THE DEHUMANIZATION OF HEARING "I HAVE ALWAYS HATED MATH"

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We share our theorizing about a common statement regarding a math person that is often perceived as innocuous in society. More specifically, we are referring to people's responses when an individual shares that they are studying mathematics, such as "I have always hated math" and "Oh, you must be so smart." We draw on the notions of marked category, narratives, dehumanization, *and* microaggression*. We use these theoretical constructs to argue that people's responses are an instantiation of mathematics as a marked category and that they function as microaggressions, especially for minoritized students who are multiply marked. Moreover, due to their prevalence, they can contribute to students' active choice of not doing mathematics in order to prioritize their humanity. Our report further highlights the importance of mathematical microaffirmations and the development of sub-communities within mathematics.*

Keywords: equity, inclusion, and diversity, undergraduate education, LGBTQIA+

"Statisticians may not play football or date cheerleaders, but they can provide statistical guidance for football coaches." (Wheelan, 2013, p. 76). This quote adds another layer to the stereotype of a statistician (or a mathematician) as an old white heterosexual man. Rhetorically the author is arguing for the worth of a statistician despite their lack of athleticism and social ineptitude. Other non-human characteristics, like being cold or robot-like are also common in describing a mathematician. This has led scholars and mathematicians to disrupt these stereotypes and highlight the humanity behind mathematics (e.g., MathematicallyGiftedandBlack.com, Lathism.org, *Mathematics for Human Flourishing,* 2020). In this paper, we further analyze the idea of being a mathematician or having mathematical ability as deviant and its potential contribution to people actively choosing *not* to study mathematics. We examine how such an idea gets circulated in everyday interactions and discuss potential ways to mitigate it.

There has been a focus on how to get more people into mathematics and to stay in mathematics with particular attention on students with minoritized backgrounds. Having a supportive community and a sense of belonging meaningfully contribute to people's persistence and success in mathematics. Unfortunately, many of the findings in the literature documented the struggle for finding such a sense of belonging. We are becoming increasingly aware of microaggressions (e.g., Yang & Carroll, 2018; Kim & Meister, 2022) and other dehumanizing experiences, like the burden of managing the threat of stereotypes for racially minoritized students (e.g., Leyva et al., 2021; McGee & Martin, 2011). A welcoming and affirming community, mathematics is not, at least not yet.

This makes us wonder about opportunities for students to affirm their choice to study mathematics or their enjoyment of mathematics. Research interviews with students about their choice of major can end up becoming such an opportunity where they get to affirm their choice of studying mathematics or other STEM fields (e.g., Leyva, 2016; Leyva et al., 2022). These interviews often remind students of their motivation for choosing their field of study. We are interested in another event that can function as an affirming event for students. This event typically starts with a question, "What are you studying at the university?" or "What do you do?"

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and after some calculation, the person might respond with "I study mathematics" or "I am a graduate student in mathematics." Then comes the reply.

These replies take many forms including statements such as "I have always been bad at math," "I have always hated math," "you must be really smart," or "you must have a little bit of Asian in you" (Shah, 2017). The statement of "I do math" is a (rare) opportunity when a student explicitly affirms their membership in the mathematics community. Yet, we argue that the typical responses do not affirm the individual's choice, even the ones that attribute intelligence to the person. Instead, it distances the individual from the responder. In other words, these responses end up becoming microaggressions that dehumanize the individual. The prevalence of these dehumanizing responses does not normalize or minimize the harm, instead, it heightens the threat, especially for individuals whose identities have historically been excluded in mathematics.

Theoretical Framework

We draw on several theoretical constructs to make sense of the phenomenon. Specifically, we draw on notions of deficit discourses in mathematics education (Adiredja & Louie, 2020) and dehumanization in the context of Damarin's (2000) idea of mathematical ability as a *marked category*. We further these ideas by incorporating microaggression theory (Sue, 2020) as a means of operationalizing these constructs in everyday interactions. All these constructs and theories focus on the interrelationship between identity, power, and discourse, and as such we are examining mathematics learning as a sociopolitical activity (Valero, 2004; Gutiérrez, 2013). And thereby, we view race and gender not just as a social marker of identity, but as a dynamic social construct that gets negotiated in interactions (Esmonde, 2009).

Marked category, as explained by Damarin (2000), refers to interrelated social processes that produce and reproduce groups as either normal or deviant in the context of a larger functional group. Thus, marked categories refer to groups of individuals who share marks of deviance based upon larger popular culture. For example, women, people of color, individuals in the LGBTQ+ community, and people with disabilities are commonly constructed as marked categories (Damarin, 2000). Individuals who exist in multiple marked categories, being doubly or multiply marked, end up at the margins of each of their marked communities since their membership in one category marks them as deviant in the other. We can see this double marking being called upon in Black Feminist work such as *All the Women are White, All the Blacks are Men, but Some of Us are Brave* (Hull et al., 1981 as cited in Damarin, 2000) which speaks to the invisibility of Black womanhood.

Damarin establishes the mathematically able as a marked category due to the popular representation of mathematicians as socially inept, hopelessly heterosexual individuals separate from general society, along with the construction of mathematical ability as something that is genetically determined within humans. The quote at the start of our paper is an example of this marked category at play in literature. Moreover, research surrounding popular conceptions of mathematicians' identities construct them as excessively intelligent (e.g., Piatek-Jimenez, 2008; Shah, 2019), obsessively passionate (e.g., Bartholomew et al., 2011, Mendick, 2005), socially inept (e.g., Piatek-Jimenez, 2008; Hall & Suurtamm, 2020), and innately able (e.g., Bartholomew et al., 2011; Jaremus et al., 2020). Together these narratives work to stereotype mathematicians at the extremes of excess and deficit, with consequences such as establishing mathematicians as incompetent in basic life skills (Picker & Berry, 2000), unemotional and cold (Ernest 1995), and uncreative (Mendick, 2005). These narratives have disparate effects and can be utilized in a large variety of settings.

Shah (2019) extended the application of math ability as a marked category by showing that a narrative of excess can also be a dehumanizing racial narrative. Shah's (2019) analysis of the statement "Asians are good at math" demonstrates its dehumanizing impacts on Asian personhood by positioning them as racial subjects. Shah argued that mathematical ability is used as a proxy for excessive intelligence at the expense of core humanistic traits. This type of narrative of excess reduces Asian people to a calculator or a tool, which strips the person of their autonomy and their ability to reason. Shah explained the connections of this intelligence with the conception of a hyper-evolved android further marks Asians as subhuman and deviant. We extend this narrative of excess and the ways it threatens personhood to other dominant discourses about gender and sexuality in mathematics.

In contrast to narratives of excess, narratives of deficits are more commonly discussed in mathematics education research. Narratives about the underperformance of different racial groups and women are quite common in mathematics education (e.g., Leyva, 2016, Jaremus et al., 2020, Mendick, 2005). As a narrative, deficit narratives are also socially constructed and reified. However, deficit narratives about minoritized groups in mathematics play an important role in broader deficit discourses in mathematics education (Adiredja & Louie, 2020). Supported also by dominant narratives about mathematics (as hierarchical, apolitical, etc.), and dominant institutional practices (e.g., standardized testing as the main form of assessment), deficit discourses systematically function to create differences between groups and utilize these differences as substantiation of the inferiority of marginalized groups (see also the racial hierarchy of mathematics ability, Martin, 2009). The positioning comes as a result of over-emphasis of assumed intellectual shortcomings of students from marginalized groups and attributing these shortcomings to their families, communities, and cultures.

Narratives of both excess and deficit play a role in dehumanizing people by positioning them to have too much or too little of what makes someone human. As Shah (2019) has argued, as part of the racial contract in the US, Asian people have an excess of mathematical ability that renders them not human, and Black, Latinx, and Indigenous people have too little mathematical ability that makes them subhuman, leaving only white people as the only group having the right amount of mathematics ability as humans. More generally, dehumanization occurs when "...individuals are necessarily deprived of human dignity at the same time that they are deprived of the possibility and opportunity to shape their own lives, to be seen and heard, in the community of others" (Ericson, 1991, p. 34). At the core of humanity is personal autonomy and being recognized as a member of a community. This dehumanization and threatening of someone's human dignity happens both on the individual level and within entire systems.

Microaggressions operationalize dehumanizing narratives in everyday interactions. They are defined as brief and subtle verbal, behavioral, and environmental indignities toward members of minoritized groups (Sue, 2020). Microaggressive statements may appear innocuous and harmless, but they have detrimental impacts on the psychological health of recipients due to their continual and everyday nature. Solórzano and Perez Huber (2020) draw connections between racial microaggressions to larger systems of racism through a tree model of the white supremacist roots of racial microaggressions. Within this model, the roots represent white supremacy, the trunk represents institutional racism, and the leaves represent racial microaggressions. They use this model to demonstrate how microaggressions reify racism in everyday interactions as well as maintain systems of institutionalized racism.

Sources of Data Illustration

We draw on data from two separate research studies to illustrate our theorizing. One study focuses on the beliefs, knowledge, and practices of prospective and beginning middle and high school teachers related to equity. The other focuses on the impact of professional development on university instructors' understanding of anti-deficit teaching of mathematics. We included two conversations during which an individual shared the impact of people's responses to their studying mathematics. The fact that these individuals shared similar interactions in two separate studies, while also not being prompted, highlights the prevalence and impact of such interaction.

The two excerpts referred to the perceived impact of people's responses to the statement that "I do math." The first excerpt is from Chris, an undergraduate student in mathematics education who identified as white and non-binary. The second excerpt comes from a dialogue between three white individuals, two doctoral students in mathematics and one instructor in a mathematics department. One is the first author, and the others were Cedric and Hannah. Cedric, the center of the excerpt, identified as a cis white gay man.

Positionality Statement

The first author is a white graduate student in mathematics and mathematics education. They identify as disabled and trans non-binary. They are interested in this topic because of their experience in hearing these types of responses and the impact such responses had on their identification with mathematics. The second author is a queer Asian male mathematics educator. While he often hears similar responses as ones that are the focus of this paper, he was initially skeptical about the impact of such statements. It was through working with the first author and hearing the interactions below that he became interested in the issue.

Data Illustration and Analysis

The phenomenon came up with Chris when the interviewer was asking about what they had learned about equity in their teacher education program. Chris began the conversation with the use of carceral pedagogy within classrooms (e.g., the disproportionate rate of Black students being asked to leave the classroom) and student ideas being undervalued. They were then prompted to connect back specifically to mathematics. Chris responded with mathematics as a "white cis-gendered heteronormative space" and connected it to people's responses to their being a math major.

> *Chris:* Yeah. Math, math is something that I'm really passionate about with this. Because I feel like it kind of goes hand in hand with science and the kind of cold understanding of what it means to do math and be a mathematician. Where it's like, it's a very kind of white cis-gendered heteronormative space where it's like, males are privileged really high. It's there's, there's a, there's a feeling, a cultural kind of feeling of what a good mathematician looks like. And it's, it's important for me to kind of break out of that.
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> Um, and it's, it's unfortunately something that I see a lot, I've met a lot of adults where I'll be saying that I'm a math major and they'll be like, "Oh, I was never good at math. I hate math." And it's, it's just brutal because it's, these people are in these groups. Like it's never, you know, a cis white guy that I'm talking to. Who's like, oh, I hate math. It's always women most of the time. And it's just like, it just, it's brutal.

Chris shared their awareness of dominant discourses ("cultural kind of feeling") about what a mathematician looks like and who is presumed to be good at mathematics, mainly white cis-gendered heterosexual men. This type of narrative is relational (see also Shah, 2019 for racial

narratives). As much as it defines who can be good at math, it also defines who is not good at math. Interpreted in this way, Chris was aware of this narrative of deficit attributed to non-dominant groups, including women and non-cis-gendered people. During their interview, issues of gender were very present in the discussion. So, it was not surprising that they connected the discussion about mathematics to gender.

We interpreted Chris' use of "brutality" to mark people's responses as a prevalent microaggression. The dominant discourse functioned as a constraint on their mathematical identity, from which they felt the need to "break out" of. However, their attempt to break out of the deficit discourse by sharing their major was frequently met with the very same discourse. Moreover, this constraining discourse also came from women. Thus, what was an opportunity for Chris to affirm their mathematical identity was instead met with a resistance by groups that could have been their co-conspirator in the fight. Being good at math challenged Chris' identification with this non-dominant group, i.e., non-white-cisgendered-heterosexual men.

Cedric shared similar accounts of his membership being challenged in a particular non-dominant group, mainly gay men. However, Cedric highlighted the dehumanization that comes from not being seen as a human being when he shared his mathematical identity. People's responses to Cedric stripped him of his humanity by putting him in the foreign box of being a math person, whose interests are not worth pursuing further in conversations.

> *Cedric*: When Weston [another graduate student] was talking about, sort of, this mutual dehumanization, I had a very vivid sense memory. And I'm pretty sure all of us have had this experience of, you know, introducing yourself to somebody in a social setting, and they go, "Oh, what do you do?" you say, "I study math." And they go, "Oh, I hate that sh*t, you're so smart. How do you do it?" And it's just like this weird, like, you don't feel like you're seen anymore. Just like, okay, cool, I'm off in this weird wilderness that's separate from you. And I don't know, I can't help but feel like–
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> *Hannah:* Dehumanized as "just like math."
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> *Cedric*: Well yeah. But yeah, there's something that I just feel like, curiosity in general about things. Is the way that I don't know, in my experience, like, I, if I'm, if somebody is curious about what I do, I find myself really engaged with that person. But if they just sort of go "ahh" and put me in a box, like, oh okay, you don't get it at all /…/
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> *Becca:* So, you just gave me another proof of concept for my thesis. So, I'm doing a thesis on the way that people respond when you bring up math. Typically, with "I hate math, I could never do that' or "You must be so smart to do that." And how, like, isolating that is, particularly when it's people that are within your same group and like– So if you're a woman and you say that I do math and then other women are like "Oh my gosh, that's the worst thing ever, I could never do it," how isolating that is from this group that you're supposed to identify with and you feel like you can't anymore. And then bring that into the math classroom and you also feel like you can't identify. That's kinda what I'm looking into. Very happy that it [this concept] happened in the wild.
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> *Cedric:* It happens a lot with gay men as well. So, there you go.

Consistent with Chris' account, Cedric also noted the prevalence of such responses from people ("all of us have had this experience"), especially from gay men, a community with whom Cedric closely identified. Hearing dissociation with mathematics from people "that are within your same group" is isolating, as Becca argued. Becca concluded that this double exclusion from

mathematics and from one's own home community makes it difficult to persist and claim ownership of studying mathematics.

In contrast to Chris, however, Cedric and Becca raised another common positioning in people's responses: "You're so smart." This positioning appears affirming as it attributes a positive characteristic to the individual. Yet it can also be dehumanizing in two ways. This narrative of excess functions similarly with the narrative of "Asians being good at math," in the way that it attributes surplus intelligence to a person. This excess intelligence stops others from relating to the individual while simultaneously stripping them of their humanity, becoming "just math," as Hannah said. The narrative puts Cedric in the foreign box separate from his own community. Returning to Damarin's idea of mathematical ability as a marked category, this form of smartness was not necessarily desirable.

Discussion

In this theoretical report, we drew on several theoretical ideas to argue that responses like, "I have always hated math" to an individual sharing their math identity are dehumanizing. We highlighted the deviant positioning of excelling in mathematics by interpreting mathematics as a marked category. Narrative of excess allows us to interpret a statement that appears affirming as dehumanizing. The response is dehumanizing in the way that it strips the individual from core traits of being human, such as self-autonomy and relationality. In this report, we also highlight the dehumanizing impacts of these responses particularly for doubly marked individuals, like Cedric and Chris, who are both good at math and members of the LGBTQ+ community. The prevalence and everyday nature of these statements and their impact of othering individuals within particular groups qualify them as microaggressions.

Just like many microaggressions, one can dismiss the impact of these seemingly innocuous slights to an individual's identity. Yet, what might be the long-term impact of hearing negative responses about studying math to individuals? While future research can examine that question, we posit that the prevalence of hearing such responses can slowly chip away at someone's mathematical identity. We recognize this type of interaction as a rare opportunity wherein an individual gets to affirm their mathematical identity outside of the academic setting. If such an opportunity is met with resistance and threatens one's membership in a community, then individuals who are doubly marked can become further isolated in pursuing mathematics.

Microaggression theory also offers some ways to mitigate this potential othering and exclusion. Microaffirmations are "the often-subtle verbal and/or non-verbal strategies (moments of shared cultural intimacy) People of Color consciously engage that acknowledge and affirm each other's value, integrity, and shared humanity" (Pérez Huber, L., & Solórzano, D. G., 2015, as cited in Pérez Huber, L., 2018, p. 1-2). We extrapolate from the theory's original focus on racial microaffirmations to mathematical microaffirmations between people within the same doubly marked categories. This also highlights the importance of subcommunities within mathematics where such microaffirmations can take place.

To get at the long-term impact of these responses on mathematics students, Becca is planning to design and conduct a study focusing on this topic, where they can systematically interview BIPOC women and trans individuals in mathematics (i.e., multiply marked individuals) on their experiences with such responses and how they negotiate their mathematical identities. The study aims to examine the generality of the responses we shared in this report, as well as additional ideas on how to mitigate these dehumanizing microaggressions.

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