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RACISM AND MATHEMATICS EDUCATION

WHAT ARE THE EFFECTS OF RACISM THAT CONTINUE TO LINGER IN MATHEMATICS CLASSROOMS?

RACISMO Y EDUCACIÓN MATEMÁTICA

¿Cuáles son los efectos del racismo que persisten en las aulas de matemáticas?

RACISMO E EDUCAÇÃO MATEMÁTICA

Quais são os efeitos do racismo que continuam a persistir nas salas de aula de matemática?

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ABSTRACT

This paper seeks to discuss the connections between racism and the mathematics education Black students receive in the urban mathematics classroom in the city of Newark. Racism continues to exist in this world and has been reformed in systematic ways in our society, and with these reforms there exists inequality in quality mathematics education offered to Black students, and as a result less future opportunities in mathematics related fields. This article will highlight experiences of the author and analyzed data from the students of Newark. To connect these experiences with current racist systems first a brief history of the origins of racism is discussed as well as the implications of racial identities and how that can affect certain groups of people. Then a conceptual framework is explained which was used to analyze the experiences which include the concepts of: racial identity, mathematical identity, and foregrounds. Then there are different topics of racism in education discussed such as the apparent disconnection between racism and mathematics education although there disparities and inequalities in the mathematics opportunities offered and the way that Black people are portrayed in society in general. The paper ends with a review of the data analysis to learn about the perspectives of students and their thoughts on race and the mathematics education that they receive.

Keywords: racism. black students. mathematical identities. foregrounds.

RESUMEN

Este artículo busca discutir las conexiones entre el racismo y la educación matemática que reciben los estudiantes negros en el aula de matemáticas urbana en la ciudad de Newark. El racismo continúa existiendo en este mundo y ha sido reformado de manera sistemática en nuestra sociedad, y con estas reformas existe desigualdad en la educación matemática de calidad ofrecida a los estudiantes negros y, como resultado, menos oportunidades futuras en campos relacionados con las matemáticas. Este artículo destacará las experiencias del autor y los datos analizados de los estudiantes de Newark. Para conectar estas experiencias con

los sistemas racistas actuales, primero se analiza una breve historia de los orígenes del racismo, así como las implicaciones de las identidades raciales y cómo eso puede afectar a ciertos grupos de personas. Luego se explica un marco conceptual que se utilizó para analizar las experiencias el cual incluye los conceptos de: identidad racial, identidad matemática y primeros planos. Luego se discuten diferentes temas de racismo en la educación, como la aparente desconexión entre el racismo y la educación matemática, aunque existen disparidades y desigualdades en las oportunidades matemáticas ofrecidas y la forma en que se representa a los negros en la sociedad en general. El artículo finaliza con una revisión del análisis de datos para conocer las perspectivas de los estudiantes y sus pensamientos sobre la raza y la educación matemática que reciben.

Palabras clave: racismo. estudiantes negros. identidades matemáticas. foregrounds.

RESUMO

Este artigo procura discutir as conexões entre o racismo e a educação matemática que os estudantes pretos recebem nas aulas de matemática urbana na cidade de Newark. O racismo continuo a existir neste mundo e foi reformado de forma sistemática na nossa sociedade, e com estas reformas existe desigualdade na educação matemática de qualidade oferecida aos estudantes pretos e, como resultado, menos oportunidades futuras em áreas relacionadas com a matemática. Este artigo destacará experiências do autor e dados analisados dos estudantes de Newark. Para ligar estas experiências aos sistemas racistas actuais, primeiro é discutida uma breve história das origens do racismo, bem como as implicações das identidades raciais e como isso pode afectar certos grupos de pessoas. Em seguida, é explicado um quadro conceitual que foi utilizado para analisar as experiências que incluem os conceitos de: identidade racial, identidade matemática e foregrounds. Depois, há diferentes tópicos de racismo na educação discutidos, tais como a aparente desconexão entre o racismo e a educação matemática, embora existam disparidades e desigualdades nas oportunidades matemáticas oferecidas e na forma como os negros são retratados na sociedade em geral. O artigo termina com uma revisão da análise de dados para conhecer as perspectivas dos alunos e seus pensamentos sobre raça e a educação matemática que recebem.

Palavras-chave: racismo. estudantes pretos. identidades matemáticas. foregrounds.

Introduction

Racism continues to plague the United States (US) as well as much of the world due to the absurd notion that one group of people is better than another due to set of visual physical characteristics that make them apparently different from European descendants, or cultural differences such as language or accents. The social construct of racism seeks to maintain the idea of superiority, power, and systematic control. By race it is the category of which people are placed due to external characteristics. By social construct I mean the embedded ways in society in which it seems justifiable to treat one group of people in a certain way because of their physical appearance, or to justify why a certain group of people behave in a certain manner.

Racist ideas were formulated earlier than the 1400s. It was deemed to be part of a missionary expedition by the Portuguese that it was holy intent for Black people to be slaves for European and Northern African conquerors. It made it justifiable to portray Black people of all shades as inferior in every way (Azurara, 2016; Kendi, 2016). These holy and ordained assumptions were passed on to the Puritan and colonial slave owners in what would later become the United States. Thoughts such as these were passed down and adapted, maintaining one group's preconceived notion that they are better than other groups because of these traits they are born with. As a consequence leaving others with the mentality that they may not be good enough, this reality is all too real for many people of color.

> "But if racism is embedded in our thought processes and social structures as deeply as many crits believe, then the 'ordinary business' of society—the routines, practices, and institutions that we rely on to effect the world's work—will keep minorities in subordinate positions" – (Delgado & Stefancic, 2001).

There are structures and intentional actions within our societies that allow this ideal to persist and create gaps between groups of people, furthering the mentality that a race is more superior than another, and they operate as normal parts of a well-oiled machine. Structures such as promotion of certain talents of Blacks, which may be in arts or sports, simultaneously promoting the acceptance of subpar understanding in academics, behaviors such as these can create an extremely narrow interest for students of color leading to less opportunities and choices in the future (Myrdal, 2017).

These lower expectations in academics, specifically in mathematics, can lead to the marginalization of knowledge, lowered confidence in ability to do math, and weakened mathematical identities (Martin, 2012; Moore & Groves Price, 2015). Operations occur smoothly in this matter and there is little attention paid to day-to-day occurrences in our education systems, and that concealed layers of racism exist maintaining some as subordinate participants. Social constructs such as the educational system leave African American students in a disadvantaged situation and lacking sufficient future career options, especially in mathematics and science fields.

> "A necessary step in countering these negative social constructs is to acknowledge that racism including structural racism, institutional racism, everyday racism, and what has come to be termed colorblind racism - is a major factor contributing to these impoverished views of African American." – (Martin, 2009a)

Awareness and acknowledgement are key to progress in education. The realizations of these noticings needs to be thoughtful and compassionate change and offering equitable opportunities. Many have experiences of racism every day, even in areas of the United States where some would assume it does not exist. However, some forms of racism are so minimal that it can barely even be detected, or it is simply downplayed.

Growing up in Jersey City, New Jersey I was fortunate to attend school and develop relationships with people of many different races and cultures. Jersey City is often considered a melting pot of cultures as there are people that migrate from many different countries into the city and into the state. Jersey City is directly across the water from Manhattan, New York, which is also widely known as home to individuals that hail from many different countries or have ancestors that migrated from a different country. But even living in a region where there are people of many different races and ethnicities, I still encountered racism and prejudice. It should be noted, found in studies that there is a key difference between racism and prejudice, where the former is the belief, behavior or action and the latter is an attitude, personality, and preconceived mindset that influences racist thoughts (Augoustinos & Reynolds, 2001; Bell & Hopson, 2017; White & Frideres, 1977).

I have experienced and witnessed racism in many ways in the US and in my travels to other countries. They have come in the form of direct verbal disrespect, degradation, unwanted encounters and looks, and passive aggressions. Such as being moved from a mathematics teacher to a physical education teacher for more than half of a school year, I was replaced by a white woman. Even though my students grew every year since the start of my career. I was considered as Haitian when visiting the Dominican Republic, receiving minimal attention and hospitality until I was able to speak both in Portuguese and English in front of the attendants. Or even during my short period here in Rio Claro, in a cellular store I was barely acknowledged until individuals recognized I was an Estadunidense (American). In all examples I was in the presence of people who appeared to have European ancestry, or other than mine, that of African ancestry. These experiences reminded me of moments in school where I was surrounded by the others and feeling internally that I needed to prove that I belonged and was good enough. An experience that is overlooked by people, who are not Black, is the fact that when entering spaces while Black you must always be aware of how you conduct yourself.

There are many negative stigmas and stereotypes that come along with being Black, as well as prejudice from others. It is difficult to talk about racism without the idea of prejudice too. But for the purpose of

this paper, I will only stay focused on the idea of racism and the effect it can have on people in various contexts and environments. These effects can occur both intrinsically and extrinsically, and it is important to remain aware of these possibilities to work towards an understanding of how to improve and provide more opportunities for everyone.

To examine how racism exists in mathematics education first I will connect the theoretical concepts involved: racial identities, mathematical identities, and foregrounds.

Origins of Racism

Racist ideas were formulated long before the societies we now know of today, and they have been communicated through dogmatic forms such as religion and education. In the United States, the first known to bring slaves to the original colonies were the Puritans who sailed the Atlantic from Britain. Using ideas of superiority from Britain they justified their rights to own slaves, specifically African slaves. The justification that they used was on the basis that their work was communicated in a divine purpose from God, it was part of their mission to build a better world through the use of slave labor, and this slave labor was intended for people of all shade of color, anyone who was not white, more specifically non-Puritan. These ideas of superiority branched from the theories of Greek philosophers, who believed that they were superior to all non-Greek people.

The famous philosopher Aristotle, who we all have studied or learned about in some way in our education, used climate theory to justify why non-Greeks were superior to all people. This theory stated that people who were either very pale or white, or those that were very dark or brown were incapable of superior strength, intelligence, or rational thinking like the Greeks. Many groups of people adopted this theory, making adaptations, and over time the attention was then completely focused on people with brown and black skin as the group of people who were intended to be the inferior to all.

This idea of inferiority was used by groups of people such as the Portuguese, the Puritans, the Spanish, and many other slave owning nations to support their claim of their right to own and exploit Black Africans for slave labor (Azurara, 2016; Kendi, 2016); Black Africans were susceptible, however Africans who were of lighter shades, also came to believe that they were superior due to their skin color.

Conceptual Framework

Racial identity characterizes the way in which one relates to a socially related category such as being Black, Latin, White, or Asian. There are different ways in which race can be applied to people, the race we are assigned by society and entities within that society, the race we assign to ourselves as result, and the racial identity people may assume you to be by looking at you, which may have diverse hierarchy implications (Bonilla-Silva, 2003). These identities can be viewed as positive or negative from any of these possible stated racial applications. Let's stay focused on Black racial identities, there are positive and negative narratives about Blackness and what it means to be Black, and assumptions about what Black people are capable of, as well as adverse effects on how Black people may perceive themselves (Lee & Ahn, 2013; Myrdal, 2017). It is important to remember that conceptions of race are based on social meanings, particular to place, and are constantly being redefined, as well how these races are identified (Winkler, 2012).

Mathematical identities refers to how one associates themselves with mathematics, their belief in mathematics, the views of their ability to do and participate in mathematics, the importance of mathematics, and their motivation in learning mathematics (Martin, 2000). Similar to race identity, there are positive and negative perspectives of one's identity, that is, one can perceive or be perceived to have a positive or negative mathematics identity. Cultivating a positive mathematics identity allows students

to use mathematics in ways that can transcend the classroom and utilize their knowledge to better understand the world around them and actively influence their role in the world (Matthews, 2014; Moore & Groves Price, 2015; Nasir & McKinney de Royston, 2013). Mathematical identities can also describe the one way approaches the subject, their anxieties, excitements, confidence, or fears of mathematics.

Foregrounds describes the views of oneself and all of their possibilities, their interests and who they can become based on their dreams, fears, and other influential life environments or experiences such as obstacles and other factors in one's life context (Skovsmose, 2014). Let's use Ole Skovsmose's definition to better understand foregrounds:

> "A foreground is formed through the possibilities, tendencies, propensities, obstructions, barriers, hindrances, et cetera, which his or her context provides for a person. Simultaneously, a foreground is formed through the person's interpretations of these possibilities, tendencies, propensities, obstructions, barriers, hindrances. A foreground is a fragmented, partial, and inconsistent constellation of bits and pieces of aspirations, hopes, and frustrations." - (Skovsmose, 2012)

The connection between racial identities, mathematical identities, and foregrounds is that they are ever changing characteristics and ways of being of people, and each can have an influence over another. Each of these concepts can also be affected by the society that one lives in as well as internally negotiated. They are concepts that evolve, devolve, and can heavily affect one's self-perception, life choices, and the future for an individual.

Racism in Mathematics Education

> "A failure to link race in the context of mathematics education to the way that race plays out in larger societal contexts has been a major limitation of extant research. This failure has mistakenly rendered mathematics education as being disconnected from the systems of oppression that order the rest of society." – (Martin, 2009b)

The link of race in the context of mathematics education, and how race plays in society, is the lack of voice and representation of Black mathematicians, and the lack of Black professionals in mathematics and STEM fields (Tate, 1994). This is a result of the paucity of opportunities for Black students in mathematics within our schools. It is connected to the way that African Americans are assessed in mathematics and can be related to the way in which Blacks are portrayed in society as mostly entertainers or athletes, in contrast to academics, making it 'uncool' to participate in areas involving mathematics (Myrdal, 2017). The continuity of this type of system and prejudices of Black learners leads people to view them as incapable or only having the ability to excel in certain ways, limiting their potential.

There are assumptions made of people of different races. In the United States for instance, those who are considered more competent in academics, especially in mathematics and sciences, are individuals who identify as White or Asian. The consequence of this assumption is the negative outlook that others may have of themselves when hearing that White and Asian people are more proficient in learning than other racial groups. On the contrary, Black people are not considered to be competent when it comes to academics, especially in the sciences and mathematics (Myrdal, 2017).

This way of thinking is all too often mentioned through the "racial achievement gap", the "gap" that exists between the way that different races perform academically. The use of this statistic and narrative perpetuates racist ideologies and the lowering of expectations for students (Martin, 2009a). As a result, teachers can be led to lowered expectations when teaching Black students.

This assumption contributes even further to negative consequences because it can lead individuals to have less belief in their abilities to learn or to improve academically, especially when this narrative is continuously used to measure aptitude. The occurrence of this assumption over decades has also normalized the idea that Blacks are not good at mathematics. At times it can be communicated knowingly and unknowingly through teachers or other staff in school buildings.

Improving the connection between a student's racial identity and mathematical identity should be included in the goals of teachers, school staff, and communities (Martin, 2009b). An observation that I have made of many of my students, as well as people that I know socially and professionally, where it is all too common to hear the phrase "I am not good at math" or "wow, you majored in math, you must be so smart!"; I raise this point because many (at least 90%) of my students were people of color; as well as some of my personal friends and coworkers that I encountered through my different fields of work. The perspectives that students and individuals have of themselves is a result of the experiences they are required to go through in school as well as experiences in their communities.

Requirements in academic mathematics are typically being lectured on how to do the mathematics. This is usually provided by a curriculum that does not consider all the students it will inform, therefore also not serving in their best interest (Martin, 2009a). It limits the ways in which students are allowed to explore mathematics in school and can possibly affect the way they will view mathematics in the future if there aren't additional opportunities outside of school. Students are told how to do the mathematics in a certain way, to perform well on an assessment, and if they perform poorly in either circumstance they are labelled as such, poor performers, or incapable. To guide students through their mathematics learning there is a need to take a deeper look at the mathematical content, practices and participation (Martin, 2000); as well as supporting students where they are and considering the knowledge they are capable of contributing.

> "Understanding how these concepts impact student engagement with mathematics and the development of their mathematical identity is integral; however, all of these concepts are symptomatic of the epistemological racism of Western, and thus, school mathematics." – (Moore & Groves Price, 2015)

There are many Black students that excel in mathematics, and there are possibly more if there is flexibility and autonomy allowed in the creation of curriculum and didactics for mathematics, as well as creativity in practices and the ways that students can participate in their mathematics learning. Thus, allowing them to transcend, explore, and deeply understand mathematical concepts. Unfortunately, much of their learning is dictated and restricted. This in addition to limited opportunities, and lowered expectations contributes to racist conditions for Black students in mathematics.

This, however, does not describe all the mathematical experiences or identities of 100% of the students I have, nor do I think it describes the standing or outlook of all students in urban school environments. Another possibility is that students that do well may feel the need to prove that they are indeed smart enough. In this sense students feel the need to prove that they too belong among those that are competent in mathematics.

Data Analysis

The participants in my study are middle school Black students and Black identified students from the city of Newark, New Jersey. In my study, the aim is to understand how the formation of a foreground influences students' mathematical identities and future goals, more specifically for African American students. I am also interested in understanding the relationship between how students perceive racial identities and understanding of mathematics.

There is a student, Petunia, that felt as though they are good in mathematics, and stated that mathematics is their favorite subject. I asked this student about their ability to do math and the correlation between how they identify racially and there seemed to be doubts, but they maintained their confidence about their ability in mathematics. Before looking at a snippet of our conversation this student identifies as both Latina and African American, and they have grandparents that come from Peru and Puerto Rico.

> Petunia: Um, my grandparents are from Puerto Rico and Peru, and they're also African-American well, one of them and then the other one is ethnicity is like from Peru and stuff like that.

Petunia is a 7th grade female student from the city of Newark. She both identifies as Latina and African American. Our discussion below explores the connections between racial identity, mathematical identity, foregrounds and possibilities for her future, as well as how she feels in thinking about this comparison and her opinions on the matter.

> Jamaal: What connection is there between that racial identity and their ability to perform in mathematics?
>
> Petunia: Um, I dunno, like, um, I don't know. A lot of the time I feel underestimated because of where I come from and I just. I just like to prove people wrong and doing good in math helps me with that to prove people wrong. And it really has helped me become who I want to be. And like what I want to do. Like, I want people to look at me differently than what they did look at me like.

Above Petunia admits to the stress and extra mental load of thinking of the need to prove others wrong, and others may look at African American students as if they aren't as capable when it comes to mathematics. In their response I also observe strength and responsibility as they make a connection between their ability to learn mathematics and have options for future desires. There is also a sense of pride to represent the place where she was raised positively. Petunia wants to be recognized and respected as a mathematician and a competent student.

Another student, Michelle, had this to say when asked about the relationship between other racial identities and their ability to do and understand mathematics:

> Jamaal: And what connections do you see between other racial identities and their interest in performance in mathematics?
>
> Michelle: Sometimes I would see people look at other people that have different races than them, look at them. Like, it's just, wow, they can do it. And they're different from me. Why can't I do the same thing or sometimes it'll be the same race. Oh, they have the same race. They're Black and I'm Black, but why can't I do it. So, I guess some people get confused or some people get offended by it.

In her response, I noticed that Michelle would not only judge herself but also compare what she is able to do in comparison to other races. Although, she was impressed by some of the abilities of these other students she was also curious about if they're able to then I should be able to as well. She also compared herself to other Black students that may be able to do the math, and concerned that at times she isn't able to understand it either, which also shows that mathematical competency is not based on race.

It is not only schools that may communicate or place additional stress on performance in mathematics. It is possible it can also stem from the community or from the home. It is possible parents pass on their anxieties of math or overload the stress about performing well on standardized tests. Formulating a healthy combination between racial and mathematical identities may also involve allowing students to be happy and not worry about the impression they are leaving on teachers, parents, or significant others in a student's life.

This may vary depending on the home environment that a student comes from. Home environment includes the neighborhood as well as the members inside of the home. Petunia and I engaged in a conversation about what she noticed about the correlation between math competency and those who have racial identities other than her own, as well as expectations from families in mathematics education.

> Jamaal: What connections do you see between other racial identities and their interest and performance in mathematics?
>
> Petunia: I've seen a lot of people doing like their work and like math and everything to impress people because of the kind of family they come from and where they come from. Because of my parents, there was a point where I tried to do that, and I realized I didn't have to impress anyone just to feel good about myself. So, I just seen a lot of times where people were trying to impress their family with their work or their math or like anything really, that's just a lot of the stuff I've seen.
>
> Jamaal: Any specific races that you've seen doing this, like where they're trying to impress their family?

> Petunia: Okay. If you come from a Hispanic family and if you come from an immigrant family, a lot of the time they want you to do really good for how hard they worked to be here. And maybe in like a house that is either Hispanic or if you're African American or Black, or like if you're Asian.

During this conversation she included an African American home among those that have high expectations for doing well in mathematics. Though the common narrative is that African American students are incapable, however, during my experience in the city of Newark students did excel in mathematics. Just not an overwhelming rate unfortunately. Most recently, according to performance on the state assessment, only 13% of students in the city of Newark were proficient or above proficiency in mathematics (Board, 2023). Parents seemingly show little interest in academics; that is not to say they don't care. But there was little to no communication made at the public school I worked for between teacher to parent and vice versa; I had a much different experience at a charter school where I taught, which is also in the city of Newark.

There is a plethora of reasons as to why there was limited communication. Just as there are many reasons why African American students seemingly appear to be less competent in mathematics. In many scenarios there are factors unknown to the school as to why families are unable to be heavily involved such as the need to work more to provide for families, living outside of school zones to send students to a better school (even if the desired school is not a well performing school), embarrassment to come into the school (this can be due to many reasons, i.e., financial struggles, drug abuse), or unawareness. Half of the students in the district are classified as chronically absent. The direction to improving and guiding to solidify racial identities, mathematical identities, and foregrounds for students is to build awareness for school staff, and partnerships to facilitate healthy communication with the community and the residing families which can then support an increase in effective mathematics learning.

Conclusion

There is evidence of systemic racial issues in mathematics education as there are still assumptions made and intrinsic biases harbored about what students are capable of based on their physical appearance. Data in mathematics education continues to narrate a deficit perspective about Black students' ability to perform in mathematics.

Through the perspective of students, racism in school settings can be sensed, as well as different day-to-day situations. There are underlayers of racism in our school systems and there is a need to improve the awareness for staff in schools and aid in the guidance for the construction and development of racial and mathematical identities at all levels; this should also be considered for communities and at home as well. These interviews informed me greatly and I think will be valuable moving forward in becoming more aware of how students feel and notice their identities both racially and mathematically, and how their thoughts of their own futures, foregrounds, and interests relate to their desires and motivations.

These interviews were conducted with students that displayed a mixture of positive and negative mathematical identity; however, I noticed disparities in how they were acknowledged for their abilities. Of these two students, I observed that there was still a sense of the need to prove to others, rather than having the focus of doing their best. However, a promising sign is that despite facing some feelings of being doubted for their knowledge based on race, they don't believe that success in mathematics depends on the factor of race, even though acknowledged.

This mindset should be adopted by educators who will be in front of Black students. Lowering one's expectations about student performance due to race maintains racist structures. It communicates disbelief in abilities as a learner. Speaking to the students about their thoughts of their racial and mathematical identities allowed them to reflect. This is an opportunity we should grant to their teachers as well. Taking time to think about their own racial identities and mathematical identities can promote one to a greater awareness of how one experiences mathematics. It can possibly instill more patience and compassion

for Black learners. There is still more left to be seen and researched with students, their racial identities, their mathematical identities and how they feel acknowledged when it comes to their performance.

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