"I WAS CONSTANTLY BEING QUESTIONED": RACIALIZED STEM GRADUATE STUDENTS IN CANADA

AUGUSTINE S.J. PARK
CARLETON UNIVERSITY

JASMEET BAHIA
CARLETON UNIVERSITY

ALEX BING
UNIVERSITY OF SASKATCHEWAN

Abstract

This article examines the experiences of racialized graduate students in science, technology, engineering, and mathematics (STEM) programs at one Canadian university. There is virtually no research on racialized inequity and STEM higher education in the Canadian context despite a robust body of literature outside of Canada, especially in the United States. Based on 25 in-depth, semi-structured interviews, this article explores the experiences of racialized graduate students in STEM through the lens of the new racism and colour-blindness. Seven racialized dimensions were reported by the participants: stereotyping, being undermined, microaggressions, subtle discriminatory experiences, inequitable funding, resistance to dealing with racism, and performative EDI as a response to racism.
Keywords: race and higher education, STEM, graduate students, EDI, colour-blind racism

Résumé

Cet article analyse les expériences vécues par les étudiants racialisés aux cycles supérieurs dans les programmes de sciences, technologie, ingénierie et mathématiques (STIM) au sein d'une université canadienne. Il n'existe pratiquement aucune recherche sur l'iniquité raciale et les études supérieures en STIM dans le contexte canadien, malgré un solide corpus en dehors du Canada, notamment aux États-Unis. Basé sur 25 entretiens semi-structurés approfondis, cet article explore les expériences des étudiants racialisés aux cycles supérieurs en STIM à travers le prisme du nouveau racisme et du daltonisme racial. Sept dimensions ont été rapportées par les participants : les stéréotypes, le fait d'être sous-estimés, les micro-agressions, les expériences de discrimination subtile, le financement inéquitable, la résistance à aborder le racisme, et l'EDI performative comme réponse au racisme.
Mots-clés : race et études supérieures, STIM, étudiants aux cycles supérieurs, EDI, daltonisme racial.

INTRODUCTION

Racialized students face significant barriers within STEM higher education (HE) in Canada, yet we know little about their experiences. Despite the expansive literature on racialized inequality in STEM HE outside of Canada, especially in the United States, with few exceptions (e.g., Burke et al., 2021), there is an absence of literature on the subject in Canada. This article contributes to ameliorating this gap in knowledge by investigating the research question: What are the experiences of racialized STEM graduate students in Canada? The importance of this inquiry is that experiences of racialized STEM graduate students cannot be assumed to be uniform across contexts. Addressing inequities in Canada must be based on empirical evidence from Canada. This article explores students' experiences in their own words, drawing on 25 in-depth, semi-structured interviews with racialized graduate students in STEM at one Canadian university. These interviews give voice to wide-ranging experiences of racism, namely: stereotyping, being undermined, microaggressions, subtle discriminatory experiences, inequitable funding, resistance to dealing with racism, and performative EDI as a response to racism. We analyze these experiences through the lens of the new racism and colour-blindness (Bonilla-Silva, 2018).

LITERATURE REVIEW

There is a vast literature on inequity and HE, but we focus on racialized inequity in STEM HE in particular, as this is the conversation to which this article contributes. The history of STEM is one of exclusion, which persists today. The Whiteness and masculinity of STEM culture (Doerr et al., 2021) are rooted in the history of scientific racism and sexism that permeated the era in which STEM HE emerged (Brockman, 2021): "Gender, race, and sexuality shape STEM norms and values, procedures, interactions, relationships, and evaluations to privilege the experiences of straight, white men as 'ideal scientists'" (Griffith et al., 2022, p. 235). "Whiteness and male-domination" have been normalized in STEM (Smith & García, 2018, p. 208), shaping ideas of who is a "valid scientist" (Spencer, 2023, p. 59). While women have been underrepresented in STEM, White women have been the principal beneficiaries of equity-advancing programs (Smith & García, 2018). Racialized students continue to be required to assimilate to the culture of Whiteness to succeed (Spencer, 2021). Yet, STEM ideology asserts that STEM is a meritocracy, an objective intellectual enterprise that is immune to social, political, or cultural forces, making it theoretically possible for anyone to succeed through hard work and motivation (Doerr et al., 2021; Russo-Tait, 2022). Thus, there is a contradiction between the meritocratic claims of STEM ideology and the structures and culture that shape the lived realities of racialized STEM students.

Within this context, racialized peoples in STEM HE share many experiences. Racialized faculty are underrepresented, are less likely to be awarded federal grants or be promoted, and face discrimination that leads to burnout and other adverse impacts (Clark & Hurd, 2020). Moreover, women of colour (WoC) STEM faculty are vastly underrepresented, face higher teaching and service loads, are disproportionately relegated to non-tenure track positions, experience high degrees of stress, and have the least decision-making power and lowest salaries relative to other faculty (Corneille et al., 2019). WoC faculty also experience identity taxation, which involves "physical, mental, or emotional labor due to membership in a historically marginalized group" (McGee et al., 2023, p. 1183).

In addition to shared experiences, differently racialized groups face specific challenges. We focus first on the experiences of Black individuals, as they face heightened marginalization in STEM. Black students are "grossly underrepresented" in STEM, paralleling a "critical lack of Black faculty" in STEM (McGee et al., 2022, p. 489). Black faculty take on significant service, including for diversity-related work, which is not valued for tenure and promotion and takes time away from their research agendas. Moreover, they often receive discriminatory teaching evaluations (Parsons et al., 2018). Black students have a higher rate of attrition from STEM pro-

grams than White students and take longer to complete their degrees when they persist (Lancaster & Xu, 2017). Black students also experience isolation, exclusion from key communities like study groups, a lack of belonging and social integration on campus, and hostile environments (Brockman, 2021; Lancaster & Xu, 2017; Rosa & Mensah, 2016). The pedagogy of STEM courses can be alienating for Black students (Lancaster & Xu, 2017). Black students experience imposterism and feel they must push themselves to be resilient and to work harder to combat negative stereotypes of being less intelligent and less scientific (Brockman, 2021; McGee et al., 2022; Rosa & Mensah, 2016).

The experiences of Black individuals in STEM HE are not only racialized, but gendered as well. Black women students confront gendered-racialized stereotypes and experience racial battle fatigue as ongoing racism threatens their well-being (McGee & Bentley, 2017). The lack of Black women mentors contributes to making STEM a chilly and isolating environment for Black women students (Brockman, 2021). Black men who are students in STEM also face a range of gendered-racialized challenges as they experience racial devaluation, invisibility, ostracization, loneliness and "only-ness" in the absence of same-race others in their environments (Alston et al., 2017; Spencer, 2023). They are accused of academic dishonesty when they excel, receive poor advising, and deal with self-esteem and mental health challenges (Alston et al., 2017; Spencer, 2023). Black men are either presumed to be less academically competent or are viewed as a "racial exception" (Spencer, 2021, 2023). Treated as spokespeople for their race, they are burdened with educating non-Black colleagues about Black experiences. Black men confront gendered-racialized stereotypes, including being seen as physically dangerous, thugs, or criminals, and are expected to assimilate to White "politics of respectability" in how they "walk, talk, and dress" (Spencer, 2021, p. 785).

Other racialized people face different challenges in STEM HE. Asian international students (especially from China and India) now constitute the majority of graduate students in STEM in the United States (Brockman, 2021). In contrast to their Black peers, Asian STEM students are treated as the "crème de la crème" of students due to the racialization of presumed ability (Brockman, 2021). Yet, they are often targets of violence, racist slurs, anti-immigrant sentiment, xenophobia, and nativist rhetoric. They experience racism from advisors, faculty, other students, and members of the community, and come to normalize experiencing hate crimes (Anandavalli et al., 2021). Between 22% and 30% of Asian international students have "been victims of intimidating, aggressive, or hateful behavior" (Anandavalli et al., 2021, p. 284).

Asian domestic students also face challenges in STEM, especially through the model minority myth, which constructs Asians as "naturally highly gifted in STEM fields and extremely, if not excessively, hardworking" (McGee et al., 2017, p. 254). The model minority myth has been criticized as supporting the myth of meritocracy, which upholds White supremacy: Asian upward mobility is used to blame other racialized communities for their historical and structural marginalization (Chen & Buell, 2018; Shah, 2019). Moreover, the model minority myth hides the realities of Asians who have not "succeeded" or ignores the racism experienced by Asians in general, including in HE (McGee et al., 2017). Shah's (2019) analysis of the discourse that "Asians are good at math" (p. 671) shows that the presumption of Asian excellence at mathematics places undue pressure on Asian students, limits their prospects for employment and education, and deprives Asian students of help when they are struggling because they are assumed to be doing fine. Moreover, Asian students who internalize the model minority myth are more likely to experience mental illness, such as anxiety and depression, relating to the pressure to succeed (McGee et al., 2017). Asian STEM students face various stereotypes including being seen as hyper-competitive and socially incompetent, while confronting intensifying racist discourses of being "foreign spies" or, for South Asian students, "terrorists" (Chen & Buell, 2018, p. 619; McGee et al., 2017, p. 255). Asian Americans continue to be positioned as "forever foreign" (McGee et al., 2017), never

belonging as full citizens. Furthermore, Shah (2019) argues that the model minority myth and the association of Asians with mathematics deprives Asians of full personhood, dehumanizing them as sub-humans who are smart but incapable of reason and creativity, like human calculators. Asian American students often feel pigeonholed into STEM and feel deprived of exploring other interests and identities; they feel stereotyped as unable to excel outside of STEM and are not treated as unique individuals (McGee et al., 2017).

Despite the prevalence of Asian STEM students, Asian scholars are not likely to occupy higher ranks in academic structures. Most Asian scientists hold non-faculty positions, Asian women engineers are underrepresented at the rank of full professor, and there is a dearth of Asian women engineers and scientists in leadership positions (Lim et al., 2021; McGee et al., 2023). Asian women professors in the United States, for example, are "the least recognized for their academic expertise and instructional authority" (Lim et al., 2021, p. 651). Thus, "Asian women scientists and engineers fall behind not only men but also White women and women of other underrepresented groups" (Lim et al., 2021, p. 651).

The robust literature on race and STEM HE outside of Canada—overwhelmingly focused on the U.S. context—demonstrates shared experiences across racialized peoples and distinctive experiences of differently racialized groups. This article serves as a corrective to the dearth of knowledge about racialized inequity and STEM HE in Canada. To explore the experiences of racialized STEM graduate students in Canada, we deploy Bonilla-Silva's (2018) concepts of the new racism and colour-blind racism.

THEORETICAL FRAMEWORK

The new racism, as theorized by Bonilla-Silva (2018), is a racial structure that belies the purported achievement of a post-racial society. Despite the real persistence of racialized inequalities, the post-racial society assumes that there are few racists, racism is rare, and issues of race are no longer significant. Operating in subtle and covert ways, the new racism renders the mechanisms of racialized inequality invisible. While overt claims of racial inferiority have declined, a new ideology works to defend structures of racialized inequality: colour-blind racism. Colour-blind racism is a racial ideology that attributes the persistence of racialized inequalities to non-racial forces. Bonilla-Silva (2018) identifies four "frames" of colour-blind racism. The frame of *abstract liberalism* uses concepts from political and economic liberalism to interpret racial issues. For instance, the concept of equality of opportunity is used to oppose equity-advancing programs as unfair. The frame of *naturalization* interprets racial matters through nature and biology. For example, residential segregation is explained through an appeal to supposedly natural in-group preference. The frame of *cultural racism* replaces biological racism by appealing to cultural explanations to maintain racialized inequality, such as a purported culture of laziness. Finally, the frame of *minimization* asserts that discrimination is no longer a defining facet in the lives of people of colour. Minimization encompasses both a dismissal of people of colours' experiences of racism as "playing the race card," making "excuses" or being "hypersensitive," and a narrowing of the definition of racism to only the most extreme manifestations (Bonilla-Silva, 2018, p. 57). Bonilla-Silva's framework is useful for interpreting racialized experience in STEM as the new racism and colour-blind racism permeate STEM ideology, as we explore in the Discussion section below.

METHODS

This article centres the voices of racialized STEM graduate students to represent their experiences in their own words. Our analysis is based on 25 in-depth, semi-structured interviews carried out in the fall of 2021 and winter of 2022 with master's and doctoral students in STEM. All the names in this article are pseudonyms and the participants' data have been de-identified to protect their identities. The participants were drawn from one comprehensive university in one of Canada's largest and most

ethnically diverse cities. The university has over 30,000 students, approximately 13% of whom are graduate students. There are approximately 100 graduate programs at this university, roughly half of which are in STEM fields.

Study Design

Recruitment of study participants entailed having administrative staff in all STEM graduate programs at this university forward a recruitment poster to their internal graduate student listservs. Interested students reached out to the principal investigator to learn more about the study, including receiving an informed consent form. All interviews were carried out online due to COVID-19 restrictions in place at the time. The interview guide was designed with broad questions to enable participants to lead the narrative. However, there were several thematic areas that loosely organized the interview guide, specifically, experiences of: classroom, lab, or other structured learning settings; supervision; funding; and sense of belonging. In keeping with principles of member checking, participants were given the option to receive a copy of their de-identified transcript to verify and modify to better reflect their meaning; however, only three participants chose to make changes. All participants were given the option to receive the preliminary data analysis to provide feedback. There were positive comments about the analysis, and no changes were recommended by participants. All participants were given a CAD $25 gift card as a token of appreciation for their time and insights.

Participants

The recruitment poster called for participants who identify as Indigenous, Black, or people of color. Although there was one participant who identified as partly Indigenous to another region of the world, there were no Indigenous participants from Turtle Island. One possible explanation for this absence is that Indigenous people may be even more underrepresented in STEM than other groups. Since the study university does not gather race-based data on students, we do not know how many, if any, Indigenous students are enrolled in STEM graduate programs. The participants were diverse in many ways. Of the 25 participants, the following shows the number of participants from different ethnic or racialized group: Black (7), Latinx (1), Middle Eastern (5), East or Southeast Asian (5), and South Asian (7). Among the participants, two are bi-racial. While many participants gave more specific, textured self-descriptions, these broad groupings ensure greater anonymity for participants. Nine participants were in engineering or related fields, while 16 were in sciences or mathematics.

DATA ANALYSIS

Interviews were audio-recorded and transcribed using NVivo Transcription, then manually verified. Data analysis for this study combined a thematic analysis with an "empathetic interpretive" approach. Thematic analysis is "the process of identifying themes in the data which capture meaning" (Willig, 2013, p. 147). Empathetic interpretation "requires the interpreter to enter the phenomenon, to get inside it and to try to understand it 'from within'" (Willig, 2013, p. 138). Empathetic interpretation seeks to illuminate the data by examining the textures of what interviewees say, noting patterns, making connections, and drawing relationships within the data. This requires looking at the data from different angles and foregrounding different dimensions of the data to enrich understanding (Willig, 2013). Rooted in the data, empathetic interpretation is an inductive approach that elucidates meaning both from what interviewees narrate and from their silences or absences in the data, while resisting the imposition of "real" meanings proposed by the researcher (Willig, 2013). The strategy adopted to put thematic analysis and empathetic interpretation into practice involved re-listening to interviews, then repeatedly reading transcripts before commencing coding to engage in a deep immersion in the data. This follows James's insight that researchers should "hang out" in interview transcripts (James, 2013, p. 574). Coding involved inductively generating themes through open coding to remain recep-

tive to all possible themes. Open coding took place using NVivo, followed by focused coding by hand to develop a sharper analytic focus (Van den Hoonaard & Van den Scott, 2015). All coded data was re-read; similar codes were clustered together and relationships between codes were generated. Reading coded data often required returning to the transcript to situate words in context to understand "how one snippet of conversation might relate to another spoken" at another point in the interview (James, 2013, p. 574). Through this strategy, a preliminary analysis of the data was generated and shared with interviewees as part of the member-checking process described above.

Researcher Roles and Positionalities

This analysis of racialized STEM graduate students is part of a larger project of the principal investigator, Augustine, on racialized graduate students as learners and teachers across social sciences, humanities, and STEM fields. Jasmeet and Alex joined the project as research assistants and carried out the STEM interviews. Jasmeet, who completed a Bachelor of Science degree, conducted interviews with participants in sciences and maths. Alex, who completed an undergraduate degree in engineering, interviewed participants in engineering and related disciplines. Augustine, who has no STEM training, designed the study, carried out recruitment, did a second verification of all transcripts, engaged in member checking, and carried out the data analysis. All three authors are Asian Canadian scholars.

EXPERIENCES OF RACIALIZED STEM GRADUATE STUDENTS IN CANADA

Most participants reported race-related issues in the context of their STEM graduate programs. Participants raised seven interrelated dimensions of experience: stereotyping, being undermined, microaggressions, subtle discriminatory experiences, inequitable funding, resistance to dealing with racism, and performative EDI as a response to racism.

Stereotypes

Participants in this study voiced complex experiences confronting stereotypes. The stereotypes participants encountered were shaped by their different racialization. For example, South Asian participants faced stereotypes about their culture, as well as the assumption that they are naturally and narrowly focused on STEM. Anika, a South Asian doctoral student, explained that when she got engaged, a professor asked her if it was an arranged marriage, activating stereotypes about South Asian relationships and gender relations. The only racialized person in her lab, Anika also expressed stress that higher expectations were placed on her compared to other students because of the pervasive and damaging assumption that Asians are high achievers and naturally talented at STEM. Similarly, Sadia and Jiera, both South Asian master's students, expressed that they are assumed to be students who would inevitably choose STEM. As Jiera put it, being South Asian in STEM is "fitting that stereotype." But both students also expressed frustration about imposed assumptions. While Sadia is not interested in pursuing medicine, she is frequently assumed to aspire to be a physician. Jiera is often met with surprise at her desire to connect her studies with social inequities, noting that "being a…social justice warrior is not so much within the stereotype."

In contrast, Black students face different stereotypes. Rose, a Black master's student, found that people question her position in science, especially since there are no other Black people in her department. Riley, a Black master's student, expressed that peers and professors "see a Black girl first" before understanding anything else about her. She deals with the assumption that "Black girls [will] be very extroverted" and finds that other students are not receptive toward her in class unless she behaves in an overtly friendly manner. Yet, she also confronts the assumption that Black women are "angry" and "are automatically already assumed to have an attitude." Likewise, Clara, another

Black master's student, conveyed that due to this stereotype, she is perceived as "rude" and being offensive. Martin, a Black master's student, explained that he "gets looks" as one of the only Black students in his program. When wearing a durag to class, Martin was met with "curiosity" and "skepticism"—giving expression to the criminalization of Black masculinity, he explained that his classmates "think it's...like, [a] gang-affiliated thing" due to representations in "hip-hop or rap videos." Martin believes that students in his classes may have never encountered a Black person before, causing him to be "guarded," filter what he says and does, and try not to convey a "bad image." While the South Asian students expressed an expectation that they "should" be in STEM, Black students like Clara, Martin, and Riley, and Rose confronted questioning and "surprise" from others that they were STEM students.

Being Undermined

Students in this study experience being undermined in various ways: underestimation, imposterism, tokenism, and claims of reverse racism. Participants conveyed that they felt underestimated in their programs. The feeling of underestimation was expressed by participants of differing racialized identities. Sonya, a Black master's student, expressed that "I was constantly being questioned about the research I was producing or my ideas. I was constantly undermined." Riley finds that peers "automatically underestimate you [if] you're Black." Bahir, a Middle Eastern master's student, explained that professors seemed to think he was "less capable in terms of my mental abilities." This underestimation results in racialized students feeling they need to work harder to prove themselves. Taylor, a Southeast Asian master's student, felt that he was not "taken seriously" and that he "had to overperform, and really overdo stuff, in order to really be recognized and taken seriously."

In some cases, being underestimated results in racialized imposter syndrome. As Sonya put it, being "questioned a lot more" than other students gave her imposter syndrome. Ayeleen, a Middle Eastern master's student, said "I feel as though I'm not smart enough to be here," and continued on to express that others are "so smart, they're doing so well and I'm, like, I don't know that I have that in me." Ayeleen also worries about letting down her supervisor or anyone else who has invested in her. Anika similarly voiced the feeling that "I really need to impress them...internally, I don't feel like I have the ability to do so." Imposter syndrome works dynamically with worries about tokenism. Racialized students worry that their successes are tokenistic. Anika was bombarded by advice that she would "have a good chance" if she applied for jobs or other opportunities aimed at visible minority women. But, Anika shared, "I don't want that to be the only reason. I want to know that I'm there on my own merit." Tamara, a Black master's student, similarly pointed out that when racialized people are "getting hired or when they're winning awards," they are assumed to be tokens rather than meritorious. Even further, Rose expressed concern that racialized students are admitted into STEM fields to reach quotas. Claims of "reverse racism" also work to undermine racialized students. One of Anika's White peers strongly implied that racialized students get preferential treatment, telling Anika "Sometimes I wish I wasn't White so that I could, you know, get a couple of things."

Microaggressions

Many participants also experience microaggressions. Microaggressions refer to "subtle, daily, and unintentional racial slights committed against members of racialized groups" (Williams et al., 2021, p. 991). Microaggressions reflect the new racism as microaggressions instantiate racism "despite an apparent overall decline in overtly offensive racist action" (Williams et al. 2021, p. 991). One form of microaggressions that our participants narrate relates to how White people speak to them. On the one hand, some participants recounted the cautiousness of White people, especially other students. Aaliyah observed that White students are "extra careful and sensitive in terms of what they're saying" and often look to racialized students for approval. Anika has found a similar cautious-

ness among White peers in relation to diversity and equity, saying in "regular interactions, I don't want people to be tiptoeing around me. I don't want them to be sensitive." The excessive sensitivity with which she is treated makes her feel that "you're really just seeing me for the colour of my skin and you're not seeing me as just an academic which is what I want mainly [to] be seen as." On the other hand, Tamara encountered peers who treat her with excessive informality, explaining that people "start to use slang with me…like AAVE" (African American Vernacular English). Continuing, she said

> I don't use that [referring to AAVE] in professional spaces and it's kind of weird to have people assume…that's the best way to interact with me as though I'm somehow different from my other colleagues, that I require a different way to be spoken to.

Microaggressions also often took the form of reinforcing the "forever foreignness" of racialized students. Both Sadia and Riley recounted being asked where they are from, implying that they could not be "real" Canadians. Souma, a South Asian master's student, and Anika both encountered constant struggles with the pronunciation of their names. As Anika explained, "No matter how often I correct them, they do say it wrong…it's pretty simple if you sound it out…they see something different and they just slaughter it…even being addressed in emails, it's constantly misspelled." Anika, moreover, noted that one professor constantly confused South Asian students in a class: "There were only two South Asian students in my class and our class was only 12 [students]. But the professor mixed us up all the time. Yeah, but he was able to get all the other students' names."

Subtle Discriminatory Treatment

Students in this study recounted experiencing subtle discriminatory treatment. As Riley explained, racism can be "in your face, but at the same time, it can be very subtle, which is what I experienced." Similarly, Sonya noted that the differential treatment she received was not "blatant discrimination." These forms of discrimination are subtle micro-level phenomena that shed light on macro-level inequalities.

One manifestation of discriminatory treatment is unfair distribution of attention and opportunities. As Taylor explained, professors spend different amounts of time with different students. For example, in one class, each student was supposed to receive 20 minutes of attention from the professor, but "sometimes, some students would get a longer '20 minutes' than me. So, that didn't feel too good." Similarly, Habiba, a South Asian master's student, explained that "a lot more attention is given to White males" in her program. The attention to White men students can be both social and in terms of opportunities. Riley observed that one student who is a White man in her lab had an extremely friendly relationship with their professor, including being invited for dinner by the professor, developing a "very close relationship" and being given "a lot of opportunities." In contrast, Riley noted, the two Black students in the lab were marginalized, including not being invited to lab meetings. Taylor also noticed the unequal distribution of opportunities, such as publishing. While he has been given some opportunities, specifically participation in a teaching-related activity, he noticed that he was often not informed about opportunities such as publishing or presenting, and was not encouraged to submit while others were, making him feel that he was not treated as a contender. He noted "there's not a lot of transparency in how these decisions and opportunities are allocated." Janet, a Southeast Asian master's student, similarly commented "I've seen positions given to other people who are White, as opposed to non-White. I've seen it all and I've seen peers talk to me about this, trying to figure it out."

Participants also reported discrimination by administrative and other bodies on campus. Anika noted that she and another racialized student in her program "have had a harder time dealing with certain administrative staff," including for issues like "funding applications, extensions, things like that." Souma found, in relation to seeking funding and internships, that administrative staff were unresponsive, "robotic,"

and uncompassionate. Clara, in dealing with another administrative office on campus, was disregarded: "I walk into the [administrative office] and they're like, 'sit right there; wait there.' And I'm waiting there for hours and, you know, literally, as I'm sitting [there], I'm the only Black person there."

Inequitable Funding

Participants referred to differential treatment in relation to funding. For example, Janet observed the unequal distribution of funding, both "to continue another year in the [program] or for travel." The funding was given to "certain groups, not other groups" and some students were "just getting more than other people." Riley similarly explained that another Black student who shares the same supervisor had her funding cut off while other students in similar situations had their funding continue. Taylor noted that a disproportionate number of racialized students in his program left their studies due to financial strain. In particular, he explained, racialized students often lack knowledge on how to apply for funding. Indeed, other participants pointed out that they did not receive communications about awards and did not receive support in applying for awards unless they proactively sought out help. In contrast, in Anika's observation, White students received help and helped each other.

Moreover, participants explained that they were not offered sufficient funding and so would rely on non-academic employment, draw on long-term savings, or apply for student loans. Indeed, Clara contended that Black students are encouraged to take out student loans rather than seek scholarships, which is advice impressed upon them starting in high school. While many White students also face financial hardship, participants pointed out that there is not a level playing field. As Habiba put it, "a lot of racialized students coming from different backgrounds are actually also coming from socio-economic strain." Programs that require students to purchase expensive supplies or equipment introduce another layer of financial inequality. Taylor and Habiba have been forced to be resourceful in locating what they need in contrast to their peers "from money," as Habiba explained, who "could afford it; it was nothing to them."

Resistance to Dealing with Race

Students in this study reported that they experienced little or no support in relation to racial issues. Both Aaliyah and Rose expressed that there is nobody to talk to about racism in their departments, and no "safe space" in which to do so. Aaliyah and Taylor expressed that issues relating to race are pushed aside in the classroom and research environment. Further, Jiera experienced open hostility from other students when she tried raising issues relating to race, despite the fact that participants also point out that they are often singled out to educate others about race.

Moreover, students expressed frustration with the resistance to equity, diversity, and inclusion (EDI) measures within STEM, especially from faculty and peers in their departments. Tamara explained:

> People are so certain that science needs to be a meritocracy and that everything has to be measured and objective. People think that, for example, having diversity hires or having diversity places in university or college is, kind of, waging a war against that meritocracy.

As Jiera similarly explained, racism is seen as a "social sciences issue," not a science issue. Thus, EDI is constructed as an attack on the supposed colour-blind neutrality of STEM. Yet, following the murder of George Floyd in 2020, universities began to pay more attention to EDI. This led to pushback to defend color-blindness, as Tamara described: "There was a lot of pushback [against EDI]," and dominant groups "felt that they were being pushed out…I say, 'but, you are the face of science. You're not being pushed out!'"

In addition to invoking meritocracy, participants report general resistance. Taylor describes "internal resistance" to addressing racism among faculty. When an EDI group Aaliyah was part of presented recommendations to fac-

ulty in her program, the group received only minimal feedback, leaving the impression that faculty were not engaging with EDI. She explains that the burden should not "be on the students to enact change. We're advising the faculty in what they can do, but it feels like they're just not taking action." Ultimately, Aaliyah's department agreed to establish a policy relating to race, but she reported that "there has been no action taken on this." Jiera, who participated in the same EDI group, expressed similar disappointment that there has "been a lot of resistance and an unwillingness to change or really even listen."

Performative EDI

When there is no overt resistance, EDI may be pursued, but in a fashion that ends up supporting the new racism by amounting to performative gestures that obfuscate the continuation of racism. Participants expressed frustration with performative EDI, which only gives the appearance of doing something, thus further invisibilizing persistent mechanisms of racism. As Aaliyah explained, after the murder of George Floyd, "academic institutions put out statements, but it's still really performative because they haven't done anything since." Clara similarly lamented that discourses of remorse or reconciliation are followed by "[going] right back to normal." One example of this, according to Clara, is the gestural approach to Black History Month in her program, which involved sending out one email. For Clara, since science has an oppressive and exploitative relationship with Black people, "it's ridiculous to send an email and, frankly, insulting." She continued, saying "it's such a lazy approach, what they're doing." Riley also noted that her program's efforts at racial justice amounted to emails. Rose described EDI as "checkmarks"—a sentiment echoed by Anika, who found that the proliferation of workshops and trainings have amounted to efforts to "check mark" boxes but do not contribute to accountability for injustice. "I don't want to say [it's] for 'show,'" Anika remarked, "but it seems like 'okay, yeah, this is the new thing we have to say.'" Administrators like to say, "'we care and we're doing this,' but I don't see any change." Ayeleen similarly expresses that "everybody kind of got a kick up their ass when all the [Black Lives Matter] things happened…I'm gonna be honest, it all feels a bit performative at times because posting a little thing on Instagram doesn't really do anything." In particular, Ayeleen urged that the university "needs to be a little bit less performative and actually do [things] more genuinely," such as providing targeted scholarships, reducing tuition fees for marginalized students, and providing financial support for student associations. Janet similarly condemned EDI efforts as "lip service" in the absence of real recognition of racism and meaningful action. Tamara expressed skepticism that, in the absence of making changes, EDI committees are apparent ends in themselves. As she sardonically expressed: "Well, we have an EDI committee so we're taking care of it!"

In addition to engaging in performative gestures that mask the mechanisms of racism per the new racism, EDI can also reproduce racial inequality by disproportionately demanding labour from racialized faculty and students. As Taylor pointed out, "the profs behind helping with a lot of EDI initiatives…they're pretty burnt out." Aaliyah explained that an EDI group created in her department is comprised of only racialized students. Jiera, in reference to the same group, which the department has refused to fund, pointed out that "they want the onus to come on us, the unpaid student." Clara also noted that any work she has seen done in relation to racism on campus has been by racialized students. Riley lamented that her White supervisor declared they would take a "hands-off approach" to EDI work in the program, "whereas we, as racialized students, can do the work."

DISCUSSION

The inequities faced by racialized STEM graduate students in this study are legible through Bonilla-Silva's (2018) theorizations of the new racism and colour-blindness. The new racism and colour-blindness work in mutually reinforcing ways with STEM ideology. In the new racism and colour-blindness race and racism are presumed to be irrelevant and to have no impact on

experience. According to STEM ideology, hard work and talent enable anyone to succeed since STEM is unaffected by outside social, political, cultural, or economic forces. This view resonates with a minority of participants in this study who reported experiencing no racism. While space does not permit exploration of these participants here, they invoked elements of STEM ideology to explain what they perceive to be an absence of racism.

The perspective of Advait, a South Asian master's student, illustrates this well. Advait argued that merit shields against discrimination. When he was a teaching assistant, students may have made race-based assumptions about his abilities. But, he contends, "once they see how I go through a tutorial, they see pretty quickly that it honestly doesn't matter who I was." Advait continued, saying "The second that you show that you don't really know what you're doing, that's when you'll have some of those preconceived notions coming more to the forefront." Following the logic of the new racism and STEM ideology, if inequalities exist, they arise from sources other than racism (Russo-Tait, 2022). Advait thus communicated his opinion that competence dispels racism and that an apparent lack of competence triggers racism. Inadvertently, this formulation works to blame the victim of racism and does not consider that the perception of competence may itself be racialized.

While STEM ideology appears to have insulated Advait from experiencing or perceiving racism, other participants' experiences show the persistence of racism in shaping STEM HE and the prevalence of the new racism. Students repeatedly faced the new racist assumption that racism is not a problem. Consider their experiences of subtle discriminatory treatment, such as Taylor's experience of receiving less time for feedback from his professor than White peers. In keeping with the new racism, the forms of discrimination described by participants are not overt and are difficult to name. The financial inequity experienced by racialized students, likewise, reflects colour-blindness. For example, racialized students lacked the know-how relating to funding applications, but no efforts were made to support them, thus ignoring the fact that access to knowledge about funding may be racially unequal.

Further, Bonilla-Silva's (2018) four frames of colour-blindness (abstract liberalism, naturalization, cultural racism, and minimization) are woven throughout students' experiences. *Abstract liberalism* invokes principles like equal opportunity and fairness to oppose ameliorating racialized inequality. Anika's experience of a White peer lamenting what they perceived as reverse racism privileging racialized students and Tamara's observation that EDI is perceived as "pushing out" dominant groups in STEM both exemplify abstract liberalism. Equity-seeking measures are recast as disrupting a supposedly fair system. Abstract liberalism echoes the presumption of neutrality, objectivity, and meritocracy in STEM ideology (Doerr et al., 2021; Russo-Tait, 2022), which casts EDI as favouring some groups and undermining a merit-based system.

Naturalization underpins the assumption faced by South Asian students in this study that they would inevitably choose STEM, echoing findings in the literature that Asians are naturally gifted in STEM (McGee et al., 2017). Jiera's interest in social justice issues deviates from the dehumanizing construction of Asians in STEM as human calculators, and reiterates the pigeonholing of Asian students in STEM, as articulated in the literature (Shah, 2019). Meanwhile, the "surprise," questioning, underestimation, and presumption of tokenism that Black students like Clara, Martin, Riley, Rose, and Tamara are met with in STEM are underpinned by the racist assumption that Black people have no natural aptitude for STEM. Sonya's experiences of being made to feel like an imposter reflect McGee et al.'s (2022) insight that imposterism involves treating racialized students as imposters. These students' experiences echo findings in the literature that Black students are negatively perceived as less able, less intelligent, and less scientific (Brockman, 2021; Rosa & Mensah, 2016; Spencer, 2021).

The new racism, however, invokes not only nature, but also culture. *Cultural racism* identifies purportedly pathological cultures as the

source of persistent inequalities. Cultural racism animates interactions of participants within STEM. For example, Martin felt his durag was perceived as being part of gang culture due to representations in media that criminalize Black communities and Black masculinity. This echoes literature showing that Black men are perceived as dangerous in STEM (Spencer, 2021). Finally, *minimization* framed students' experiences when racism was not taken seriously. Bonilla-Silva (2018) points out racialized people's experiences get minimized by dismissing them as being overly sensitive or "playing the race card" (p. 57). Aaliyah recounted that White peers tiptoed around her when discussing issues of diversity. Excessive cautiousness manifests the minimization frame as it positions racialized people as hypersensitive or making a big deal about race, rather than taking the persistence of racialized inequality seriously. The resistance to dealing with race and EDI, as discussed above, works to minimize and dismiss racism. Performative EDI also minimizes racism by reducing racism to something that can be addressed through gestures and symbols, like posting positive messages on social media.

CONCLUSION

This article contributes to knowledge by providing unique insight into the racialized experience of STEM HE in Canada, which is an under-researched context. The findings of this study largely echo research conducted outside of Canada, especially in the United States. Yet more research in Canada is needed since solutions for racialized students in Canada would be best served by empirical data gathered in a Canadian context. Further research on Canada could also uncover ways in which Canada may constitute a unique context for racialized graduate students and STEM HE.

The limitations of this study point to specific future directions for research. No Indigenous students came forward to participate in this study, which underscores the need for research with Indigenous STEM students. Research with Indigenous STEM students would ameliorate the pervasive lack of attention to Indigenous students and their experiences in STEM HE in the broader literature. While a key strength of this study is the inclusion of various racialized students to identify shared experiences, research focused on specific groups is needed in Canada to explore the particularities of different racialized groups. For example, this analysis makes it clear that Black students and Asian students face different forms of stereotypes. Questions relating to gender, class, or other identities were not specifically included in this study, but there were hints—albeit few—in the data that suggest the need for an intersectional approach. For instance, two of our participants mentioned being mothers, some participants made passing reference to being the first in their families to attend university, and others discussed economic inequality. Thus, future research in Canada should address intersecting dimensions of STEM students' experiences. As this study focused on only one institution, future research should include more, and a wider variety of, institutions. Future research should also examine factors that protect against racism, contribute to positive experiences in STEM education for racialized graduate students, and enable racialized graduate students to help transform STEM HE.

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