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(Mis)Alignment of Challenges and Strategies in Promoting Inclusive Racial Climates in STEM Graduate Departments

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This descriptive qualitative study used racialized organizations (Ray, 2019) as a lens to examine how 27 faculty, administrators, and postdoctoral fellows in STEM departments at two institutions understood the problems that underlie negative racial climate, the strategies they used to improve racial climate, and the alignment between problems and solutions. Participants did not discuss racism and White supremacy as factors that contribute to negative racial climate. Instead, they indicated a weak STEM pipeline, and lack of faculty engagement created negative climate. Because participants did not attend to how racism and White supremacy fostered negative climate, their strategies (e.g., increased recruitment, committees, workshops) left systemic racism intact and (un)intentionally amplified labor for racially minoritized graduate students and faculty champions who often led change efforts with little support. These findings can help move departments away from intervention-centered models of change and toward more systemic approaches that contest how racialized organizations operate.

Keywords: *descriptive analysis, diversity, focus group interviews, graduate education, higher education, organization theory/change, qualitative research, racial climate, STEM education*

Scholars have argued that a strong connection exists between graduate education in science, technology, engineering, and mathematics (STEM) and the economic and social prosperity of the United States (McGee, 2020; Okahana & Zhou, 2018). Accordingly, there has been increased attention to improving STEM graduate education and encouraging students to pursue advanced degrees (National Academies of Sciences, Engineering, and Medicine [NASEM], 2018). By some metrics, these efforts have been successful. The annual number of science and engineering doctoral degrees has risen, yet racially minoritized students earn fewer of these degrees. In 2018, White graduate students earned significantly more science and engineering doctoral degrees (24,951) in comparison with their Asian (3,305), Latinx (2,582), Black (2,456), and Native American (115) peers (National Science Foundation [NSF], 2020). Despite increased enrollments, racially minoritized graduate students in STEM often face marginalization, isolation, and hostile departmental environments that affect their retention and success (Burt et al., 2018; Gildersleeve et al., 2011; Slay et al., 2019). When racially minoritized students are not supported, their abilities to achieve their goals are impeded and the benefits of a racially diverse STEM workforce is not fully realized.

There have been substantive efforts to advance diversity, equity, and inclusion (DEI) in STEM through creating holistic admission processes, improving mentoring and advising practices, and providing opportunities to learn about implicit bias (Griffin et al., 2016; Hill et al., 2011; Posselt, 2020). However, many of these recommendations have not been fully implemented or face active faculty resistance given the dominant view that DEI and social identities are not relevant to STEM given the emphasis on objectivity (Le & Matias, 2019; McGee, 2020; Posselt, 2020). Perhaps then, it is not surprising that many institutions struggle to improve racial climate in STEM graduate education (Griffin, 2019; Slay et al., 2019).

Despite numerous efforts to improve racial climate within STEM departments, there is limited research on how those in positions of authority describe the underlying

issues (e.g., racism, White supremacy, faculty reward structures) that may contribute to a negative racial climate in STEM and how these conceptions of the problem inform approaches to departmental change (McCoy et al., 2015; McGee, 2020; Posselt, 2016, 2020). Accordingly, this research study explored the following questions:

1. How do faculty, administrators, and postdoctoral fellows understand the problems that contribute to negative climates for racially minoritized graduate students in STEM?
2. What strategies do faculty, administrators, and postdoctoral fellows use to address the underlying problems they believe contribute to negative climates for racially minoritized graduate students in STEM?
3. To what extent are the strategies used by faculty, administrators, and postdoctoral fellows to promote an inclusive departmental climate for racially minoritized graduate students in STEM aligned with the problems they have identified?

By examining how those in positions of influence conceptualize and act upon negative racial climates in STEM departments, we may better understand how and why DEI initiatives in STEM graduate education vary in their success. Specifically, our work is designed to examine the extent to which faculty, administrators, and postdoctoral fellows attend to structural racism in conceptualizing climate and approaches to improving it. Our findings can be used to guide more systems-oriented and power-conscious approaches to improving racial climate in STEM, which may better support racially minoritized graduate students' success.

Review of the Literature

To situate our study, we first examine the literature related to racial climate in STEM graduate education. Then, we review the literature on advancing DEI in STEM departments, highlighting approaches to change and barriers to improving racial climate.

Racial Climate in STEM Graduate Education

Although enrollment of racially minoritized students in STEM graduate programs has increased over time, they continue to graduate at lower rates than their White peers (Okahana & Zhou, 2018; NSF, 2020). These disparities are not surprising given findings across qualitative studies that illustrate racially minoritized graduate students attempts to survive hostile departmental and institutional climates at predominantly White institutions (PWIs) with less access to the resources and support they need to succeed (Burt et al., 2018; Gildersleeve et al., 2011; Perez et al., 2019; Ramirez, 2017; Truong & Museus, 2012). Scholars have consistently argued that faculty mentors are pivotal in supporting graduate students' success. However, many racially minoritized graduate students at PWIs did not have access to supportive faculty mentors (Burt et al., 2018; Gildersleeve et al., 2011; Noy & Ray, 2012; Ramirez, 2017; Truong & Museus, 2012). In turn, students have questioned how faculty members' assumptions about race informed the mentorship they received. For instance, Black male engineering graduate students in Burt et al.'s (2018) study consistently wondered if anti-Blackness contributed to receiving "explicitly discouraging messages from their advisor that ranged from passive-aggressive to explicit challenges regarding their ability to do doctoral-level work" (p. 991) or being ignored.

Although some racially minoritized graduate students in other studies reported feeling academically supported by advisors, particularly if they were faculty of Color, they also described feeling tokenized and distanced from White faculty who did not understand their experiences with racism (Amelink & Edwards, 2020; Ramirez, 2017; Truong & Museus, 2012). For racially minoritized graduate students who were recruited to STEM departments that touted their commitments to DEI, their subsequent interactions with faculty often led them to feel as though they were caught in a "bait and switch" (Slay et al., 2019, p. 268). In effect, many racially minoritized graduate students received "unequal socialization" (Ramirez, 2017, p. 25) given the varied quality of their interactions with faculty and limited access to opportunities and resources to support their success.

Across the literature, racially minoritized graduate students at PWIs also had their academic abilities questioned by classmates, were excluded from peer groups, and engaged in labor to address racial microaggressions perpetrated by peers (Burt et al, 2018; Gildersleeve et al., 2011; Perez et al., 2019; Truong & Museus, 2012). In STEM fields where work is often collaborative, exclusion or strained peer relationships had material consequences on students' abilities to make progress in courses and research (Burt et al., 2018; Griffin et al., 2018). Thus, racially minoritized graduate students in STEM experienced compounding disadvantages when racism manifested as inadequately being supported by faculty and peers while concurrently being viewed as less capable.

For some racially minoritized graduate students, their pervasive sense of otherness was normalized, which compounded its deleterious effects (Gildersleeve et al., 2011; Truong & Museus, 2012). Chilly if not hostile climates often had negative effects on racially minoritized students' well-being. Truong and Museus (2012) found that participants suffered physical manifestations of racial stress (e.g., headaches, upset stomachs) in addition to the negative effects on their mental health. Racially minoritized graduate students also reported experiencing "vicarious trauma"

(Slay et al., 2019, p. 272) and asked themselves, "Am I going crazy?" (Gildersleeve et al., 2011, p. 100) as they analyzed and maneuvered their way through racially hostile environments. The unnamed and unquestioned presence of racism in many STEM graduate programs left many students doubting themselves and questioning their perceptions of their environments.

Advancing DEI in STEM Departments

Acknowledging the need to better support racially minoritized graduate students in STEM, faculty and academic leaders have used multiple strategies to improve racial climate. Nonetheless, creating departmental, institutional, and disciplinary/field-level change in STEM remains difficult (Dancy & Henderson, 2008; Jones, 2016; McGee, 2020; Posselt, 2020). Dancy and Henderson (2008) suggested that change is slow in STEM because there is a strong dependence on developing a dissemination and change model that requires "some degree of fidelity" (p. 2) by those who were not involved in developing the model. This can foster opposition rather than collaboration where change agents blame faculty or vice versa for the lack of progress. Although Dancy and Henderson (2008) identified the challenges of using an explicit theory of change, Kezar et al. (2015) illuminated how implicit theories about change create barriers to achieving it. Specifically, change was stifled when individuals believed that the process (a) started with interventions rather than understanding the problem, (b) was a rational rather than political process, and (c) was either bottom-up or top-down (Kezar et al., 2015).

The literature on improving racial climate in STEM graduate education has demonstrated a dependence on interventions without consistently examining the underlying issues that create negative racial climate (e.g., racism, White supremacy; McGee, 2020). For example, STEM departments may work to improve racial climate by placing a strong emphasis on increasing compositional diversity of applicants and admitted students (Jones, 2016; Posselt, 2016, 2020; Slay et al., 2019). Often, the underlying assumption is that increasing the number of racially minoritized graduate students and perhaps faculty will decrease isolation and alleviate the stress of being the only or one of few People of Color. Another common strategy used within departments is to host workshops (Hill et al., 2011) or to create communities of practice (Gehrke & Kezar, 2017) that are designed to enhance faculty members' awareness of DEI in STEM and to increase their cultural competence. The assumption that regularly undergirds this approach is that interventions focused on DEI knowledge acquisition and skill building will improve faculty members' abilities to support racially minoritized students and create structural changes. In addition to these strategies, departments may create initiatives (e.g., mentoring programs, student organizations) to connect racially minoritized students with faculty and student peers outside of the department and/or institution who share their racialized experiences (Griffin et al., 2018; Posselt, 2020). When this approach is used, departments acknowledge the potential benefits to racially minoritized graduate students when they are mentored and supported by people who share their social identities. However, this strategy can shift responsibility for supporting racially minoritized graduate students outside of the department and may not address climate problems within it.

Although changing racial climate in STEM is difficult, it is possible and requires making implicit theories of change explicit (Kezar et al., 2015), referring to but not limiting oneself to dissemination models (Dancy & Henderson, 2008), and perhaps most importantly, "intentionality, time, coordination, and honest self-analysis" (Posselt, 2020, p. 14). Rather than overly relying on interventions as solutions, Jones (2016) suggested that faculty and academic leaders in STEM needed to understand their political landscape, cultivate relationships within and beyond the institution, and conduct assessments to understand the effectiveness of DEI initiatives. Furthermore, Posselt (2020) asserted the need for honest assessment of departmental culture, policies, and practices; "activity on multiple scales and through a combination of top-down, bottom-up, and inside out forces" (p. 14); and commitment from departmental and institutional leaders.

While the aforementioned factors are important to improving racial climate, McGee (2020) argued that change cannot occur until people reckon with "the racialized structure of STEM . . . [which] maintains gross inequalities that are illustrative of structural racism, which both informs and is reinforced by discriminatory beliefs, policies, values, and distribution of resources" (p. 633). For example, mentoring programs for racially minoritized STEM graduate students are often designed to assimilate rather than empower them (McGee, 2020). These programs regularly provide students with individual strategies for navigating STEM environments and stories about cultivating traits that help one persist (e.g., grit, strong work ethic). This approach to mentoring supports racially minoritized students' abilities to survive STEM environments, but it may not contend with how departments and institutions inadequately support racially minoritized students. Furthermore, it may not attend to how notions of objectivity and identity evasiveness in STEM are tools to uphold Whiteness as a dominant way of knowing and being. By failing to acknowledge the centrality of Whiteness in STEM and how it is used to marginalize and exclude racially minoritized individuals, interventions and models designed to improve racial climate often make limited change because they leave racist structures intact (Le & Matias, 2019; McGee, 2020). To change racial climate and better serve racially minoritized graduate students, departments and institutions must

reckon with and commit to dismantling structural racism in STEM.

Conceptual Framework

We used Ray's (2019) theory of racialized organizations to explore how faculty, administrators, and postdoctoral fellows characterized the problems that undergird negative climate for racially minoritized graduate students in STEM and the strategies they used to address the problems they identified. Rather than conceptualizing organizations as race and power-neutral, Ray (2019) described "organizations as racial structures—that is, cultural schemas connected to social resources" (p. 30). Racialized organizations are rooted in Whiteness and are designed to maintain racial inequalities through unequal distribution of resources, labor, and opportunities to the detriment of racially minoritized people (Ray, 2019; Ray et al., 2022).

Ray (2019) highlighted four mechanisms that inform organizational hierarchy and processes that help maintain the centrality of Whiteness. First, racialized organizations operate in ways that support the agency of White people and constrain racially minoritized people. Second, the unequal distribution of resources, opportunities, and labor within racialized organizations is legitimate and normalized. Third, Whiteness operates as a credential that imbues power and legitimacy. Finally, stated commitments to DEI are decoupled from policies and practices that maintain White supremacy. This decoupling perpetuates the appearance of neutrality even though "'Objective' rules and practices may be enforced in ways that disadvantage non-Whites, or rules aimed a diversifying or ending discrimination may be ignored" (Ray, 2019, p. 42).

Ray's (2019) theory of racialized organizations allowed us to consider how racism and Whiteness operated as barriers to improving racial climate, shaping both problems and solutions in ways that may constrain transformational change in STEM. By acknowledging that racism informs policy, practice, and racially minoritized individuals' agency within organizations to maintain racial stratification, this theory provided a power-conscious lens through which we examined organizational change. Attending to structural racism and White supremacy (Le & Matias, 2019; McGee, 2020) as we explored the potential (mis)alignment of the strategies selected by leaders to address the problems they identified is a departure from power-evasive dissemination models (Dancy & Henderson, 2008; Hill et al., 2011), and it may better illuminate how to improve racial climate in STEM.

Methodology

This research was part of a National Science Foundation project that supported a network improvement community (NIC) of nine institutions seeking to advance inclusion in STEM. NICs are learning communities that use rapid cycles to test, assess, and refine strategies to address a shared challenge or problem (Bryk et al., 2011; LeMahieu, 2015). Ideally, NICs accelerate change as members test interventions in various settings and share insights with the group, which increases collective capacity for identifying solutions (Bryk et al., 2011; LeMahieu, 2015).

In our NIC, members worked to improve racial climate and support racially minoritized graduate students in STEM with the aim of maintaining or increasing these students' interest in faculty careers. NIC institutions implemented interventions (e.g., workshops, mini grants) designed to enhance faculty members; graduate students; and postdoctoral fellows' knowledge, skills, and abilities to advance DEI. Because NIC institutions were actively trying to change racial climate within STEM departments, they were well suited to exploring how faculty, administrators, and postdoctoral fellows described the problems that undergird negative racial climate, how these parties conceptualized solutions to the problems they identified, and assessments of the alignment between problems and solutions.

We engaged in longitudinal qualitative research at two NIC institutions to understand the challenges and strategies used to change racial climate within STEM departments. A qualitative approach allowed us to investigate *why* and *how* participants promoted inclusive departmental climates and enabled us to make sense of conflicting attitudes, behaviors, and strategies employed to do so (Denzin & Lincoln, 2000). We designed this constructivist basic qualitative study using purposeful and maximum variation sampling (Merriam & Tisdell, 2016; Patton, 2002) to select institutions that varied in type, geographic location, and interventions used to improve racial climate.

Our approach allowed us to explore how participants made meaning of a particular phenomenon, in this case the underlying causes of negative racial climates for graduate students in STEM (Merriam & Tisdell, 2016; Sandelowski, 2000). Notably, basic qualitive research is distinct from grounded theory in that it is not designed to generate new theory, though this approach can contribute rich understanding of less-understood phenomena and guide subsequent practice (Sandelowski, 2000, 2010). In this case, our work can illuminate how the racialized nature of organizations informs work to change racial climate in STEM graduate departments.

Data Collection Sites

Our study was conducted at two predominantly White universities, Mid-Atlantic University and Northeast University (pseudonyms), in the NIC. We selected these institutions based on their differing choices of interventions for racially minoritized graduate students and unique

institutional contexts. This approach reflected our desire to find information-rich cases that would help us better understand perspectives on the underlying causes of negative racial climates in STEM graduate departments (Merriam & Tisdell, 2016; Sandelowski, 2000).

Mid-Atlantic University is a large, urban institution that is racially and ethnically diverse. The institution has numerous highly ranked graduate STEM programs and used interventions focused on community-building and improving mentoring/advising experiences for graduate students and postdoctoral fellows. NIC liaisons at Mid-Atlantic University focused their interventions on students and postdoctoral fellows since they previously had limited faculty engagement in DEI initiatives.

In contrast, Northeast University is a small, rural, elite private institution that is internationally recognized for STEM excellence. Northeast created interventions designed to increase faculty, postdoctoral fellows, and graduate students' racial bias literacy. They also provided cohort-based career development and community-building opportunities for racially minoritized graduate students and postdoctoral fellows. At Northeast University, NIC liaisons had strong relationships with graduate students, postdoctoral fellows, and faculty leaders who expressed commitment to DEI. These relationships were leveraged to increase participation in NIC interventions.

Data Sources

Our data sources were focus groups conducted with STEM faculty and postdoctoral fellows and university administrators who worked with STEM departments at each site. Focus groups elicited multiple perspectives and allowed participants to engage in shared meaning-making (Glesne, 2011; Ritchie & Lewis, 2009). Participants reflected on their experiences and formulated meaning as they conversed with other participants (Ritchie & Lewis, 2009). Our protocol explored topics such as perceptions of climate for racially minoritized graduate students, current efforts to improve racial climate in departments and the institution, challenges to improving racial climate, and perceptions of what needs to be done to improve racial climate. Sample questions included the following: In what ways does your department contribute to a negative racial climate? What is being done in your department to improve racial climate? In what ways do you think that your department could improve the experiences of underrepresented graduate students? Our protocol allowed us to explore the extent to which participants attended to racism and White supremacy as a part of organizational life (Ray, 2019) as they tried to improve racial climate.

Across sites, we conducted six focus groups with 27 participants (see Table 1). At Mid-Atlantic University, we conducted two groups with 12 participants while at Northeast University we conducted four groups with 15 participants. Each focus group was approximately 90 minutes long and was professionally transcribed. Participants included 19 women and 8 men representing various roles as administrators (7), faculty (6), a self-described combination of administrator and faculty member (10), and postdoctoral fellows (4). They represented a range of STEM fields and institutional roles, including agricultural sciences (3), biological sciences (7), computer sciences (3), engineering and physical sciences (3), social sciences (3), and central administrative support (5). Many participants were newcomers with less than five years at their respective institutions (16 of 27). To reduce the possibility of deductive disclosure, we did not collect demographic data related to racialized identities; some participants did describe their race, and this information was documented.

Data Analysis & Trustworthiness

We coded focus group transcripts using a systematic, inductive approach (Bogdan & Biklen, 2003). Our initial list of codes was guided by literature and included concepts such as "trainings and programs" and "pipeline/recruitment" that were relevant to changing racial climate in STEM departments. Then, we independently coded one focus group using the initial scheme to determine if additional codes were needed. Subsequently, we discussed the initial and potential new codes, developing a revised scheme that was used to analyze the remaining transcripts. This revised scheme included change strategies such as "colloquia/seminars" and barriers such as "prestige," "funding," and "lack of intersectional thinking."

We then utilized a second level of coding to explore how participants understood the problems underlying negative climate and the strategies they used to improve climate. Specifically, we reread transcript excerpts related to "challenges for Students of Color," "change strategies," and "barriers to change" through the lens of racialized organizations (Ray, 2019). As we revisited excerpts, we documented participants' descriptions of problems and solutions and the extent to which their framings attended to race, racism, and White supremacy. Our inductive approach allowed us to more fully explore how efforts to improve climate in STEM may be shaped by racialized organizational processes.

Limitations and Trustworthiness

Despite the care we took to design and implement our study, this inquiry has several limitations. We did not explicitly ask participants about how racism and White supremacy informed the climate of their departments and approaches to improving climate. If we had asked more explicit questions, our insights about racialized organizations and participants' understandings of them may have differed. Also, our use of

TABLE 1
Focus Group Composition

Institution	Number of Groups & Participants	Gendered Identities	Institutional Role	Discipline & Field Composition	Years at Institution
Mid-Atlantic	2 Groups, 2 interviews; 12 participants	9 Women 3 Men	3 Administrator 3 Faculty 5 Administrator & faculty 1 Postdoctoral fellow	0 Agricultural sciences 1 Biological sciences 3 Computer sciences 2 Engineering 3 Physical sciences 3 Social sciences 0 Central administrative support	10 (0–5 years) 0 (6–10 years) 0 (11–15 years) 1 (16+ years) 1 (Not reported)
Northeast	4 Groups; 15 participants	10 Women 5 Men	4 Administrator 3 Faculty 5 Administrator & faculty 3 Postdoctoral fellows	3 Agricultural sciences 6 Biological sciences 0 Computer sciences 1 Engineering 0 Physical sciences 0 Social sciences 5 Central administrative support	6 (0–5 years) 2 (6–10 years) 2 (11–15 years) 2 (16+ years) 3 (Not reported)
TOTAL	6 Groups 2 interviews; 27 participants	19 Women 8 Men	7 Administrator 6 Faculty 10 Administrator & faculty 4 Postdoctoral fellows	3 Agricultural sciences 7 Biological sciences 3 Computer sciences 3 Engineering 3 Physical sciences 3 Social sciences 5 Central administrative support	16 (0–5 years) 2 (6–10 years) 2 (11–15 years) 3 (16+ years) 4 Not reported

*Note: Fields were defined using NSF classifications for STEM and were aggregated to reduce the potential for deductive disclosure.

focus groups allowed us to gather multiple perspectives across disciplines, fields, and position types. However, the breadth of our data in service of basic qualitative method limited our depth of understanding of change at the department and field level. Furthermore, we were unable to assess if participants' change strategies were effective in improving racial climate.

Cognizant of our study's limitations, we used multiple strategies to enhance the trustworthiness of our work (Jones et al., 2014). These included triangulation among multiple investigators, consensus building, and exploring our positionalities (Jones et al., 2014; Knafl & Breitmayer, 1989). To triangulate among multiple investigators, we engaged in debriefing conversations throughout our data collection and analysis processes to explore emerging insights, strengthen our inferences, and explore our findings. We built consensus by writing, sharing, and discussing memos to determine the most salient themes across our data.

As a team, we explored our positionalities, including our social identities and how we came to this work. We are social science researchers for this NSF-funded project and have a vested interest in the success of the institutions involved given the relationships we have cultivated with NIC members. Collectively, we are racially minoritized and equity-minded scholars with commitments to advancing DEI. We have been engaged in departmental efforts to broaden participation and to enhance inclusivity for racially minoritized graduate students, both within and outside of STEM. Although we are not professionally situated within STEM departments, we have a strong desire to understand and improve departmental climates for racially minoritized graduate students in STEM.

Findings

Our findings highlight that participants' understandings of negative racial climate did not consistently inform their subsequent approaches to change. Although participants often spoke about the effects of negative racial climates, they seemed less attuned to the root causes (e.g., racism, White supremacy) that foster negative climate in racialized organizations (Ray, 2019). This lack of attention to structural racism was also apparent in the approaches to change described by many participants, which created additional challenges to improving racial climate. Given that many participants were one of few or the only individual who holds their role or identities in their area of expertise, we provide selective demographic information to reduce the potential for deductive disclosure.

Conceptions of Problems Undergirding Negative Racial Climate

Participants identified the lack of racially minoritized graduate students and faculty as a primary driver of negative

racial climate. From this perspective, racial climate was a pipeline problem as one White faculty member noted:

> I think that Northeast University should do everything it's doing. All these programs are great, but do we need to just wait 10 years for all of them to work? We have the same problem with our faculty pools. When I'm on search committees, there's like 100 applicants, and 2 of them come from underrepresented groups.

This faculty member described the urgency of increasing the compositional diversity of applicant pools and of their department if climate were to improve. Although they understood the benefit of other programs (e.g., trainings, workshops), they did not think those initiatives would have the same impact as the presence of racially minoritized graduate students and faculty. However, they did not seem to question why the pipeline was leaky such that few racially minoritized scholars were in recruitment pools (see Table 2 for additional examples). In effect, this manifestation of Whiteness as an organizational credential (Ray, 2019) was unquestioned.

When departments successfully recruited racially minoritized graduate students and faculty, participants noted they often received inadequate support from the department and institution upon arrival. For example, an administrator at Mid-Atlantic University said:

> I think what happens is with grad students, it's like whispering at work. So maybe they'll find people to talk to, or friends will tell other friends, but I think that with the graduate community, at least in some STEM departments. We don't do enough for graduate students. I think the assumption is, they're learning, passing their classes, writing papers, going to conferences. They are doing fine. And then, when you start to talk to them individually, you understand people are not fine, but it just depends on what becomes a priority to the department. And it's money, it's grants, how many people are getting awards this year? It's not always community.

This participant noted that increasing compositional diversity was often coupled with inadequate support for racially minoritized students once they arrived on campus. As such, racial climate was also viewed by some as a retention problem. This was evidenced by a White faculty member who pointed out that at Northeast University, "the retention [for racially minoritized students] is lower than the overall rate for all of our students." Again, when framed as a pipeline issue, participants tended to point toward manifestations of a negative climate (i.e., struggles to recruit and retain racially minoritized students) but did not explicitly speak to structural racism as creating cracks and leaks in the pipeline. Within racialized organizations, the unequal distribution of resources to support students of Color is expected and is designed to maintain the dominance of Whiteness (Ray, 2019). As noted previously, racially minoritized students may move through racialized organizations and appear "fine" but may not be well given the costs of navigating Whiteness.

Participants also identified lack of faculty engagement as a factor in creating a negative racial climate in many departments. A White faculty member directly said that DEI was not a priority for many (White) faculty and that had direct implications for racially minoritized colleagues at Mid-Atlantic University:

> I think a lot of the diversity work does get pushed onto underrepresented minorities and I think it's a real problem. . . . We live and die by being the best. If we're not seen as excellent, we don't get funding. We don't get the best faculty. We don't get the best graduate students. So, faculty are obsessed by perceptions of excellence and even though they might believe that diversity is good, if they don't. . . . They see it as making the department become more excellent then, it's an ongoing problem.

From this participant's perspective, the focus on prestige and being "the best" was often framed by faculty as separate from being inclusive. In effect, faculty work in STEM did not require nor did it reward DEI work. As such, many faculty members focused their energies on research and maintaining conceptions of excellence that centered Whiteness (see Table 2 for additional examples). Ultimately, the unequal distribution of DEI work and lack of reward for this labor reflects how racialized organizations are structured to constrain and control the labor of racially minoritized individuals to maintain the status quo (Ray, 2019; Ray et al., 2022).

Given the emphasis on research at both institutions, it was not surprising that many participants noted faculty engagement in DEI initiatives was lacking. An administrator at Northeast University observed, "We do have a tendency to see the same faculty at our events, at our programming. That's great. But they're not really the faculty who we need to be reaching." Essentially, a few select faculty were involved in efforts to change racial climate in their departments and were proactive about increasing their knowledge and skills to support racially minoritized students. Although participants identified faculty reward structures and the emphasis on prestige as shifting focus away from improving racial climate, they did not make explicit connections between these factors and systemic racism and White supremacy. Moreover, it was not apparent if participants saw the lack of faculty commitment and engagement with DEI work as connected to the pipeline problem they identified as contributing to negative racial climates. As such, participants at both institutions rarely named racism as a problem that undergirded negative climate. They identified manifestations of a negative climate and structural racism (i.e., pipeline problems, labor shifted toward racially minoritized people, lack of commitment to DEI) without naming racism or White supremacy. In this regard, the racialized nature of participants' organizations was often obscured in their framings of negative racial climates.

TABLE 2
Additional Quotations Illustrating Findings

Institution	Demographic Information*	Institutional Role	Underlying Issue	Illustrative Quote
Conceptions of Problems That Create Negative Racial Climate				
Mid-Atlantic		Faculty member	Pipeline	I was looking at this the other day; a group of us are trying to start a workshop to bring in like undergrads in their later years and to get them interested in our program to sort of diversify our pool as a starting point. That's obviously not the only solution. So the other day, I would say underrepresented minorities out of how many grad students do you think we have? Maybe twenty-five, well we don't have a huge number of undergrads, but active undergrads that are not like ABD and off somewhere, I don't know. I would say maybe ten. Maybe ten percent of underrepresented minorities. That's gone down in recent years, I don't know exactly why. I don't know if . . . I've only been here four years. So I don't know if that was like an uptick that the anomaly or now we're going down. But yeah, I'd say like three or four out of twenty-five. I guess it's a little more than 10 percent.
Northeast	White person	Faculty member	Pipeline	And I think some of the initiatives, too, are a little bit falling . . . I guess not, falling short in some ways. I think there's specific things they could be doing to make it clear. Even making it clear that we want our faculty, our applicant pools to look more diverse. I mean, Northeast, looking at the applicant pools for the graduate programs, they're really fantastic and really diverse. And I certainly see that impacting our graduate programs. There's a lot of diversity in the project programs. The undergrads here are also, the way the admissions process works, the undergrads are diverse as well. So we've got the right pools. It's just not getting up into the faculty level.
Mid-Atlantic		Faculty members	Faculty engagement	Speaker 1: Yeah, with the three assistant professors who are women, they are on every single committee. And then, we have one Latino professor, and he is on a lot of committees as well and I think that there's . . . And that doesn't add to your tenure. That doesn't add to your tenure profile. Speaker 2: It sort of takes away from it.
Northeast	White person	Administrator	Faculty engagement	I want to go back to one of the points you made earlier because I know that it's not the efforts aren't happening at the departmental levels, but they're often stymied. Either the tenured faculty aren't interested in picking it up or the tenured faculty are part of that group of, for example, women or people of color, so it gets to be an in-house conversation that happens over and over and over again. There's a fair degree of frustration about that. I mean I know you're hearing it too, where people have in good faith, really engaged the issues and offered strategies for changing, have brought issues of microaggressions or stereotypes. But actual change hasn't really gotten much traction.
Solutions to Improve Negative Racial Climate				
Mid-Atlantic		Faculty/admin	Pipeline	Probably for engineering, women are underrepresented also. And so it's starting to look like we have, we have women in aero and astro. And they are very focused on pipeline issues. It's a mix of grad and undergrad. It's actually mostly run by undergrads, but they also have grad who are participating. And they hold spring Open Houses, just like there's college Open Houses and then there's this one that the students put on specifically in Aero. And I think, at some level it's nice having the grad students and the undergrad feeling like they're giving back. They seem to really enjoy being members of an organization . . . But again, post docs, there are women who are post docs who are waiting for green cards.
Mid-Atlantic	White person	Administrator	Faculty engagement	I would say the environment is . . . I would agree that it's isolating. There are few, I don't know the numbers and, I myself was hired on, apparently, as a push to help with the diversity effort. I don't think my position existed before I took it up. At least, that's what I've heard. So, I don't know what happened within the department or why it came to be, but this is a completely new position, like, I'm the first one in it to look at the inclusion efforts and diversity efforts, along with outreach.
Northeast	White person	Administrator	Faculty engagement	*On eliminating GRE requirement in one department*: But what happened behind the scenes was that there was one faculty who was championing this. And the reason why, I think very well-intentioned just no matter what. But I think the real reason why he ended up being the champion for this and he's a young white man. He has two underrepresented minority students in his lab who are also ambassadors of mine who've been pretty vocal and are strong in their convictions. They really impressed about him and he was like, "Oh my gosh. If I hadn't taken a personal interest in them and really looked at them and met them before they applied and all of that, they probably wouldn't be here and they're amazing." So he became the chair of the admissions committee.

Note: Participants were not asked to report demographic information but often did so in the focus groups. We report the information that was self-disclosed by participants.

Strategies for Improving Racial Climate: (Mis)Alignment with Problems

When asked to share what their departments were doing to improve the climate given the problems they identified, participants frequently described administrative and programmatic strategies. Specifically, they reported recruiting and admitting more racially minoritized graduate students, creating DEI committees, and hosting workshops and trainings related to inclusive teaching and mentoring practices (see Table 2 for additional examples). Given the lack of awareness of how departments operated as racialized organizations, the strategies used by participants frequently created new tensions when working to improve racial climate.

Strategies for Fixing the STEM Pipeline. Because negative racial climate was primarily framed as a pipeline issue, participants at Northeast and Mid-Atlantic University recounted multiple departmental initiatives to recruit more racially minoritized graduate students. For example, a faculty member at Northeast University described a Diversity Preview Weekend across several STEM departments that was organized by graduate students, many of whom were racially minoritized:

> The graduate students in a few STEM departments created and got funding for what they refer to as a Diversity Preview Weekend. The event invites underrepresented students to Northeast for a weekend in the year before they apply to graduate school. And the weekend consists of a series of workshops in which they learn about the application process, how to write a CV, how to write a personal statement, what sorts of fellowships are available that they might apply to, how to pick out an advisor and meet faculty.

The Diversity Preview Weekend described here was designed to support racially minoritized undergraduate students who were interested in graduate degrees. Although this approach provided these students with valuable information and had the potential to increase the racial diversity of the applicant pool, the labor of coordinating and implementing the event was placed upon graduate students. In effect, as these departments at Northeast University attempted to address one problem they believed contributed to a negative climate (i.e., lack of compositional diversity), they potentially maintained another (i.e., lack of faculty engagement) and added to graduate students' labor. Because participants did not link the leaky pipeline in STEM education to structural racism (McGee, 2020), it may have been difficult for them to recognize the connections between the problems they identified and the need to address them concurrently. This Diversity Preview Weekend is an example of how racialized organizations can inequitably distribute labor to those with less power and decouple stated commitments to DEI from practices that disrupt White supremacy (Ray, 2019).

In some departments at both institutions, participants suggested improving support systems (e.g., mentoring, networking) and encouraging racially minoritized graduate students to get involved with disciplinary/field-level communities to increase retention. A Mid-Atlantic University administrator described one such effort:

> The assistant director is expanding graduate students' lab and social groups and getting people to meet across disciplines for board games and for various activities. We also have a person from development, who's sort of been placed in our department and they have access to funds, which is crucial, and created this thing where once a month graduate students can go have happy hour and then you can get food and chat and try to get to know each other just to talk. That has been helpful.

This strategy helped racially minoritized graduate students build relationships with peers and faculty outside of their labs. Although this department at Mid-Atlantic had staff and financial support allotted for graduate student support initiatives, this was not normative across participants' academic units. Moreover, initiatives designed to enhance social support did not regularly attend to students' racialized realities. Although they were intended to build the STEM pipeline, they often did not attend to how racism created cracks in it. As racialized organizations, departments can allocate resources to support racially minoritized students without fully addressing their complicity in upholding racism and perpetuating White supremacy. Thus, providing resources can signal commitment but may not create meaningful change if there is not concurrent attention to underlying power structures that created the necessity for additional supports for racially minoritized students (Ray, 2019).

Strategies to Improve Faculty Engagement. To increase faculty engagement in efforts to improve racial climate, many departments across institutions created committees to lead the change process. These groups often hosted workshops on inclusive teaching and advising, trainings on implicit bias, and events centering diversity in the discipline/field. Although these groups generated programming, these organizational structures did not necessarily contribute to increased commitment to DEI work among faculty and often relied on the labor of graduate students. For example, a White faculty member at Mid-Atlantic University said that their department had "a grad student and diversity committee and they put on a conference every year, where they bring in speakers because in our STEM field there's a lot of research on diversity." Similarly, a White faculty member at Northeast University stated:

> So the Diversity Council for our department, it's entirely graduate students. . . . I basically just said, "Well, what do you wanna do? We all know what the problems are. What are the solutions? I don't know what they are, but what do you guys think?" And a lot of them have decided that they do wanna focus a lot on improving our recruitment weekend. . . . And then another thing they did was, we had these social activities on Saturday, and they created their own that. . . . The Diversity Council created their own [event] that's like a diversity-centric event.

Although many departments created organizational structures (i.e., committees) to coordinate DEI efforts, few faculty members participated, and again the work of improving climate was shifted to graduate students, particularly those who were racially minoritized.

When faculty members were actively involved in improving racial climate, they often found themselves doing that work with little support from their colleagues. In effect, the work often fell onto a faculty "champion" who was expected to lead departmental change. A White faculty member at Mid-Atlantic University who was a champion in their department lamented:

> We have a young faculty member who, as you mentioned, really cares about diversity and inclusion issues, and she has been a proponent in the department for making sure that applicants for grad school and new hires are not overlooked, particularly if they are URMs [underrepresented minorities]. So, she's been a saving grace for me but, generally, I feel pretty on my own in terms of support.

Thus, the lack of faculty engagement in change efforts not only shifted labor to graduate students, but it also left faculty champions feeling unsupported and, at times, isolated. The presence of a champion may have signaled that departments were actively working to improve racial climate; however, the reality was that commitments to DEI were often individual rather than collective ones. The inequitable distribution of labor to those with less power (i.e., graduate students, early career faculty) reflects how racialized organizations limit capacity to create meaningful change and, in doing so, sustain the existing racial hierarchy (Ray, 2019).

Notably, participants did not identify resistant and/or racist faculty as one of the drivers of negative racial climate, but they did characterize them as challenges to engagement and barriers to implementing changes. When asked how they work with faculty who are not interested in DEI initiatives, one faculty member at Mid-Atlantic University said, "A lot of people have to go and die." To improve the racial climate, this participant implied that their strategy was to wait for resistant or problematic faculty to leave, retire, or in their words, die. Though this was a morbid example, avoidance was a strategy used when faculty colleagues were characterized as difficult, as evidenced by another faculty member at Mid-Atlantic University who said, "There are a few really terrible faculty members, but I just avoid them. I try to tell my students who to avoid but it is a problem." Although this participant thought they were being helpful by sharing information about faculty members who are "terrible," they also allowed their colleagues to continue being problems. Essentially, problematic faculty can remain as such and contribute to hostile racial climate, potentially worsening it for everyone. Characterizations of faculty as "difficult" and "terrible," without making explicit connections to racist attitudes and behaviors, affirms lack of attention to systemic racism when trying to change racial climate.

Challenges to Aligning Problems and Strategies for Improving Racial Climate. Our findings highlight the difficulty of trying to improve racial climate and of aligning problems and solutions when approaches evade structural racism (McGee, 2020; Ray, 2019). In addition to the tensions we previously described, faculty and administrators said their departments and institutions struggled to prioritize DEI efforts among other competing priorities (e.g., research prestige). Many participants also felt they did not have the appropriate training to lead DEI initiatives, which may be another reason the labor fell to a faculty champion or graduate students. In addition, some participants said it was difficult to simultaneously focus on improving racial climate given their department's desire to address the lack of gender diversity and negative climate for women. From this perspective, the needs and experiences of racially minoritized women were invisible, which created the potential to amplify rather than ameliorate racialized sexism.

Though infrequent, several participants at both institutions recognized that there was a need to shift departmental culture if they were to improve the racial climate and better serve racially minoritized graduate students. As a faculty member at Mid-Atlantic University said:

> We're trying to figure out how to shift the culture, and the diversity numbers should increase because of that, as opposed to trying to focus on diversity but ignore the culture. This is fairly new. Essentially, we became more and more aware that it's a problem. We became more interested in trying to figure out how to address it.

Recognizing the need to change culture is vital to creating closer alignment between problems and strategies designed to improve racial climate. Engaging with culture can be particularly beneficial if members of the department are willing to consider how racism and White supremacy shape departmental norms, policies, and practices (Griffin, 2019; Ray, 2019). However, most participants did not explicitly connect departmental culture to structural racism. In turn, we were left to wonder what their visions for changed departmental culture might be and how participants might move toward creating them.

Discussion

Although there are consistent calls to improve racial climate in STEM departments, change remains difficult. Shifts in STEM are stymied because they rely on change models that require implementing interventions with fidelity (Dancy & Henderson, 2008) and implicit theories of change (Kezar et al., 2015). Yet, McGee (2020) named the reluctance for STEM departments to address structural racism and White supremacy as a key barrier to change. Without clearly naming and understanding how structural racism shapes and constrains STEM graduate education, it is difficult for departmental and institutional leaders to create meaningful

change in racialized organizations (Ray, 2019). In effect, people are working to change climate in STEM departments without a full understanding of the problem. Perhaps then, it is not surprising that participants relied on interventions that may create incremental change at best because they did not attend to the underlying issues that seed negative racial climates.

Our findings show how race evasiveness within racialized organizations influenced faculty, administrators, and postdoctoral fellows' understandings of the problems that contributed to negative racial climate in STEM departments and the subsequent solutions they identified for advancing change. Participants identified the STEM pipeline and lack of faculty engagement as primary drivers for the negative racial climate experienced by racially minoritized graduate students. Their descriptions of the pipeline centered on the need to increase compositional diversity and to enhance retention efforts rather than an examination of how racism and White supremacy created cracks and holes in the pipeline. Accordingly, departments focused on recruiting more racially minoritized students and faculty and on providing opportunities for racially minoritized students to build relationships.

Although these efforts were beneficial, DEI initiatives were often led by graduate students, particularly those who were racially minoritized. Efforts to improve racial climate increased racially minoritized graduate students' labor, which may have amplified their perception of a negative climate (Perez et al., 2019, 2022; Slay et al., 2019; Truong & Museus, 2012). Our findings suggest that change mechanisms within racialized organizations can also be drivers of inequality that maintain inequitable distribution of labor and limit individuals' abilities to change existing power structures (Ray, 2019; Ray et al., 2022). Thus, there were (un) intended consequences of not attending to racism and White supremacy when identifying the problems to address in relation to negative racial climate.

Similar shifts in labor occurred when participants described the need to address the lack of faculty engagement in DEI work. Participants noted that many faculty did not participate in efforts to improve racial climate given their focus on conducting research and maintaining traditional notions of academic excellence. These notions of excellence were framed as separate from equity and inclusion and were not rewarded. Rather than attending to how race-evasiveness and White supremacy inform constructions of research prestige and excellence in STEM (Le & Matias, 2019; McGee, 2020) and in turn shape faculty behavior, departments created diversity committees to lead change initiatives that were peripheral to faculty work. Because these diversity committees were not core to faculty work, they relied heavily on graduate student labor and faculty "champions," many of whom were pre-tenure and/or racially minoritized, which again had the potential to amplify negative racial climates (Perez et al., 2022). The design of committees unintentionally reinforced the idea that diversity work is "extra" for faculty and that it is separate from notions of scholarly excellence. Collectively, these messages reinforce that Whiteness is central to STEM and that it operates as a credential for degree and career advancement (Ray, 2019). These findings extend how we conceptualize racialized organizations by illustrating how decoupling DEI from organizational priorities (e.g., scholarly productivity, prestige) slows change processes. DEI work is present, but it remains on the margins within racialized organizations. Moreover, the work is often taken up by those without authority or support to shift organizational policies, practices, and most importantly, culture.

Although committees planned workshops, trainings, and events to increase awareness of diversity, they struggled to increase faculty participation, and in some instances, encountered faculty resistance. Notably, participants described resistant faculty in race-evasive ways (e.g., terrible, difficult) rather than racist. Furthermore, their strategies for dealing with faculty who engaged in racist behavior was to avoid them or to wait them out. Active avoidance and silence were forms of complicity that left systemic racism intact within many departments and reflected decoupling of stated commitments to DEI from organizational policies and practices (McGee, 2020; Ray, 2019). Furthermore, this pattern may accentuate the idea that individuals, not institutions, perpetuate racism. Our findings build on Ray's (2019) conception of racialized organizations to illuminate how a focus on individual-level change is often a tool to evade engaging with structural racism.

Ultimately, our findings illuminate how racialized organizations perpetuate systemic racism in STEM graduate education and change processes. Despite a desire to improve racial climate, participants were either unaware or hesitant to name racism and White supremacy as factors that affected the STEM pipeline, a lack of faculty engagement, and faculty resistance to DEI work. Accordingly, approaches to improving climate often targeted individual learning and needs (e.g., trainings, mentoring students) rather than addressing systemic issues. Thus, the approaches taken by participants were in stark contrast to the research that emphasizes the need to honestly analyze departmental culture and to build relationships that translate into collective commitment and action to improve racial climate and the experiences of racially minoritized graduate students (Griffin, 2019; Jones, 2016; Posselt, 2020). Although this approach might be framed as solely indicative of identity-evasive ways of operating in STEM (Le & Matias, 2019; McGee, 2020), we argue that our findings reflect racialized organizations operating as intended to uphold systemic racism and White supremacy (Ray, 2019).

Implications for Future Practice and Research

Given our findings, departments need to examine departmental climate and culture to identify the underlying norms,

values, and standards that guide their policies and practices (Griffin, 2019; Posselt, 2020) and grapple with how this culture may center Whiteness to the detriment of racially minoritized people. Acknowledging that STEM fields tend to take identity and power-evasive approaches to work under the guise of objectivity (Le & Matias, 2019; McGee, 2020), it would be beneficial to seek and compensate those with expertise related to decentering Whiteness and creating racially inclusive and equitable courses, policies, and practices to lead sustained learning opportunities for faculty. Regularly engaging with an external facilitator who can support learning and challenge race-evasive thinking may create opportunities for honest dialogue and more strategic, equity-oriented thinking. This approach moves departments away from intervention-centered models of change (Dancy & Henderson, 2008) and toward more systemic approaches that can contest how racialized organizations operate.

Accordingly, departmental and institutional leaders need to prioritize, financially support, and reward DEI work if it is to become a normative cultural practice that is proactive rather than reactive (NASEM, 2018). Rather than relying on a faculty champion or graduate students, academic leaders should require all faculty to articulate how they are contributing to DEI work in their annual evaluations. As Ray (2019) noted, organizational processes such as evaluations cannot become symbolic. They can and should be used to reward those who engage in the labor of improving climate and to hold those who harm racially minoritized students accountable. Those engaging in more DEI work may receive supplemental grants, summer salary, or course releases to reward their labor (Griffin, 2019) while faculty who are known to harm students may have limited ability to hire research assistants and can be coached to engage in DEI professional development before working with new students. Implementing reward structures that account for racialized labor (Ray et al., 2022) while concurrently working to create shared responsibility for DEI work is vital to shifting culture.

Although our research described perspectives on the underlying problems and subsequent strategies for improving racial climate, our study was not designed to examine if participants' efforts were effective. Future researchers could use longitudinal methods to understand if and how the strategies selected to improve racial climate are effective. Similarly, future research can examine how efforts to improve racial climate may vary by discipline/field and how approaches to creating change may vary by role (e.g., faculty, postdoctoral fellow) and social identities. Because departments will often have those who resist change or are outright racist, there is also need for research and practice that attends to how departments work with, around, and through those who are obstacles to improving racial climate. Research that uses participatory methodologies and a transformative paradigm may enable scholars to better support those who earnestly want to improve climate in STEM but struggle within racialized organizations. Scholarship of this nature can foster communities of support that allow people to collectively contest and change racist climates and cultures in service of minoritized graduate students' humanity and success.

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