Talking Mathematics in the Context of Class Discussion Can Challenge Whiteness as Property

In four of the eight episodes I analyzed, one of the three Black girls are accessing mathematical content in the context of class discussion and they are publicly talking

mathematics: sharing their thinking, explaining their reasoning, or asking a good question.

The first two episodes, 1A and 1B, occurred in the discussion of conditions of the "warm-up problem" on day three of the summer program. In episode 1A, La'rayne was engaged in the mathematical discussion, hence accessing mathematical knowledge. She, however, was only accessing such content because the teacher ignored her apparently disruptive behavior and believed in her raised hand. The calling of the student to share her answer was a choice of the teacher; she had other students with raised hands to call at that moment, still she called on La'rayne. She was at that particular moment deciding her action based in different norm circles, one that told her La'rayne was not engaged in the discussion, and another that told her the student knew something and wanted to share with the class. The teacher recognized her behavior as a valid way of participating in class, as a legitimate way of doing mathematics. Miah, in episode 1B, was also engaged in the discussion. However, Miah's contribution was even more mathematically sophisticated because of the condition she chose to emphasize when answering which condition Olivia's solution did not follow. In both episodes mathematical *content* was being accessed by the girls.

Moreover, both girls observed the norms for participation in mathematical class discussions: they spoke at appropriate times, only when prompted by the teacher and did not interrupt another student; when prompted to explain their answers, their explanation were based in mathematical facts; when teacher asked for a solution that violated another condition, Miah followed the teacher lead. These norms were presented, reinforced, and coordinated by the teacher, and they counteract stereotypical expectations for Black girls. These girls were not aggressive, but they were also not passive. They respectfully talked mathematics to the class. They did mathematics in collaboration with others. This class cultivated meaningful mathematical talk, and both girls were engaging in it.

In episodes 6 and 7, Miah and Alex were accessing mathematics by performing a mathematical practice skillfully. The teacher enforced norms about what does it mean to do mathematics and legitimated who did it well. Additionally, they become a model of what it looks like to write clearly or to ask good questions, because the teacher assigned competence to these girls. In episode 6, Miah demonstrated mathematical ability by using mathematical *practices*: she wrote complete sentences to explain her thinking. This practice of *writing complete sentences* was emphasized by the teacher, indicating that it made Miah's writing clear, which is good in mathematics, because makes it easier to understand. This episode suggests that Miah could articulate and communicate her mathematical thinking, which is evidence of her accessing mathematical knowledge. When she showed her answer she was able to unpack it on the fly, using complete sentences on her speech as she did on her writing. It is interesting that Ala pointed the use of the word "condition," that had been worked on the class before, but the teacher did not pick that up. The teacher had one contribution that focused on vocabulary, and another that focused on a mathematics (learning) practice. She decided to highlight practice rather than vocabulary. By doing this, the teacher reinforced mathematical practice norms, and could counter the idea that mathematics is a set of rules. A focus in mathematical practices reinforce the idea that mathematics is something developed by people that work in a particular way to approach and solve problems. This instance suggests the teacher was actively reinforcing a particular norm circle. It is difficult to point however, based on this instance, whether the teacher belongs to only such circle,

or if the teacher also belongs to another conflicting circle(s). In any case, the students were being exposed to the circle that views mathematics as something people do, and they might, at some point, become a member of such circle, therefore also reinforcing this idea.

In the final episode, another mathematical practice was the focus of accessing mathematical knowledge, a practice that is very important, but frequently not thought as such. In episode 7, Alex (publicly) asked a question about Michio's explanation. Just asking the question did not make her accessing mathematical content, but the way she asked made her accessing mathematical practices. She precisely indicated why she was not convinced by Michio's argument, what helped him to address her specific concern. I consider her ability in asking a question as precise an important mathematical practice. As a mathematics teacher myself I can think of many times when I was teaching and felt unable to help my students when they struggled to name exactly what they did not understand.

Alex was courageous in this clip to ask a question in front of her peers. By doing that she transformed a possible vulnerability (not knowing something) into a very powerful participation (asking a very good question). She was countering the idea that asking questions is only for students that are not smart and do not understand the content. She was showing that not knowing is part of the learning process, and that asking good questions is something a good learner do. Of course she did not do all of this by herself, the teacher emphasized how important was to ask good questions. The way the teacher highlighted this to the whole class was important for two reasons. First, the teacher made it available to other students that this is important when one is learning mathematics from someone. Second, the teacher raised the social status of Alex as competent mathematics learner.

11. Homework Norms Can Also Challenge Whiteness as Property

The other episodes bring two different ways homework norms in the summer program influence how students of color access mathematical knowledge. In one of them, homework norms influence how students access mathematics by themselves and the other reveals how homework can serve as a tool for parents to monitor their children access of mathematics.

Episode 2 shows one more time the mathematical capability of La'rayne, as well as her interest in the program. She wanted to do homework, and she wanted it to be challenging, which is very disruptive of the idea that girls, and particularly Black girls, are not interested in or able to do mathematics. In this case, for La'rayne access mathematics the way she wanted, the teacher had a difficult situation to negotiate, with conflicting norm circles involved: (1) protecting the program, that in this context means making sure to deliver homework that contributed to student learning of ambitious mathematical content; and (2) being respectful towards students' ideas and viewing they as able to make decisions about their learning process. Moreover, circle 2 was complicated by the fact that students had different opinions about how the homework should be, and respecting all of them would then be challenging. This was definitely an example of a very complex normative intersectionality described by Elder-Vass 2010, and the outcome was that the teacher did not follow any norm exactly, but found an innovative action. The class, guided by the teacher suggestion, agreed in a solution for

the homework impasse that, although more protective of the program, were not completely denying the voice of the girls or the interest of the other students.

Furthermore, I questioned myself about the existence of norm circles with respect to homework in social contexts of school. Many students voiced out loud the desire to keep the homework easy, so I wondered whether that is a norm reinforced by a circle. Is it "cool" to ask for easy homework or easy mathematics? Where? By whom? If the answer to the first question is yes, there might be a norm circle reinforcing that it is cool not to be interested in mathematics (or wanting to do easy homework). Could then a different circle emerge in the summer program? With the interaction about the homework and its final outcome, maybe homework could become a part of school life that it is important and desired by students. Even though these questions are far from being answered, they raise ideas of how norm circles emerge and potentially oppose other circles, generating opportunities for change.

Episode 5 shows how Alex's mother used homework to track Alex's progress. There is not clear evidence that Alex's mother was interested in her daughter learning mathematics specifically, she could have been interested in Alex's learning regardless of subject. Still, Alex's mother was tracking her daughter progress in an optional mathematics class in spite of U. S. culture that tolerates failure in mathematics (Moses and Cobb, 2001), what nevertheless indicates she wanted her daughter to learn and access mathematics. She cared about Alex's education and resisted the idea that Black girls could not learn mathematics. Alex was expected to learn mathematics seriously even in a summer program that would not give her any grade. She wanted her daughter to learn and had at least one tool to track it. The way she used homework might have been interfered in the homework norms in this classroom. The teacher was certainly reading students' homework and she thought Alex did great work. Why the teacher thought she did great work however, was not communicated to her mother. In terms of norm circles, Alex's mother's resistance somewhat disturbed the norm circle for homework in this classroom. However, the conflicting norms are not exactly opposite in this case, and the teacher could easily accommodate Alex's mother's request.

12. Challenging Liberalism

Hylton (2010) claims that liberalism incorporate ideologies associated with free-market and individualism; and that this focus on individualism is very pervasive, because it shift discourses from systemic to individual reasoning in a way that seems very rational and compelling. For example, Solomon, Portelli, Daniel, and Campbell (2005) report that teacher candidates may see students' personal effort as a main reason for their successes and failures. This explanation does not capture how students of color are systematic excluded of advanced courses in spite of good achievement (Oakes, 1995), or how students of color can receive less challenging instruction (Ladson-Billings, 1997), or any systemic inequality with respect to educational opportunities. The authors continue that, teacher candidates believe that there is no need to change their practices to make them more equitable because they do not view this liberalist way of thinking as racist. This imply that teachers might perpetuate racist practices in their classrooms, but they might not see it that way, because they explain their practices based on individual characteristics they or their students have.

To counteract such liberalist and individualist discourses it is important to call out work that is collectively done in a classroom and how it is done. In this study I am looking at how authority is distributed in classroom, who has knowledge authority, what and/or who grants it to someone. To investigate knowledge authority it in the summer program I will one more time turn to 5 of the 8 sampled episodes of instruction. The episodes 2, 6, and 7 were already described in the previous section, so I will now describe episodes 3, and 4.

Episode 3: Miah Participating in the Teacher Contract Discussion

After the homework discussion in episode 2, the teacher moves to a different topic: "What is a different thing that should be on the teacher contract? Not about the homework [pause] Something different." And calls on Miah to respond. Miah says, "The teacher should listen to what we have to say." The teacher asks Miah to repeat it, indicating with a hand behind her ear that she has not heard. Miah repeats. At this point, other students also listen to Miah, some laugh, and one says: "You already do it," implying that the teacher already listened to students. The laughing and commentary indicate that these students thought it was stupid to add something on the contract that the teacher routinely did. The teacher, however, continues talking with Miah, seriously taking her concern and asking her why this matters.

> M: because sometimes when uh [pause] like you're asking your neighbor something and your teacher thinks that you're talking during class and then you get in trouble. And then you tell them you're just asking something, you still get into trouble.
> [Other students are quiet and seem interested in Miah's explanation while she was speaking.]
> T: So, you want the teacher [pause] sounds like you don't want the teacher to misunderstand you. You want the teacher really try to understand what you're saying?

Miah confirms. Then, the teacher records in the chart (checking if that is what Miah said), "Listen to what we have to say and understand it." Miah confirms it one more time. The teacher then asks if anyone would like to add anything to this item, and moves to another topic after no student answered this last request.

This episode reveals Miah voicing an important issue. She was worried that her real interest in studying mathematics could be misinterpreted by the teacher as class disturbance. Her concern can be tied to different norms with respect to race and class participation. One (liberal) norm is that students are expected to participate and to demonstrate interest in class, or, in other words, to demonstrate personal effort (Solomon, Portelli, Daniel, & Campbell, 2005). But Miah is revealing that her participation can overlap with normative construction of Black girls femininity (Annamma, 2015; Gholson, 2016) and could lead a teacher to take her interest as class disturbance. A third norm is that, in a traditional U.S. model of instruction, students are expected to be quiet and listen to the teacher (Stigler, & Hiebert, 1997). Miah is in a conflicting normative space. Should she participate and risk being seen as a disruptive Black girl? Should she stay quiet and risk being seen as a student who does not try hard enough? Moreover, it seemed so personal, that I wonder how many times she had felt misinterpreted in her past experiences in school. Thinking about the work that the teacher did in this case, it looks like, first Miah felt comfortable to voice such ideas in class, second the teacher listened to the student with respect and encouraged her to elaborate her thinking.

Episode 4: La'rayne Participating One More Time in the Teacher Contract Discussion

In a third episode in the context of the teacher contract, the teacher continues to gather students' input in it. She restates the question and reminds students what was the purpose of the teacher contract: "What does a good teacher do that helps you to do really well and supports you to learn a lot?". La'rayne then says that the teacher was calling kids more from one side of the room than the other. She points her finger to which parts of the room she was referring to. Teacher checks with La'rayne if she wanted the teacher to be careful and look all the room when calling people. La'rayne almost interrupts with a loud "YEAH!" The teacher asks where she was not calling, La'rayne points again, saying, "Over there." Teacher records in the chart: "Be sure to look all around the room to call on us." La'rayne agrees, and the teacher adds: "That's a really helpful one I think". This brief interaction shows that classroom participation can be unequal even when a skillful teacher intentionally works to provide all students opportunities to participate. La'rayne's comment pushes the teacher to make sure all students get the same share of classroom participation.

This episode has two additional pieces from moments that happened in this same day, but occurred afterwards. In the second piece of this episode the students are about to start working independently on a fraction problem written in a chart that was posted on the board. The teacher wants to make sure all students understand the problem and asks a student to read it out loud. When she does it, she specifically refers to La'rayne's suggestion about calling on students: "I'm trying to do what La'rayne suggested, I'm trying to look around the room more." She then calls on a student from the part of the class La'rayne had pointed out that she was not calling on students. In the third part of the episode, students are independently working on this problem. The teacher is circulating when she approaches La'rayne, bending over the table so she could be closer to La'rayne and individually reaffirms how helpful her comment on the teacher contract was: "La'rayne, that was a super helpful comment you made for the teacher contract, about looking out around the room. That was really helpful."

This episode shows La'rayne being bold and courageous by explicitly indicating something the teacher was not doing well (which contrasts with Miah observation about something the teacher was already doing). Moreover, what occurred in the second and third pieces of the episode is evidence that the teacher respectfully listened, acknowledged the issue and tried to address it with follow up actions.

13. How Distribution of Classroom Authority Can Challenge Liberalism

In two of the five episodes I am reporting in this section, the teacher makes use of her authority in the classroom to distribute part of it among students in ways that challenge both individualism and herself as the single person in charge for the class.

In episode 2, when the class discussed the homework in the context of the teacher contract, liberalism in classroom is being challenged because the teacher is not only allowing students to contribute to something that is usually attributed to teacher discretion (planning the homework), but also, allowing students to disagree with one another about it. Particularly, a White girl raises the issue that homework should be challenging, which already disrupts the idea that girls are not interested in mathematics,

but La'rayne (a Black girl) supports her White peer, making visible that Black girls can be interested in mathematics too. The teacher's orientation to the disagreement was crucial so students could compromise and meet half-way. It was not a matter of casting votes, but presenting arguments, respecting others' points of view, and finding a common ground. In this case, the teacher was sharing part of her authority in the planning of the homework. Of course, the teacher still had obligations with respect to the students' learning and homework comprises a piece of that, but still, students gave some input in how the homework should look like, and the teacher made sure Serenity's and La'rayne's concerns were taken into consideration in the discussion.

In episode 4, even though the teacher wanted to call on all students, as it can be noticed in the lesson plans, and engaged frequently in assigning competence, the teacher was still not calling students from a particular section of the class. Her intentionality in creating a classroom environment in which all students actively engaged and participated in class could create a false liberal assumption that every student was getting an equal opportunity to participate in class. By distributing part of her authority as classroom manager with La'rayne through the teacher contract, the teacher was able to revise her practice.

Relevant to note is that the teacher is White and is still responsible for coordinating class participation. This reflects how Whiteness can be preserved even when the teacher is aware of it and deliberately tries to disrupt it. La'rayne noticed it, she named it publicly and explicitly. In this episode, the teacher was subject to two conflicting different norms: (1) preserve her Whiteness as the coordinator of class participation; (2) attend to students' input about class participation. La'rayne indicated an specific point in which these norms conflicted by showing how students were being left out of class participation. In this particular situation the teacher became conscious of the conflicting norms to which she was subjected, and as a result of the interplay of these two norms, the teacher revised her actions, and tried to follow the second.

14. How Assigning Competence Can Challenge Liberalism

In three episodes the teacher engages in assigning competence (Boaler, 2008; Cohen & Lotan, 2014). Assigning competence "involves teachers raising the status of students that may be of a lower status in a group, by, for example, praising something they have said or done that has intellectual value, and bringing it to the group's attention" (Boaler, 2008). A crucial piece of this practice is teacher intentionality in raising the status of a student as a knower of mathematics. Cohen and Lotan (2014) argue that students tend to believe in the evaluative authority of the teacher, in other words, if a teacher says a student is good in mathematics, then other students tend to believe so. They also say that a teacher effectively assigns competence when the evaluations are public, so others learn what is being recognized as important; intellectually targeted, so mathematical work is praised; specific, so students know what is exactly being called out; and connected to the learning success of others.

This practice is important to disrupt deficit-oriented discourses with respect of students of color, particularly because these discourses are frequently shaped by factors that do not depend on the intellectual capability of such students (Gutiérrez 2007). In this study, assigning competence means to assign mathematical competence to a Black girl, therefore counteracting several discourses with respect to Black girls. A Black girl may

not be seen as good in mathematics because she is a girl or because she is Black, but she can be also not seen as "academic material" because she is Black *and* a girl. Morever, assigning competence to a Black girl in the local context of this class would expose students to what does it look like when a Black girl has competence in mathematics, it could serve as a model to other Black girls in class, for example.

In episode 3, Miah was countering a normative discourse in traditional classrooms: "For students to learn, they have to be quietly paying attention. Students that talk with others are just disturbing the learning of others." Miah implied that, students might talk during class for reasons that actually pertain to the class and to their learning. Her whole point however, was not immediately understood by her classmates. When Miah first shared her thinking, she was positioned by her classmates as incompetent learner. Some of her classmates assumed she wanted to include something in the teacher contract that the teacher already did. In their opinion, she was wasting an opportunity to make a more useful request. The teacher, despite all the respect she had for all the students, used her authority in classroom to influence students' judgment about Miah. Her position shifted as consequence. This episode illustrate an example of the practice of assigning competence, if not in a content specific case, it still raised her social status among other students as a competent mathematics learner.

There were several cultural classroom norms simultaneously operating in this episode: (1) Miah described a norm from other classroom environments; (2) the students that laughed at Miah implied that the classroom teacher was listening to what students had to say; (3) the teacher had an authority position in the summer program classroom (even though the teacher wanted to have students' input and used a teacher contract to get some of it, that does not mean the teacher did not have authority, the teacher could still distribute it as she wanted). The latter is crucial for challenging liberalism inside the classroom. Liberalism in classroom contexts presupposes that students would be recognized as competent by other whenever they are truly competent, however this was not the case in this episode. Miah was a competent learner, but her classmates would not have recognized this had the teacher had not assigned competence to her.

This was not the only time the teacher assigned competence to Miah. In episode 6, the teacher does it in a content-specific context. The teacher raised her status as someone who can write and talk mathematics clearly by writing and speaking complete sentences. In both episodes, the students were not all listening to or interested in what Miah was sharing, but after the teacher intervened they become interested. In episode 6, when prompted by the teacher, some students were even able to name what was one thing Miah did was good in her explanation, acknowledging her competence. Miah's competence was acknowledged because of a feature of her explanation. Explanations in mathematics need to be understood by others, so they need to be clear, and writing complete sentences supports clarity. Miah's explanation was clear because it was written (and spoken) with complete sentences. This feature of an explanation is relevant independent of who is explaining. In this case, the data did not show any difference of how Miah's clear writing could be different from a White student's also clear explanation. However, in episode 3, Miah's way of being a good mathematics learner looks different; she talks to her peers to learn. When the teacher assigned competence to Miah in episode 3, Miah could learn that her way of learning mathematics was an appropriate one. Moreover, she could serve as a model to other Black girls.

In episode 7, the teacher also assigns competence in a content specific context, in this case to Alex. The teacher emphasized how important was to ask good questions. Alex's

question disrupted a common view that asking questions, and particularly asking clarifying questions, is not something a good mathematics learner does. This was important to both allow Alex to access mathematical content (described in the previous section) and to raise her status among her peers. Moreover, Whiteness as property and liberalism were only disrupted because of the interaction that happen between teacher and student, it required Alex's skillful and insightful contribution and the immediate and deliberate teacher emphasis on her contribution. This episode also brings an interesting example that challenges liberalism because of how mathematics is collectively produced. Michio's first argument was correct, but still not very convincing. It was only because Alex asked a very good question that Michio's argument was refined, becoming more convincing.

15. Conclusion

The overarching goal of this paper was to contribute to research that seeks to understand how education can support and promote social change. I focused in this study on the relational aspect of teaching — the interactions among teacher, students and content embedded in social environments. From this view, teachers' instructional practices mediate the interactions, and are also constrained by normative expectations about the teacher's role. I sought to investigate how instructional practices could be seen in the context of persistent structural racism. I also introduced a critical realist lens to interpret mathematics instructional practices with respect to race and racism, particularly to investigate how instructional practices might be able to challenge and/or disrupt structural racism. This paper reports then on critical realist causal explanations of local disruption of racism in a mathematics laboratory classroom. Using a framework that combined critical race theory and critical realism, I focused closely on eight episodes in which I analyzed how structural racism seemed to be challenged and/or disrupted. In each case, I was able to identify moves and interactions that did not fit normative (racist) expectations and practices.

The regulation of who gets access to mathematics is a racist norm in current U.S. society. White men are privileged with respect to the kind of mathematics to which they commonly have access. Therefore, instructional practices that support access to mathematics by students of color can serve to locally disrupt racism. Some of those practices were supporting students to publicly speak mathematics, respecting and giving space for students' views and taking up their suggestions, and assigning competence.

Finally, the concept of norm circles was useful in seeking to unpack mechanisms of local disruption of racism in this summer program classroom. The concept of norm circles provided a way to articulate micro with greater level(s) of the social world. I applied it to capture norms at play in each episode and how they might influence teachers' practice. The idea is that instructional practices are regulated by normative prescriptions, some or many of them racist. The teacher would be compelled to reproduce the norm, consciously or not, but would not be obligated to do so. When a teacher challenges a racist norm in their instructional practice, they are locally disrupting racism. I discussed in this paper a few ways of doing so, or in other words, what it looks like to challenge racism within mathematics instructional practices. It is, at this point, difficult to imagine whether and how these local disruptions could build up and systematically challenge pervasive racist structures. However, it is also difficult to imagine ways to disrupt racism without micro-interactions such as the ones reported on

this paper. Racism is pervasive in U. S. society and any systemic change necessitates infiltrating with ways of socially interacting that break with racism.

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