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FORUM PAPER

Science identity possibilities: a look into Blackness, masculinities, and economic power relations

Katemari Rosa[1]

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Abstract This forum paper dialogues with Sheron Mark's *A bit of both science and economics: a non-traditional STEM identity narrative*. In her paper, she discusses the development of a Science, Technology, Engineering, and Mathematics (STEM) identity by a young African American male during an informal STEM for Social Justice Program. Here, the discussion focuses on Black masculinities, identity formation, and the role of science educators in making STEM fields a welcoming place for young Black men. Drawing from Mark's data and discussion, this paper is a dialogue between science identity possibilities in the United States and in Brazil when we look at the intersections of race, gender, and socioeconomic status. Using the shared colonial past of both countries a connection is established to address race relations within science education. The main argument in this paper is that racism can no longer be denied and dismissed by the science education community worldwide and that intersectional approaches are needed to face this issue.

Keywords Science identity · Critical race theory · Masculinities · Intersectionality

Possibilidades de identidade científica: um olhar sobre negritude, masculinidades e relações de poder econômico

Este artigo de fórum dialoga com o texto *A bit of both science and economics: a non-traditional STEM identity narrative*, de Sheron Mark. Em seu artigo, a autora discute o

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✉ Katemari Rosa
katemari@gmail.com

[1] Institute of Physics, Federal University of Bahia, Rua Barão de Jeremoabo, Campus Universitário de Ondina, Salvador, BA 40170-115, Brazil

desenvolvimento de uma identidade em Ciências, Tecnologias, Engenharias e Matemática (STEM, em inglês) por um garoto afro-americano durante um Programa de STEM para Justiça Social. Neste texto para o fórum, a discussão foca em masculinidades negras, formação de identidade e o papel de educadoras e educadores em Ciências para tornar os campos de STEM mais acolhedores para jovens homens negros. A partir dos dados e da discussão no trabalho de Sheron Mark, este artigo propõe um diálogo entre possibilidades de identidade científica nos Estados Unidos e no Brasil quando olhamos para as intersecções de raça, gênero e status socioeconômico. Utilizando o passado colonial que ambos países têm em comum, é estabelecida uma conexão para discutir relações raciais no âmbito da educação científica. O principal argumento neste artigo é de que o racismo não pode mais ser negado nem ter seu papel diminuído pela comunidade mundial de ensino de ciências e de que abordagens interseccionais são necessárias para se enfrentar essas questões.

This paper comes as a conversation initiated by Sheron Mark's *A bit of both science and economics: a non-traditional STEM identity narrative*, where she discusses the development of a Science, Technology, Engineering, and Mathematics (STEM) identity by a young African American male during an informal STEM for Social Justice Program. By reading her paper, which focuses on the reality of the United States, I immediately started thinking of how I would like to see more research around "increasing the active engagement and representation" of students of color and populations from low-income communities in Brazil. While the science education community appears to speak the same language and to be concerned with similar issues, when it comes to addressing the continued and systematic exclusion of students of color, the conversation seems to diverge. Specifically, in Brazil discussions around gender, race, and ethnicity within science education are almost nonexistent. Therefore, I will use Mark's paper as an opportunity to address these issues in the Brazilian context, as I discuss scientific identity possibilities for young men of color and from low-income communities in Brazil and in the United States.

Drawing from Mark's data and discussion, I hope to bring attention to social structures conditions in relation to STEM identity development. Through this paper, I use the term STEM and science interchangeably, even though recognizing a difference between both. I choose to do so because while Mark's paper focuses on STEM, the US interdisciplinary curriculum approach that encompasses Science, Technology, Engineering, and Mathematics, Brazil does not have such integrated and applied program, offering a more traditional and disciplinary curriculum. For the purpose of the discussion here, I will assume these differences will not significantly compromise my arguments. I intend to question in which ways STEM education programs may play a role within larger social structures that allow for or prevent science identity development in young Black male students from economic underprivileged communities. In addition, I would like to stimulate science educators worldwide to contribute to advancing conversations around those issues. Although focusing on Brazil and the United States, this is a conversation about science identity possibilities when we look at the intersections of race, gender, and socioeconomic status.

I start by arguing that, while different, Brazil and the United States have a lot in common when it comes to race relations, and that allows us to, jointly, build knowledge to support these discussions within science education. For that, I draw from the history of Black people in both countries and ground my analysis on critical race theory (Delgado and Stefancic 2001). Then I add on Mark's identity framework, which focuses on identity formation through practice (Lave and Wenger 1998), to discuss possibilities of convergence and conflicts between STEM identity, Blackness, and masculinities through performance (Butler 1990). I hope this paper can help to continue a discussion that cannot be avoided any

longer and one that needs to be in the center of our actions if we intend to actually live in a socially just society.

A critical race approach to the United States and Brazil

Critical race theory, a movement that came out from legal studies as a dissident group of critical scholars of color in the 1970s, has as one of its tenets the recognition of racism as a structural part of society in the United States. I argue that this characteristic is also shared by Brazilian society. I believe that one of the points of convergence between Brazil and the United States' experiences relates precisely to our shared past in the trans-Atlantic slave trade and our ongoing tense race relations. The fact that this affects in great extent our STEM education, even though it has been historically downplayed, makes it an interesting starting point to discuss science education in both countries.

When we look at the history of these countries, the two largest ones in the Americas, and focus on the legacy of enslaved people from Africa who were brought to those lands, we can start to see how our histories have a lot in common. Brazil was the country that received the majority of enslaved people during the trans-Atlantic slave trade. Voyages database (2014) shows that while the US trafficked 305,326 people from Africa, the traffic to Brazil was of 5,848,266 people. As much as the history of Black people in Brazil and the United States have differences, the struggles of Black communities in both countries remain, and we still face the consequences of societies that have racism ingrained in their structures since colonial times.

The recognition of racism as structural and as part of our societies is fundamental to understand that:

1. Racism is not in the action of isolated people, of individuals—that would be bigotry;
2. Racism is a system of power promoting advantages and disadvantages based on race;
3. Multiple measures are necessary to counter the effects of racism;
4. Racism affects all people in society, those who suffer from it and those who benefit from it;
5. Benefiting from racism is what is called White privilege, and one does not have to intentionally claim those benefits, they structurally occur.

In effect, racism permeates all our experiences, actions, relations, and social interactions, from reading a novel, watching television, from traveling on vacation, or driving a car, entering a store, looking for a job, dating, and choosing a career. It means we live racialized experiences, independently of our racial or ethnic affiliation, of being in the receiving end of advantages or disadvantages.

For discussion in this forum, all of these have two implications that I want to focus on: how racism plays a role in our experiences to develop a science identity and how racism affects our educational science-related programs. This leads to my second perspective that guides this paper, informing about theories of identity.

STEM identity

In Mark's paper, she rightfully states that STEM identities "intersect with and develop alongside existing gender, ethnic, racial, linguistic, socioeconomic, and other identities". Correspondingly, I would like to look at the intersection of gender, ethnic, and racial identity, specifically looking at Black masculinities in science and society.

Masculinities and STEM

I will use Raewyn Connell's (2000) notion of masculinity, as "configurations of practice within gender relations, a structure that includes large-scale institutions and economic relations as well as face-to-face relationships and sexuality" (p. 29). Connell says a specific kind of masculinity can be "embedded in the gender regime of an institution such as an army, a corporation or a school". In addition, masculinity is not a personified concept, it exists in culture and is enacted by individuals, the language, and other symbols in the social structure. People can reproduce masculinities but can also contest and confront it (Connell 2000, p. 30). These concepts are useful because they allow for thinking of how masculinity is present in science and science education.

In fact, I want to bring a point bell hooks made during a question and answer part of her public dialogue with Melissa Harris-Perry at The New School, in New York (2013), when she reminds us to separate (hyper)masculinity from patriarchy. This is important in this discussion so we do not take masculinity as an oppressive concept, but a notion to understand a social practice dynamic. Masculinity is not about a system of power; it is about gendered practices that have been socially associated with male bodies. On the other hand, when male bodies are combined with a system of power that benefits men and oppresses women, we have what can be called patriarchy.

Victoria Foster, Michael Kimmel and Christine Skelton (2001) argue that there are "cultural prescriptions that equate masculinity with the capacity for violence" (p. 16). They support this argument by showing statistics of crimes, suicide, and homicide being committed mainly by men and boys. Other practices can also be linked to masculinities such as power, leadership, strength, logic thinking, and careless behavior.

Masculinities are not characteristics of men, they are social practices that can be enacted by people, be men or women. Men are socially expected to perform masculinities and women to perform femininities. When people cross these lines, they are reminded they are out of place, or that they are different, and may be penalized for that, sometimes with violence. For example, gay men that perform masculinities are better "accepted" then those who perform femininities; they "can be" gay, as long as they do not cross the line. Another example is when a woman displays a behavior that would be seen as a positive thing in a man, an accepted masculinity like leadership; to her, it is seen as negative, as bossy behavior, and she is penalized for this transgression.

It happens, not by coincidence, that science was built with an image that reflects many of the traits linked with masculinities. STEM disciplines, in general, reinforce this idea that the field is for people that display masculinities. As a result, it makes it easier for young men to identify with STEM than young women when we consider favorite subjects at school or career choices. Developing a science identity should not be an issue for male students when we look solely through the lens of masculinity, and we could expect all boys to do well in science.

However, Mark shows numbers on gaps for Black and Latino students among high achieving STEM students. Her data is evidence that something happens when we combine our gendered and racialized experiences in STEM; which takes me to my next point for discussion in this forum regarding science identity possibilities.

When Blackness, masculinities, and socioeconomic status meet

The public perception of who makes science constitutes an image that, generally, conflicts with the collective images *about* Black people and the self-identities *of* Black people. The image of a Black person in low payment and low social status job, or even as a criminal is "normal", "natural", not shocking, and in Brazil, it is part of our social landscape. It is this naturalized landscape that makes it possible for people to say, for example, a Black person does not look like a medical doctor in this country (Garcia 2016). If this Black person is a male, another set of beliefs and expectations are set on them.

Images of violence, danger, crime, and illegal substance abuse are often associated with Black male bodies. Masculinities, when linked to Black people are seen as a threat and negative behavior. The pervasive ways racism works make it for even gendered experiences to be developed differently in the context of race. When we combine that with low-income populations, we are looking at young Black men with hardly any obvious connection with STEM.

In Brazil, these young Black men will be most likely living in areas close to the illegal drug business and have to resist not to be co-opted by the crime. Speaking of the US reality, Herman Gray (1995) says "the figure of the menacing black male criminal body is also the object of adolescent intrigue, fascination, and adulation" (p. 403). We can look at pop culture, fashion and media to see how Black masculinities are connected to gangster life, making money, violence, and prison. As bell hooks (2004) points out, "now more than ever before, the dark forces of addiction, of violence, of death seem to have a more powerful grip on the black male soul than does the will to live, to love, to be healthy, and whole" (p. 159). Black masculinity in the United States is associated with physicality over intellectual ability, violence, and lack of self-control (Collins 2005), much like the way it happens in Brazil.

This picture is not to reinforce the stereotypes put on Black boys and men, on the contrary, it is to make it explicit the social conditions and structures that can play a fundamental role in science identity development. For example, when we talk about stereotype threat (Shapiro and Williams 2012) in STEM education and how it can affect students' performance, we cannot forget stereotypes associated with Black male bodies.

STEM identity possibilities in action

While Sheron Mark focuses on an identity in/through practice framework, her data also reveals the performative characteristics of identity. Judith Butler (1990) offers a framework to think of identity as a performative act. Our gestures, moves, voice tone, choice of words, clothing, and actions are crafted (consciously and, for most of it, unconsciously) to act as how we want to be seen by others and how we see ourselves, depending on different contexts. This performative notion of identity, as I see it, does not conflict with Mark's idea, they complement each other.

Mark's description of Tanner's actions, one of the students in her study, is an example of Black masculinities performance. When first presenting the students' conversations during

an urban planning project meeting, Mark's paper provides a dialogue where "leadership" ["I got it!", says Tanner], "take over", and "irritation" are described. The following is a dialogue from Mark's work:

> Melissa: We gotta do something about…
>
> Tanner: I got it! Less drinking. [Tanner stands and writes his point.] Have less drinking…
> Melissa: Well, you can have more places for rehabilitation.
> Tanner [pauses and thinks]: That's mad money. [Tanner continues taking notes for the group]… [Tanner writes and says] Gang violence.
> Melissa: Shelters.
> Tanner: Expensive.
> (…)
> Tanner: Yea. If you build more, it will be like the same thing, obviously [Tanner makes a noise indicating his irritation. (…)].

Here we see an interaction between a male and a female student, Tanner and Melissa, where he performs both masculinities and patriarchal behaviors, by assuming a leadership role and being dismissive of his colleague's ideas, respectively.

When analyzing the narrative of another student, Randy, Mark explains he "engaged in martial arts training prior to his enrollment in the program". This student was involved in the training of a type of fight, which can be connected to violence and force, at the same time martial arts are known for providing discipline, which connects to control and good behavior; a disciplined and under control Black masculinity. This combination was used as a "cultural resource" into the STEM for Social Justice Program Community of Practice.

Mark gives another evidence of performative identity when she talks about "his desired identity of humorous and sociable young man" indicating Randy chose to or had the perception he needed to perform as a humorous student. Either way, it was his "desired" identity that was enacted in that space. Randy could choose to be seen as humorous and sociable or as strong and able to fight, options that can be associated with a martial arts training. Being strong and able to fight are positive masculinities for White men, and a reinforcement of negative stereotype for Black men and as Brian Wright points out "manifestations of African American masculinity are racialized and otherwise viewed as "oppositional" to the culture of school" (2009, p. 126). It is possible, then, that Randy's choice was influenced by his racialized lived experience as a Black young man in educational settings.

When exploring his initial connections with STEM as video game designer or engineer, Randy says "what [he's] thinking about could earn [him] millions of dollars". Mark says that more than passion, he was interested in making the millions. Again, thinking about Black masculinities in low-income spaces, the appeal powerful and ostentatious Black men have to youngsters transform "making the millions" into a desire and expected achievement.

Borrowing Edna Tan and Angela Barton's (2016) idea of hacking through STEM, it is interesting to see Randy's use of his martial arts training to be seen as a "ninja", a master, an expert. The use of the word ninja tells me it was probably an Asian martial art that Randy practiced. It is almost like he hacked this Asian identity for STEM, a racial identity typically associated with success in the area. Had Randy had a Capoeira training, perhaps this would be used differently.

Capoeira is a martial art practiced by Black people in Brazil since the slavery times. Brazil was the last country to officially abolish slavery in the Americas, in 1880. In 1890,

with the Republican state and the first penal code, capoeira was officially criminalized, and it was illegal to practice capoeira in Brazil until 1934 (Cordeiro and Carvalho 2013). In 2014, capoeira was granted a status of intangible cultural heritage (BBC 2014). With the understanding of how racism operates in our society, it is not hard to imagine Black young men in Brazil who practice capoeira not being able to apply Randy's strategy to hack their way into STEM.

It is not all bad and not all good. At the same time masculinities can help young Black men to maneuver their identity development in STEM, Black masculinities can hinder science identity development of Black young men. Understanding this complex dynamic can inform science educators designing science-related programs. One of the challenges is to use the constructed notion of STEM as an area for masculinities to attract and engage Black young men while simultaneously working to deconstruct patriarchal views that seem to reinforce this very STEM image.

I do not have answers for that, on the contrary, more questions arise, such as how can we connect Black young men with STEM without resorting to links with masculinities. Perhaps one possibility would be to strengthen connections with race and ethnicity, making it a more salient identity at play. Even with Randy's economic power interest, a masculinity trait, his concerns with reducing liquor stores from the neighborhood seemed to prevail, which meant doing something for the Black community in spite of a possible money loss.

One can argue that looking at the intersections of race and gender in science education is a relatively new phenomenon (Scantlebury and Baker 2007), and that we have been seeing a growing literature looking at women of color in science, such as the work of Mia Ong (2005) and Heidi Carlone, and Angela Johnson (2007). However, we still lack studies looking at men of color in science. While we have these conversations happening among educators in various parts of the world, the Brazilian science education community seems to be oblivious to the debate. The scenario now is no different from when Josimeire Julio and Arnaldo Vaz (2009) denounced the absence of studies on masculinities and intersectional approaches in science education in Brazil.

Sheron Mark's piece is a careful work that addresses those issues and shows, through an individual STEM identity development process, evidence of how larger social and economic structures can play a role into connecting people to science. Mark's work provides an opportunity for a dialogue about STEM spaces (school, after-school, summer programs, etc.) as a site of racialized and gendered practices.

Final thoughts

Patricia Hill Collins (2005) says that "recognizing that racism even exists remains a challenge for most White Americans, and increasingly for African Americans as well" (p. 5). That is not different in Brazil, where the myth of a racial democracy still survives. Even though I am trying to address social structural issues in this paper, I believe changes start with individual practices and constant (re)evaluation of what we do. Consequently, recognizing racial, gender, and socioeconomic status privileges, could be a start. Educators in Brazil and the United States, as well as those from countries looking for decolonial educational practices, should consider intersectional approaches to research and teaching.

I believe acknowledging racism and gender practices as structural and, therefore, ingrained in our education practices is important so we can understand it is of everyone's responsibility to address the various forms of oppression STEM spaces reproduce and reinforce. It is not just a concern for people of color or gender minorities. Similarly, we have to

be reminded that these social problems are complex and need to be seen through intersectional lenses.

I agree with Tobin Jenkins (2011) that Black men have beautiful minds, are creative, and that we need to rethink Black masculinities so we can foster intellectual identity and scientific identity. STEM fields can gain from having more beautiful minds at work, but more important than that is to have Black young men knowing they belong to science and are welcomed in this world.

Postscript

As I finish revising this writing I am presented with the news of today in Brazil, a Black young gay undergraduate student at the university where I work was killed last night (Correio 2017), not too far from where I live, and Judith Butler and Wendy Brown were harassed at the airport this morning (Gobbi 2017), as they were leaving the country, by people accusing them of destroying families and corrupting children with their "gender ideology". It is next door today, tomorrow it might be next to your door, the fact is, we all have a responsibility to teach for social justice, even (or especially) in science education.

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Katemari Rosa is an Assistant Professor in the Institute of Physics at the Federal University of Bahia, in the city of Salvador, Brazil. Grounded on feminist perspectives, Critical Race Theory, and decolonizing frameworks, her research interests include Physics Education Research and Practice, History of Science, preservice Physics Teacher Education, and discussions around the intersections of gender, sexuality, race, ethnicity and socioeconomic status in Science and Science Education. She is the principal investigator in a research to build an oral history archive gathering stories of Black Brazilian scientists and to develop educational materials that incorporate the contributions from Black people in science.