AMERICAN PSYCHOLOGICAL ASSOCIATION

Journal of Experimental Psychology: General

ISSN: 0096-3445

2024, Vol. 153, No. 11, 2742–2750
https://doi.org/10.1037/xge0001571

Can I See Myself There? How Black Potential Applicants Use Diversity Cues to Learn About Graduate Program Climate

Keturah P. Ragland and Samuel R. Sommers
Department of Psychology, Tufts University

In academia, showcasing diversity, equity, and inclusion (DEI) values has become increasingly prominent in efforts to recruit students and faculty with marginalized identities, yet little work has examined the empirical effects that such DEI practices and identity safety cues have on the perceptions of these institutions. In the present study, we examine the contextual factors that shape how Black science, technology, engineering, and mathematics (STEM) students learn and draw inferences about diversity and cultural climate in the graduate programs to which they consider applying. A sample of 217 Black participants with background in a STEM discipline viewed a mock academic department website which presented varied combinations of expressed diversity cues (diversity vs. neutral mission statement) and/or evidence-based diversity cues (racially diverse vs. all-White faculty). Participants reported perceptions of the department's DEI culture, their own perceived fit within the program, and belief of future personal success within that institution. Results indicated a significant main effect of evidence-based cue, in the form of faculty diversity, on all examined outcomes, with Black participants more positively assessing a program exhibiting this cue. An expressed cue, in the form of diversity statement, did not have significant effects. These results indicate that in higher education, as in other settings, evidence-based cues may be more effective means to cue identity safety. This study provides a foundation for future research to help guide efforts of academic programs seeking to create a welcoming and supportive climate for all potential applicants.

Public Significance Statement

With the rise in conversations regarding best practices for approaching diversity, equity, and inclusion (DEI) efforts, it becomes increasingly important to empirically study the effects of such initiatives, specifically within academia. The present work explores factors that impact DEI efforts and more general identity safety cues in higher education—specifically, among Black potential applicants to a graduate program in psychology. The study examined the individual and combined effects that faculty representation and diversity statements within a department have on Black potential applicants. We found that faculty diversity had a larger, and more positive, effect on perceptions than the statement. This study extends previous work by exploring the unique context and considerations that arise within an academic setting, and it also has implications both inside and outside of academia that can be applied broadly and inform organizational DEI efforts.

Keywords: racial diversity, identity safety cues, faculty representation, graduate school applications, higher education

Black students seeking to pursue a graduate degree in a science, technology, engineering, and mathematics (STEM) discipline typically face the daunting task of committing to years of studying, working, and daily living in predominantly white spaces. In the field of psychology, an analysis by the National Science Foundation (2020) revealed that in 2019, only 8.5% of doctorate degrees were received by Black students, with 9.6% by Latino students, 5.9% by Asian students, and 0.4% by Indigenous students. Among marginalized individuals who decide to pursue graduate study, social media movements such as #BlackinTheIvory and #PsychologyWhileBlack have illuminated the uniquely challenging experiences they often encounter in higher education. Given this context, and given the stated desire of many in academia to diversify STEM disciplines, it becomes critical to examine the

This article was published Online First April 25, 2024.
Keturah P. Ragland https://orcid.org/0000-0002-3479-8773
Samuel R. Sommers https://orcid.org/0000-0003-2981-5396
The authors thank Keith Maddox, Jessica Remedios, Reese Whiteman, and Leigh Wilton for their conversations about and contributions to this work. Presentation of some of this study's preliminary findings has taken place at two academic conferences in 2023. Data and ideas in this manuscript were presented by Keturah P. Ragland via a poster at the Society for Psychological Study of Social Issues and by Samuel R. Sommers during a talk at the Eastern Psychological Association Conference.

Keturah P. Ragland served as lead for conceptualization, data curation, formal analysis, investigation, methodology, project administration, validation, visualization, and writing–original draft. Samuel R. Sommers contributed equally to writing–review and editing and served in a supporting role for conceptualization, formal analysis, investigation, methodology, and supervision.

Correspondence concerning this article should be addressed to Keturah P. Ragland, Department of Psychology, Tufts University, 490 Boston Avenue, Medford, MA 01255, United States. Email: keturah.ragland@tufts.edu

factors that shape how Black students learn and draw inferences about the expected diversity-related climate of the departments to which they consider applying. Specifically, in this study, we investigate contextual cues that may influence Black students' perceptions of diversity, identity safety, and personal fit within potential graduate programs.

In response to historical and contemporary inequities—and amid nationwide discourse surrounding diversity, equity, and inclusion (DEI) priorities—many universities and academic departments have taken steps with the intent of creating more inclusive and diverse graduate programs. Ironically, despite the fact that those driving such efforts are frequently scientists and other scholars who emphasize empirically driven conclusions in their own academic work, relatively little is known regarding the actual effects of these DEI initiatives and other identity cues on the perceptions of marginalized potential applicants. Indeed, empirical assessment of the effects of DEI strategies and cues in the higher education space has been scarce, leaving open the worrisome possibility of disconnects between intent and impact, as well as uncertainty regarding the potential interactive effects of multiple cues. More work examining DEI strategies and cues has been conducted in organizational settings, examining their effects on corporations, and we draw on these findings in designing the present research. However, as we articulate in more detail below, the unique ways that identity arises in academic spaces, specifically within STEM fields (e.g., Murphy et al., 2007), and the corresponding importance of DEI initiatives and cues for shaping the future of scientific higher education, necessitate investigating their impacts within the context of the objectives and cultural norms particular to STEM.

Specifically, in the present investigation, we asked Black STEM students to evaluate the website of a fictitious psychology department as if they were considering it for potential graduate study and seeking to learn more about it. We then assessed their perceptions of diversity-related dimensions of the program as a function of two manipulated sets of cues: a diversity statement and faculty racial representation. In doing so, we sought to further our understanding of how different DEI cues may influence the perceptions of Black potential applicants, and to contribute to a growing research literature on the effects of diversity and identity-related cues in higher education contexts (e.g., Auelua-Toomey & Roberts, 2022; Howansky et al., 2022; Johnson et al., 2019).

Perceptions of Organizational DEI Priorities

As a wide range of organizations has placed increased emphasis on DEI objectives in recent years, scholarship has assessed the effectiveness of strategies intended to advance such priorities (Kalev et al., 2006; Onyeador et al., 2021). This research has found mixed results regarding the effectiveness of diversity-related initiatives when it comes to recruitment and retention of individuals with marginalized identities (e.g., Dover et al., 2020; Purdie-Vaughns et al., 2008; Windscheid et al., 2016). The most effective strategies for increasing representation within organizations have been found to be ones that include organizational accountability and evidence-based efforts, such as hiring practices—in particular, hiring individuals with DEI expertise (Kalev et al., 2006; Wilton et al., 2020).

Research suggests that individuals with different racial identities tend to perceive DEI initiatives and diversity-related strategies differently. For example, Avery et al. (2013) found that marginalized individuals who strongly identify with their racial identity tend to value DEI efforts more than do other individuals, and are also more likely to apply to work at organizations that signal DEI priorities. It might be tempting to view findings such as these as evidence in support of including any and all DEI strategies when thinking about recruitment and retention of marginalized individuals, but other studies provide reason for caution via findings that DEI initiatives also have potential for negative effects. For example, the presence of prodiversity messaging can lead to lower perceived competence, negative affect, and more negative feelings about an organization when marginalized individuals are not selected for an open position (Dover et al., 2021). Other work suggests that some types of DEI efforts can lead to perceptions of preferential treatment and lower expectations of performance across members of an organization (Heilman & Alcott, 2001; Wilton et al., 2015), or can have negative effects on the way accusations of discrimination are handled within organizations (Dover et al., 2013).

Identity Safety Cues (ISCs) and DEI Priorities

Insight from psychology affords an identity-centered approach to this examination of the effects of DEI cues. A relevant body of scholarship is the growing research literature on ISCs as a strategy to mitigate social identity threat—the stress associated with negative stereotyping based on certain social identities (Branscombe et al., 1999; Steele & Aronson, 1995). Social identity threat has been found to decrease domain identification, engagement, and openness to feedback, as well as lead to decreased interest in certain career paths (Casad & Bryant, 2016). ISCs are identity-specific cues intended to signal value and safety to individuals with stigmatized identities (Cipollina & Sanchez, 2019; Emerson & Murphy, 2014; Howansky et al., 2022). ISCs can improve trust and feelings of belonging, and can strengthen diversity-related retention efforts (Cipollina & Sanchez, 2019; Good et al., 2020; Wilton et al., 2020). ISCs have been studied in a variety of domains, from business organizations to healthcare settings, and in a variety of forms.

The efficacy and perceptions of ISCs appear contingent on the contexts in which they are presented and their intended targets. As one example, Wilton et al. (2020) argue that the combined effects of different cues can create new, and possibly negative perceptions, compared to examining cues individually. Wilton and colleagues classify ISCs in two ways: evidence-based cues and expressed cues. Evidence-based cues show an organization's culture or commitment as it relates to DEI, via specific practices or outcomes (such as demographics indicating that an organization has successfully diversified its membership). Expressed cues tell about intended principles or ideals as they relate to DEI (such as the written philosophies of a diversity statement). Kruk and Matsick (2021) offer a further taxonomy of ISCs as including four different categories: minority representation, diversity philosophies and programming, environmental factors, and identity safe information. Examining the effects of different types of cues in academic contexts is key to understanding how their combined effects may work in harmony (or disharmony) to combat the effects of social identity threat. In the present study, we do this by examining the impact of one evidence-based cue and one expressed cue on the perceptions of Black individuals as they seek to learn more about the diversity of the higher education programs to which they are considering applying.

Previous work has shown that evidence-based ISCs often have positive implications for how students perceive academic spaces (Johnson et al., 2019; Murphy et al., 2007; Van Laar et al., 2019). Evidence-based ISCs have also been shown to increase the likelihood of enrolling in classes and decrease absences (Good et al., 2020; Howansky et al., 2022; Kizilcec & Saltarelli, 2019). Research that explores racial and gender representation as cues of identity safety have found them to be mostly effective (Kruk & Matsick, 2021), and the stereotype inoculation model may be one reason why this is the case. This model suggests that greater representation of those with shared stigmatized identities in threatening contexts can serve as a social vaccine from identity threat (Dasgupta, 2011). One example is that Black women students reported greater feelings of trust and belonging within their institution when given examples about Black women professors at their school (Johnson et al., 2019). Other research in social settings has indicated that interracial interactions feel safer and less threatening for Black individuals when a White partner is known to have a diverse friendship network, but this is particularly the case when that diversity includes in-group (i.e., Black) friends (Milless et al., 2022). The efficacy of expressed ISCs appears to be nuanced and dependent on other contextual factors in the environment.

More mixed findings have emerged when it comes to evidence regarding the efficacy and impact of expressed cues, in particular the use of diversity statements, despite such statements being among the most common DEI practices used within academic spaces. In the classroom, diversity statements that take a multicultural approach (valuing diversity by emphasizing the differences between people and groups) have been shown to positively affect feelings of belonging, attendance, and performance (Good et al., 2020). Perceptions of diversity statements may be dependent on audience, such that majority group members often favor statements that take a colorblind approach (focusing on commonalities between people and encouraging assimilation) or an instrumental approach (describing diversity as a tool to achieve an organization's overall goals), whereas marginalized individuals often prefer more multicultural and moral approaches (Jansen et al., 2015; Starck et al., 2021).

Other work has shown that perceptions of diversity statements may be dependent on wording, audience, as well as other organizational factors, such as representation (e.g., Apfelbaum et al., 2016; Plaut et al., 2018; Purdie-Vaughns et al., 2008; Wilton et al., 2015, 2020). For example, Dover et al. (2021) found the presence of prodiversity messaging had no effect on racially marginalized individuals' feelings of belonging, fairness, or organizational concerns about racial discrimination. Suggestive of the potentially negative effects of diversity statements are the findings of Rosenblum et al. (2022), which indicate that Black individuals often infer racial attitudes and motivation from White individuals' written egalitarian claims, leading to perceptions of mistrust and concern about possible racial biases. Apfelbaum and Suh (2024), on the other hand, reported that a stated commitment to diversity, coupled with transparency regarding even unfavorable diversity-related outcomes, can result in positive feelings about a corporation.

Additional research findings also raise the possibility of negative consequences for prodiversity messaging when there are discrepancies between an organization's stated values and actual representation. Kroeper et al. (2022) found that counterfeit diversity, defined as exaggerated claims about representation within an organization, led to increased identity threat concerns and participants believing the organization was insincere (see also Windscheid et al., 2016). Wilton et al. (2020) developed a scale to measure this phenomenon, calling it diversity dishonesty. They found that when the actions of an organization do not align with their stated DEI commitments, participants had greater feelings of diversity dishonesty, which were also negatively associated with perceived fit, authenticity, and predicted performance. Diversity dishonesty has not yet explicitly been examined in the context of academic settings. Black students in STEM spaces may grapple with this construct when assessing the credibility of deliberate DEI cues in comparison to other evidence in their environment, while also navigating the prevailing cultural norms and stereotypes within the field. Understanding the causes and consequences of perceptions of diversity dishonesty may provide greater understanding of the various discrepancies seen in the literature regarding the efficacy of diversity strategies as ISCs.

In sum, the investigation of ISCs in the domain of higher education, and in STEM disciplines in particular, remains an important ongoing endeavor. For example, how individuals identify with STEM, their STEM identity, is shaped by their social identities as well how those identities align with the norms and stereotypes of their field; this STEM identity has been found to have significant implications for Black students' academic success (Aschbacher et al., 2010; White et al., 2019). Developing a STEM identity can be complex for Black students, as stereotypes and norms within STEM may differ from that of their other identities, leading individuals to feel like they need to hide certain aspects of their identity to succeed in STEM (Mattheis et al., 2020). The process of shaping one's STEM identity can be further complicated when cues within one's environment align or misalign with the broader norms of the field. As we noted above, Black, and other minoritized students who pursue degrees in STEM, typically do so in predominantly white spaces. And, indeed, situational cues including a setting's features, norms, and organization have been theorized to signal social identity threat in such domains (Murphy et al., 2007). Moreover, many common DEI practices in higher education can be considered efforts to create ISCs to counteract such signals of threat. These might include listing pronouns in a syllabus, efforts to emphasize a diverse range of scholars in a course reading list, and departmental diversity/positionality statements (Chaney & Sanchez, 2018; Starck et al., 2021). While the present study does not directly assess participants' global ratings of STEM identity, our primary objective is to assess the effects of diversity-related cues on the adjacent questions of how participants perceive their own academic fit and likelihood of success in a particular STEM department.

The Present Study

Given the underrepresentation of Black and other marginalized students in STEM doctoral programs, and given the efforts of many academic departments to develop and implement initiatives to address this underrepresentation, it is important to assess the influence of diversity-related cues within the context of Black prospective applicants seeking to learn more about potential graduate school programs. It is becoming increasingly common for institutions of higher education—and individual departments within these institutions—to articulate priorities related to diversity and inclusion (Starck et al., 2021). Whereas research has examined the influence of such cues in other organizations (e.g., Wilton et al., 2020), we still know relatively little regarding the important question of whether

these effects generalize to higher education. Specifically, how do a STEM department's proclamations regarding its DEI priorities impact the perceptions of Black potential applicants? To what degree does faculty racial representation shape potential applicants' perceptions of academic fit and likelihood of success in a STEM program?

To address these questions, we explored the influence of a departmental diversity statement and faculty racial composition on Black individuals' perceptions of diversity dishonesty, perceived fit with the program, and beliefs regarding the likelihood of future success within the program. Specifically, we recruited a sample of 217 Black participants with a STEM background, and then presented them with the website of a fictitious psychology department and asked them to explore the site in the effort to learn more about the program. We varied whether this department included on its website a diversity statement versus a more general, race-neutral mission statement; we also varied whether the department faculty was depicted as racially diverse versus all-White. We predicted that there would be a main effect of faculty diversity such that those in the faculty diversity condition would experience lower perceptions of diversity dishonesty, greater perceived fit, and greater belief of success. Given the discrepancies in the literature regarding the efficacy of expressed cues, we were unsure what to expect for the effects of statement type, nor did we have a priori hypotheses regarding potential interaction effects, which we examined in exploratory fashion.

Method

Participants

We conducted an a priori power analysis (for a between-groups *F* test with four groups) to obtain .95 power to detect a medium effect size of .25 at the standard .05 α error probability, which yielded a required sample size of 210 participants. We used the online platform Prolific (https://www.prolific.co) to recruit a sample of Black individuals who were enrolled in or had completed a bachelor's degree in a STEM or STEM-related field. We recruited participants with a broad STEM background (rather than requiring a narrower focus in psychology) in order to increase sample size and out of the expectation that students across STEM disciplines likely weigh some similar considerations in evaluating potential graduate programs. Admittedly, the authors' affiliations in a department of psychology also shaped our interest in focusing on these questions as they relate to our own field.

The composition of the final sample ($N = 217$) included participants ranging from 18- to 35-years-old, of whom 152 identified as women, 48 identified as men, 16 identified as nonbinary or questioning, and one indicated preference not to say. Demographic information was collected using multiple-choice questions. These questions allowed for multiple answers to be selected and included an "other" selection that included a free-response box for participants to explain further if they chose to. Only the demographic questions regarding race required a response in order to ensure that participants identified as African American/Black. Other screening criteria included living in the United States, fluency in English, and Prolific approval rating of 95% or higher. Participants were compensated $3.00 for their participation.

Procedure and Materials

Participants were directed from Prolific to a Qualtrics survey where they were prompted to review a psychology department website we created. After providing informed consent, participants were instructed to review the site as if they were prospective graduate students seeking to learn about a program to which they might apply. They were told to be thorough in their review because they would be asked to complete a variety of questionnaires regarding their perceptions. Participants were then randomly assigned and directed to one of the four website conditions.

We manipulated how diversity cues were presented on the mock department website using evidence-based and expressed cues. The expressed diversity cue was operationalized with the inclusion of either a diversity statement or a more general mission statement shown on the home page of the website. The two statements were derived from the same template, but words were changed to create either a diversity focus or a more general value focus unrelated to diversity/equity issues. For example, the mission statement said, "We strive to create a rigorous and supportive climate," whereas the diversity statement instead said, "We strive to create a respectful and affirming climate." See Figure 1 for the complete text of both statements.

The evidence-based cue was operationalized by manipulating the apparent racial diversity among the 20 faculty within the mock university department, such that participants either saw a racially diverse faculty representation (65% White and 35% non-White faculty; of the non-White faculty, four appeared to be Black, including two Black women and two Black men) or an all-White faculty representation (100% White faculty). Faculty racial identity was manipulated via photograph, and in both versions of the website, half of the faculty appeared to be women and half appeared to be men. Participants were also able to review individual faculty pages, which included an email address, office number, broad area of research, and courses taught (see Figure 2 for example profiles). Additional information regarding specific research area was omitted. Other than apparent racial identity and faculty name, all information—including apparent faculty gender—was held constant across conditions.

The website instructed participants to read through the homepage that contained a statement as well as the faculty directory, where they were able to click through individual faculty pages. Qualtrics required participants to remain viewing the website for at least 5 min before being able to proceed. After reviewing the website, participants

Figure 1
Department Website Statements

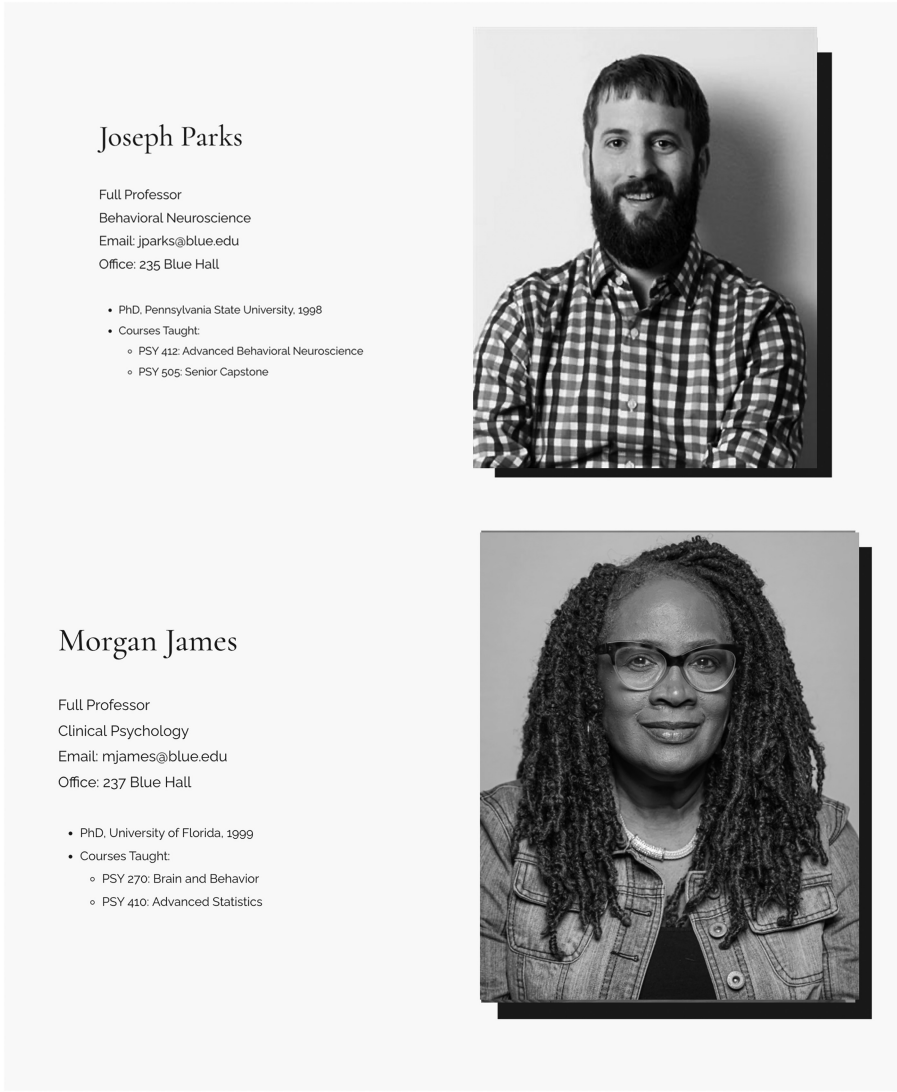
Diversity Statement

We strive to create a respectful and affirming climate in which all students, staff, and faculty are valued and feel inspired to achieve their full potential. We are committed to cultivating a diverse student body that will enrich all students' experience and prepare them for academic excellence and achievement. We believe that a diverse environment benefits all in our community by creating a space where thoughts and cultures can be shared. In our economy today, we cannot claim to be living our mission unless we make every effort to ensure our students are prepared for an increasingly diverse, globalized 21st-century world. We can best accomplish these goals by promoting a diversity of backgrounds, thoughts, and perspectives inside and outside of the classroom.

Mission Statement

We strive to create a rigorous and supportive climate in which ~~all~~ students, staff, and faculty are valued and feel inspired to achieve their full potential. We are committed to cultivating an interdisciplinary curriculum that will enrich all students' experience and prepare them for academic excellence and achievement. We believe that a collaborative environment benefits all in our community by creating a space where scientific perspectives and frameworks can be shared. In our economy today, we cannot claim to be living our mission unless we make every effort to ensure our students are prepared for an increasingly collaborative 21st-century world. We can best accomplish these goals by promoting interdisciplinary thinking, collaboration, and scientific rigor inside and outside of the classroom.

Figure 2
Example Faculty Profiles From Fictitious Department Website



were directed back to the Qualtrics survey to complete the questionnaires regarding perceptions of diversity within the department and feelings about attending the institution.

Measures

Diversity dishonesty, perceived fit, and belief of success within the department were collected using self-report measures. Diversity dishonesty was measured using an adapted version of the diversity dishonesty scale created by Wilton et al. (2020) that includes five measures asked on a Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*) (Cronbach's $\alpha = .90$). Example items: "This department acts like it is better about diversity-related issues than it really is," "Ethnic minorities seem to be promised more resources and support than are actually provided by this department," "This department is not sincere about its prodiversity messages to students." Higher scores of diversity dishonesty indicate greater belief that an organization is being dishonest about its DEI values. We embedded at the end of these items about diversity two manipulation check questions about whether the department highlighted diversity in its website statement and its faculty representation.

Participants were then asked a series of questions regarding their feelings about becoming a student within the department. Questions about perceived fit included 11 measures that we created, scored on the same Likert scale (Cronbach's $\alpha = .95$). Example items: "People at Blue University would accept me," "I belong at Blue University." "I think I would feel alienated from Blue University" (reverse-scored).

Finally, we assessed beliefs regarding success within the institution via two measures that we created, also scored on the same Likert scale (Cronbach's $\alpha = .93$). Scale items were reverse scored as needed and means were taken for each scale to create a composite score for each participant. Items: "I would be enthusiastic to attend this institution," "I would apply to this department based on what I've seen on the website."

For the correlations between independent measures, see Table 1.

Transparency and Openness

We report how we determined our sample size, all data exclusions, and all manipulations. The data and analysis code used in this study can be found at https://osf.io/wzvea (Ragland, 2023). Additional research materials are available upon request from Keturah P. Ragland. This study's design and its analysis were not preregistered.

Results

Manipulation Checks

Manipulation checks were conducted to ensure that the cues presented (statement and faculty diversity) were accurately represented and perceived in each condition. For the diversity statement variable, participants reported that the diversity statement ($M = 5.81$, $SD = 0.126$) contained significantly more diversity-related language than did the mission statement ($M = 4.20$, $SD = 1.82$), $t(215) = 7.34$, $p < .001$, $d = 1.01$. For the faculty composition variable, participants in the diverse faculty condition ($M = 5.38$, $SD = 1.47$) reported seeing a more diverse faculty than did participants in the all-White faculty condition ($M = 1.78$, $SD = 1.42$), $t(215) = 28.2$, $p < .001$, $d = 2.49$.

Diversity Dishonesty

For the diversity dishonesty measure, the overall mean was 4.02 ($SD = 1.48$). We conducted a 2 (Faculty Diversity: Diverse, All-White) × 2 (Statement: Diversity, Mission) analysis of variance (ANOVA) with diversity dishonesty as the dependent variable (see Table 2 for summary of condition means for this and all dependent measures). We found a main effect of faculty diversity such that those in the diverse faculty condition ($M = 3.18$) gave significantly lower ratings of diversity dishonesty than those in the all-White faculty condition ($M = 5.04$), $F(1, 213) = 133.81$, $p < .001$, $\eta^2 = .38$. We did not find a significant main effect of statement type, as there was no significant difference between participants' ratings of diversity dishonesty in the diversity statement condition ($M = 4.19$) and in the mission statement condition ($M = 4.04$), $F(1, 213) = 0.85$, $p = .356$, $\eta^2 = .002$. We also did not observe a significant interaction between faculty diversity and statement, $F(1, 213) = 0.75$, $p = .388$, $\eta^2 = .002$).

Perceived Fit

For the perceived fit measure, the overall mean was 4.33 ($SD = 1.29$). We conducted another 2 × 2 ANOVA with perceived fit as the dependent variable. We found a main effect of faculty diversity such that those in the diverse faculty condition ($M = 5.03$) gave significantly greater ratings of perceived fit than those in the all-White faculty condition ($M = 3.46$), $F(1, 213) = 126.94$, $p < .001$, $\eta^2 = .35$. We did not find a significant main effect of statement type, as there was no significant difference between participants' ratings of perceived fit in the diversity statement condition ($M = 4.34$) and in the mission statement condition ($M = 4.15$), $F(1, 213) = 1.81$, $p = .179$, $\eta^2 = .005$. We also did not observe a significant interaction, $F(1, 213) = 1.48$, $p = .226$, $\eta^2 = .004$.

Table 1
Correlation Matrix of Independent Variables

Variable	Diversity dishonesty	1	2
1. Perceived fit	−.748***	—	
2. Belief of success	−.755***	.847***	—

*** $p < .001$.

Belief of Success

For the belief of success measure, the overall mean was 4.00 ($SD = 1.83$). We conducted another 2 × 2 ANOVA with belief of success as the dependent variable. We found a main effect of faculty diversity, such that those in the diverse faculty condition ($M = 5.00$) gave significantly greater belief of success ratings within the mock department than those in the all-White faculty condition ($M = 2.75$), $F(1, 213) = 122.86$, $p < .001$, $\eta^2 = .37$. We did not find a significant main effect of statement type for those who received the diversity statement ($M = 3.92$) compared to the mission statement ($M = 3.83$), $F(1, 213) = 0.17$, $p = .680$, $\eta^2 = .001$. We also did not observe a significant interaction between faculty diversity and statement, $F(1, 213) = 0.11$, $p = .747$, $\eta^2 < .01$.

Discussion

Conversations regarding diversity cues and priorities in higher education take place in multiple venues, from department diversity committees to social media conversations in which individuals share their lived experiences. Indeed, one impetus for the present investigation in the higher education domain was our discovery of multiple social media threads in which marginalized applicants expressed frustration with various aspects of institutional diversity initiatives in academia. One example post: "Your diversity statement is how you treat people, not the words you put on a page saying how you treat people" (Cox, 2020). Given the renewed focus among many institutions on recruitment strategies and retention efforts for students with marginalized identities, we believe that it is necessary to develop a deeper empirical understanding of how individuals learn about and perceive the diversity-related climate of academic spaces. Specifically, our present goals were to begin such an investigation of the different factors that shape the process of how Black students learn and draw inferences about the expected cultural climate of graduate programs in STEM.

To examine this question, we recruited a population that has been severely under sampled in psychological investigation: Black participants. In particular, we recruited over 200 Black adults with a background in STEM—the very population who might consider applying to graduate study in the sciences. We found that the faculty diversity of a graduate program had a consistent and robust positive effect on participants' ratings of diversity dishonesty, perceived fit, and likelihood of success within the program, suggesting that evidence-based cues can be an effective strategy at conveying an inclusive and supportive culture to prospective applicants. Our diversity statement manipulation, on the other hand, had no significant effects on the dependent measures, consistent with previous work that has shown that expressed cues—like a diversity statement—have relatively little impact on how individuals with marginalized identities perceive DEI culture within an organization.

Table 2
Means by Conditions Across Three Dependent Variables

Dependent variable	Statement	Faculty	*N*	*M*	*SD*
Diversity dishonesty	Mission	All-White	46	4.90	1.168
		Diverse	77	3.18	1.153
	Diversity	All-White	51	5.19	1.216
		Diverse	43	3.19	1.074
Perceived fit	Mission	All-White	46	3.27	1.006
		Diverse	77	5.02	1.027
	Diversity	All-White	51	3.74	1.216
		Diverse	43	5.07	0.797
Belief of success	Mission	All-White	46	2.67	1.469
		Diverse	77	4.99	1.329
	Diversity	All-White	51	2.82	1.734
		Diverse	43	5.01	1.312

This study builds on the work done in organizational spaces to examine the impact that different DEI strategies have on the perceptions of those with historically marginalized identities. We also seek to bridge the work in organizational spaces with the ISC literature largely situated in more academic spaces, in order to explore how these practices impact feelings of safety and belonging. The present results demonstrate that the differential impact of evidence-based and expressed diversity cues does generalize to the domain of higher education—and, specifically, when it comes applications to graduate programs in psychology. In this fashion, these data contribute to a growing literature demonstrating that representation matters in STEM and in higher education more generally. We also found some slightly different patterns from Wilton et al. (2020) as relates to diversity dishonesty, highlighting the importance of exploring these phenomena in different domains and in the context of their specific cultural norms and expectations. Readers for whom this conclusion is not novel may find themselves thinking, so now what? We believe that another contribution of the present work lies in its development and successful implementation of a novel paradigm for the future assessment of the impact of a wide array of diversity-related cues and initiatives in this important domain. Of course, faculty diversity is not the only cue of interest to such an investigation. It is not, in and of itself, a DEI initiative (though it can be a desired outcome of such initiatives), and it is an evidence-based diversity cue that is not easily attained by departments overnight.

We propose that a variety of DEI initiatives in higher education merit future investigation, perhaps through a modified version of the present paradigm. Examples include, but are not limited to the following: resources intended to support marginalized students, including research/travel fellowships and the creation of affinity groups; sponsorship of research projects or miniconferences on research related to DEI priorities; funding and publicity for programming that highlights the work of marginalized scholars or the study of marginalized groups; curricular initiatives and resources intended to diversify a program's course offerings and support instructors' efforts to diversify the corpus of researchers covered on syllabi in these courses; transparent evidence of efforts to assess program climate and implement strategies to address limitations identified by such assessment.

Furthermore, while the present results indicate that STEM departments would be well-served by prioritizing efforts and resources to diversify faculty, other forms of representation are also important and warrant future investigation, including the diversity of a program's graduate students and research staff. And the present findings do not rule out the possibility that still other variations on a departmental diversity/mission statement may yet have positive effects on minoritized applicants' perceptions (e.g., Apfelbaum & Suh, 2024). Our present manipulation utilized a fairly generic statement regarding the value of diversity and the importance of mutual respect. Might an academic department—even one with little in the way of faculty diversity—be able to craft a more persuasive and impactful statement focusing on culturally responsive science pedagogy? Or one centering antiracism allyship and advocacy?[1]

The present investigation has limitations. We note that we operationalized faculty diversity in a manner that included non-White faculty members of different apparent racial identities, which raises additional questions for continued exploration. There are multiple, intersectional ways through which faculty diversity can be assessed; recent research by Milless et al. (2022) indicates that among Black individuals, racial diversity with in-group representation produces better outcomes than racial diversity without in-group representation among Black students. This study was conducted using a fictitious academic department website, which allowed us to control for extraneous variables, but impacts the ecological validity regarding the true experience one goes through in learning about an academic department outlined above—to which potential applicants may also be exposed.

Future research should also consider individual difference variables that may play an important role in predicting potential applicants' perceptions of a graduate program, such as stigma consciousness, the intersection of race with gender and other social identities, and centrality of group identification more generally. Additionally, the published literature suggests that the medium in which cues are presented, and the source of such information, may play a role in one's perceptions of the DEI culture (Burrows et al., 2022; Pietri et al., 2018, 2021). These possibilities can be explored in future studies through the use of videos, testimonials from members of a department, or even climate survey reports.

Constraints of Generality

We chose to focus our investigation on Black individuals with a STEM background because this is an understudied population and because doing so allowed us to assess the effects of diversity-related cues and practices on the very population often targeted by DEI

[1] We thank an anonymous reviewer for these suggestions.

initiatives regarding graduate school admissions. We further chose to examine one specific minoritized group, as opposed to grouping various non-White minoritized individuals together and generalizing findings to all people of color, so that we could explore nuances within this group. Future studies should be replicated with other marginalized populations within education to explore the nuance and generalizability of these findings (we also note that our sample was predominantly composed of individuals identifying as women). Moving forward, an intersectional framework will be important for this research—for example, considering whether participant gender differences emerge in department climate related assessments, and evaluating the influence of gender-diversity related cues. It will also be important to examine the effects related to other identities (such as different racial backgrounds, sexual orientations, and academic standings) in conjunction with ISCs.

Conclusions

To close, if recruitment and retention of historically marginalized students is to be a central goal of academia, it is necessary that we continue the work to understand the learning processes and mechanisms that lead to perceptions of departmental climate. Given the limited time and resources of academic departments, it is crucial that they understand the effects of diversity-related cues on potential applicants, and target their efforts toward those inclusion strategies that will be most effective. Evidence-based cues (and initiatives designed to promote them) may be the best method to do this, as they signal to students and prospective applicants that a department "walks the walk and doesn't just talk the talk." The present investigation showcases the need to not only cue identity safety, but to also create it by showing concrete accomplishments of DEI efforts.

References

Apfelbaum, E. P., Stephens, N. M., & Reagans, R. E. (2016). Beyond one-size-fits-all: Tailoring diversity approaches to the representation of social groups. *Journal of Personality and Social Psychology*, *111*(4), 547–566. https://doi.org/10.1037/pspi0000071

Apfelbaum, E. P., & Suh, E. Y. (2024). Transparency about lagging diversity numbers signals genuine progress. *Journal of Experimental Psychology: General*, *153*(1), 255–267. https://doi.org/10.1037/xge0001489

Aschbacher, P. R., Li, E., & Roth, E. J. (2010). Is science me? High school students' identities, participation and aspirations in science, engineering, and medicine. *Journal of Research in Science Teaching*, *47*(5), 564–582. https://doi.org/10.1002/tea.20353

Auelua-Toomey, S. L., & Roberts, S. O. (2022). The effects of editorial-board diversity on race scholars and their scholarship: A field experiment. *Perspectives on Psychological Science*, *17*(6), 1766–1777. https://doi.org/10.1177/17456916211072851

Avery, D. R., Volpone, S. D., Stewart, R. W., Luksyte, A., Hernandez, M., McKay, P. F., & Hebl, M. M. R. (2013). Examining the draw of diversity: How diversity climate perceptions affect job-pursuit intentions. *Human Resource Management*, *52*(2), 175–193. https://doi.org/10.1002/hrm.21524

Branscombe, N. R., Ellemers, N., Spears, R., & Doosje, B. (1999). The context and content of social identity threat. In N. Ellemers, R. Spears, & B. Doosje (Eds.), *Social identity: Context, commitment, content* (pp. 35–58). Blackwell Publishing.

Burrows, D., Pietri, E. S., Johnson, I. R., & Ashburn-Nardo, L. (2022). Promoting inclusive environments: In-group organizational endorsement as a tool to increase feelings of identity-safety among black women. *Sex Roles*, *86*(1), 67–88. https://doi.org/10.1007/s11199-021-01253-2

Casad, B. J., & Bryant, W. J. (2016). Addressing stereotype threat is critical to diversity and inclusion in organizational psychology. *Frontiers in Psychology*, *7*, Article 8. https://doi.org/10.3389/fpsyg.2016.00008

Chaney, K. E., & Sanchez, D. T. (2018). Gender-inclusive bathrooms signal fairness across identity dimensions. *Social Psychological and Personality Science*, *9*(2), 245–253. https://doi.org/10.1177/1948550617737601

Cipollina, R., & Sanchez, D. T. (2019). Reducing health care disparities through improving trust: An identity safety cues intervention for stigmatized groups. *Translational Issues in Psychological Science*, *5*(4), 315–325. https://doi.org/10.1037/tps0000207

Cox, M. [@DrMonicaFox]. (2020, December 27). *Your diversity statement is how you treat people, not the words you put on a page saying how you treat people* [Tweet]. Twitter. https://twitter.com/drmonicacox/status/1425457128173617154

Dasgupta, N. (2011). Ingroup experts and peers as social vaccines who inoculate the self-concept: The stereotype inoculation model. *Psychological Inquiry*, *22*(4), 231–246. https://doi.org/10.1080/1047840X.2011.607313

Dover, T. L., Kaiser, C. R., & Major, B. (2020). Mixed signals: The unintended effects of diversity initiatives. *Social Issues and Policy Review*, *14*(1), 152–181. https://doi.org/10.1111/sipr.12059

Dover, T. L., Major, B., & Kaiser, C. R. (2013). Diversity initiatives, status, and system-justifying beliefs: When and how diversity efforts de-legitimize discrimination claims. *Group Processes & Intergroup Relations*, *17*(4), 485–493. https://doi.org/10.1177/1368430213502560

Dover, T. L., Major, B., & Kaiser, C. R. (2021). Cardiovascular, behavioral, and psychological responses to organizational pro-diversity messages among racial/ethnic minorities. *Group Processes & Intergroup Relations*, *24*(8), 1241–1261. https://doi.org/10.1177/1368430220944222

Emerson, K. T. U., & Murphy, M. C. (2014). Identity threat at work: How social identity threat and situational cues contribute to racial and ethnic disparities in the workplace. *Cultural Diversity and Ethnic Minority Psychology*, *20*(4), 508–520. https://doi.org/10.1037/a0035403

Good, J. J., Bourne, K. A., & Drake, R. G. (2020). The impact of classroom diversity philosophies on the STEM performance of undergraduate students of color. *Journal of Experimental Social Psychology*, *91*, Article 104026. https://doi.org/10.1016/j.jesp.2020.104026

Heilman, M. E., & Alcott, V. B. (2001). What I think you think of me: Women's reactions to being viewed as beneficiaries of preferential selection. *Journal of Applied Psychology*, *86*(4), 574–582. https://doi.org/10.1037/0021-9010.86.4.574

Howansky, K., Maimon, M., & Sanchez, D. (2022). Identity safety cues predict instructor impressions, belonging, and absences in the psychology classroom. *Teaching of Psychology*, *49*(3), 212–217. https://doi.org/10.1177/0098628321990362

Jansen, W. S., Otten, S., & van der Zee, K. I. (2015). Being part of diversity: The effects of an all-inclusive multicultural diversity approach on majority members' perceived inclusion and support for organizational diversity efforts. *Group Processes & Intergroup Relations*, *18*(6), 817–832. https://doi.org/10.1177/1368430214566892

Johnson, I. R., Pietri, E. S., Fullilove, F., & Mowrer, S. (2019). Exploring identity-safety cues and allyship among black women students in STEM environments. *Psychology of Women Quarterly*, *43*(2), 131–150. https://doi.org/10.1177/0361684319830926

Kalev, A., Dobbin, F., & Kelly, E. (2006). Best practices or best guesses? Assessing the efficacy of corporate affirmative action and diversity policies. *American Sociological Review*, *71*(4), 589–617. https://doi.org/10.1177/000312240607100404

Kizilcec, R. F., & Saltarelli, A. J. (2019). *Psychologically inclusive design: Cues impact women's participation in STEM education*. Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (pp. 1–10). https://doi.org/10.1145/3290605.3300704

Kroeper, K. M., Williams, H. E., & Murphy, M. C. (2022). Counterfeit diversity: How strategically misrepresenting gender diversity dampens organizations' perceived sincerity and elevates women's identity threat concerns. *Journal of Personality and Social Psychology*, *122*(3), 399–426. https://doi.org/10.1037/pspi0000348

Kruk, M., & Matsick, J. L. (2021). A taxonomy of identity safety cues based on gender and race: From a promising past to an intersectional and translational future. *Translational Issues in Psychological Science*, *7*(4), 487–510. https://doi.org/10.1037/tps0000304

Mattheis, A., De Arellano, D. C.-R., & Yoder, J. B. (2020). A model of queer STEM identity in the workplace. *Journal of Homosexuality*, *67*(13), 1839–1863. https://doi.org/10.1080/00918369.2019.1610632

Milless, K. L., Wout, D. A., & Murphy, M. C. (2022). Diversity or representation? Sufficient factors for Black Americans' identity safety during interracial interactions. *Cultural Diversity and Ethnic Minority Psychology*, *28*(1), 103–111. https://doi.org/10.1037/cdp0000492

Murphy, M. C., Steele, C. M., & Gross, J. J. (2007). Signaling threat: How situational cues affect women in math, science, and engineering settings. *Psychological Science*, *18*(10), 879–885. https://doi.org/10.1111/j.1467-9280.2007.01995.x

National Science Foundation. (2020). *Survey of earned doctorates*. https://ncses.nsf.gov/pubs/nsf21308/data-tables

Onyeador, I. N., Hudson, S. T. J., & Lewis, N. A. (2021). Moving beyond implicit bias training: Policy insights for increasing organizational diversity. *Policy Insights from the Behavioral and Brain Sciences*, *8*(1), 19–26. https://doi.org/10.1177/2372732220983840

Pietri, E. S., Johnson, I. R., Majid, S., & Chu, C. (2021). Seeing what's possible: Videos are more effective than written portrayals for enhancing the relatability of scientists and promoting Black female students' interest in STEM. *Sex Roles*, *84*(1-2), 14–33. https://doi.org/10.1007/s11199-020-01153-x

Pietri, E. S., Johnson, I. R., & Ozgumus, E. (2018). One size may not fit all: Exploring how the intersection of race and gender and stigma consciousness predict effective identity-safe cues for Black women. *Journal of Experimental Social Psychology*, *74*, 291–306. https://doi.org/10.1016/j.jesp.2017.06.021

Plaut, V. C., Thomas, K. M., Hurd, K., & Romano, C. A. (2018). Do color blindness and multiculturalism remedy or foster discrimination and racism? *Current Directions in Psychological Science*, *27*(3), 200–206. https://doi.org/10.1177/0963721418766068

Purdie-Vaughns, V., Steele, C. M., Davies, P. G., Ditlmann, R., & Crosby, J. R. (2008). Social identity contingencies: How diversity cues signal threat or safety for African Americans in mainstream institutions. *Journal of Personality and Social Psychology*, *94*(4), 615–630. https://doi.org/10.1037/0022-3514.94.4.615

Ragland, K. P. (2023, October 18). *Can I see myself there? How black potential applicants use diversity cues to learn about graduate program climate*. https://osf.io/8te93

Rosenblum, M., Jacoby-Senghor, D. S., & Brown, N. D. (2022). *Detecting prejudice from egalitarianism: Why Black Americans don't trust White Egalitarians' claims* [Preprint]. PsyArXiv. https://doi.org/10.31234/osf.io/96hkw

Starck, J. G., Sinclair, S., & Shelton, J. N. (2021). How university diversity rationales inform student preferences and outcomes. *Proceedings of the National Academy of Sciences*, *118*(16), Article e2013833118. https://doi.org/10.1073/pnas.2013833118

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology*, *69*(5), 797–811. https://doi.org/10.1037/0022-3514.69.5.797

Van Laar, C., Meeussen, L., Veldman, J., Van Grootel, S., Sterk, N., & Jacobs, C. (2019). Coping with stigma in the workplace: Understanding the role of threat regulation, supportive factors, and potential hidden costs. *Frontiers in Psychology*, *10*, Article 1879. https://doi.org/10.3389/fpsyg.2019.01879

White, A. M., DeCuir-Gunby, J. T., & Kim, S. (2019). A mixed methods exploration of the relationships between the racial identity, science identity, science self-efficacy, and science achievement of African American students at HBCUs. *Contemporary Educational Psychology*, *57*, 54–71. https://doi.org/10.1016/j.cedpsych.2018.11.006

Wilton, L. S., Bell, A. N., Vahradyan, M., & Kaiser, C. R. (2020). Show don't tell: Diversity dishonesty harms racial/ethnic minorities at work. *Personality and Social Psychology Bulletin*, *46*(8), 1171–1185. https://doi.org/10.1177/0146167219897149

Wilton, L. S., Good, J. J., Moss-Racusin, C. A., & Sanchez, D. T. (2015). Communicating more than diversity: The effect of institutional diversity statements on expectations and performance as a function of race and gender. *Cultural Diversity and Ethnic Minority Psychology*, *21*(3), 315–325. https://doi.org/10.1037/a0037883

Windscheid, L., Bowes-Sperry, L., Kidder, D. L., Cheung, H. K., Morner, M., & Lievens, F. (2016). Actions speak louder than words: Outsiders' perceptions of diversity mixed messages. *Journal of Applied Psychology*, *101*(9), 1329–1341. https://doi.org/10.1037/apl0000107

Received February 13, 2023
Revision received February 2, 2024
Accepted February 11, 2024 ■