

When Cultural Norms and Values Enable Inequity to Spread

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Abstract

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A society's norms and values – the thoughts, behaviors, and people that are perceived as typical or desirable – are often taken for granted. Norms and values can thus be overlooked as sources of inequity, leading inequity to persist even after solutions are enacted. Using cultural and social psychology, I identify how cultural norms and values deemed objective and beneficial reinforce inequities, such as racism and sexism. Across three manuscripts, I investigate (1) how to identify a culture's underlying norms and values (*Paper 1*) and (2) why cultural norms and values contribute to inequity (*Papers 2 and 3*).

In the first section of this dissertation, I identify the underlying cultural norms and values that prioritize the voices and perspectives of dominant groups (e.g., White people, men) and marginalize those of other groups. In Paper, 1 demonstrate that norms in psychological research perpetuate the same racial inequities observed outside of the lab. Indeed, I find that with respect

to who gets chosen as participants and who research questions typically focus on, Native American, Multiracial, Latinx, Asian, and Black people are, in that order, the most understudied racial groups in U.S. research on race. Compared to people of color, White people's voices and experiences are overwhelmingly prioritized in research on race and diversity. I theorize that cultural preferences favoring Whiteness spill into field norms, dictating how good research on race *should* look and subsequently influence the seemingly objective field of scientific research.

In the second section of this dissertation, I examine how people's choices within educational settings are influenced by their cultural contexts. In Paper 2, I provide evidence that gender disparities in STEM education (i.e., Science, Technology, Education, Mathematics) are largest between women and men with most social advantages and opportunities (i.e., higher opportunity contexts). Using cross-national datasets, data from the U.S. Department of Education on the number of STEM degrees obtained by race and gender, and comparisons by social class of U.S. school districts, I demonstrate that some gender gaps in STEM are paradoxically greater in higher versus lower opportunity contexts, suggesting new paths for understanding and reducing gender disparities. In Paper 3, I find that offering, versus not offering, diversity awards leads application pools for more lucrative unrestricted awards (i.e., awards open to everyone) to become less diverse. When two unrestricted awards are offered, applicants from marginalized groups are more likely to select the more lucrative award. However, the presence of a less lucrative diversity award causes applicants from marginalized groups to apply for and prioritize applications to the diversity award over the more lucrative unrestricted award. By not considering the context in which diversity awards are offered, diversity awards may maintain inequity between student groups by leaving larger, more lucrative awards to be won by primarily men and White students. To address this potential source of inequity, I propose potential

solutions for remedying this issue that do not focus on changing people from marginalized groups' behaviors or on eliminating diversity awards altogether, but instead focus on local structural solutions that could increase the attractiveness of unrestricted awards to applicants from marginalized groups.

Taken together, the data and theories presented in this dissertation support the need for a new more integrated model of culture's influence on inequity. Understanding how cultural norms and values influence and maintain inequity is essential for creating solutions to inequities that work. By examining our broader norms of who is seen as typical and uncovering how cultural features that seem beneficial possibly are not, this dissertation provides a new framework for understanding and reducing inequity.

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A society's cultural norms and values – the thoughts, behaviors, and people that are perceived as typical or desirable (Cialdini & Goldstein, 2004) are extremely influential. Norms influence our behavior and beliefs (Asch, 1951; Crandall et al., 2002; Miller & Prentice, 2016; Paluck & Shepherd, 2012) and are an integral part of what distinguishes one cultural context from another (for review see Lehman et al., 2004). Yet, norms and values are often taken for granted. Similar to how a fish may be unaware of the water it swims in, the norms and values that envelop a society can go unnoticed. I propose that when norms and values are taken for granted, they can be overlooked as sources of social inequity (e.g., racism, sexism).

Norms and values may influence inequity via the culture cycle, a psychological framework for identifying the multilayered relationship people and their cultural contexts (Hamedani & Markus, 2019; Markus & Kitayama, 2010). The culture cycle deconstructs culture into four dynamic levels: ideas, institutions, interactions, and individuals, with each level influencing the next. I theorize that cultural norms and values would be placed at the “ideas” level of the culture cycle, forming the foundation of a culture's broader ideals. These ideas about what and who is normative influence notions of what behaviors are good and typical within our social institutions (e.g., colleges and universities, workplaces), within our social interactions with one another, and what individuals' think about themselves (Markus & Kitayama, 2010).¹ In line with the culture cycle, I propose that when the ideas that lay the foundation of a culture contain traces of inequity, even unintentionally, inequity will spread throughout each level of that culture.

¹ It is necessary to note that while the culture cycle is understood to be bidirectional with the ability for individuals to be influenced by culture and culture to be influenced by individuals (Boiger & Mesquita, 2012; Markus & Kitayama, 2010), here I will primarily focus on just one direction of this relationship, how norms and values of who is typical and what behaviors are valued are dispersed into day-to-day life.

For instance, inequity within the ideas level of the culture cycle could prompt organizations to fail to notice that their policies privilege members of dominant over marginalized groups. An example of this can be seen with tenure-clock stoppage policies. Tenure-clock stoppage policies allow academic women and men to “pause” their tenure clocks after the birth or adoption of a child. On the surface this policy seems beneficial to all new parents. However, data suggests that men in academia benefit more from tenure-clock stoppage policies compared to women (Antecol et al., 2018). In line with the culture cycle, this may be because broader cultural norms suggest that within heterosexual partnerships, women are responsible for child rearing and men are responsible for earning a high income (Croft et al., 2020; Diekmann & Eagly, 2000). Thus, when women and men take advantage of tenure-clock stoppages, women are still responsible for attending to child care needs while men use this time to get ahead on research (Antecol et al., 2018). This example illustrates that when inequity exists within a culture’s broader ideals, in this case the ideals of parenthood, even policies that are meant to be beneficial can promote inequity.

Across three manuscripts, I will demonstrate how cultural norms and values deemed objective and even positive maintain inequity. I will investigate (1) how to identify a culture’s underlying norms and values and (2) how and why cultural norms and values contribute to inequity. By identifying and understanding the relationship between inequity and cultural norms and values, I plan to devise more comprehensive theories of how inequity operates in modern life. In particular, I am interested in why it is that solutions meant to remedy the inequities seem to, in many instances, continue to propagate them instead.

Part I: Identifying Cultural Norms and Values

Cultural norms of whose ideas are desirable who is typical and may enable inequity to spread undetected in even seemingly objective contexts. It may be that even when a context is intended to be free of bias, the norms that influence that context may still promote inequity. In Part I, I identify the norms and values that prioritize the voices and perspectives of people from dominant groups (e.g., White people) and marginalize those of other groups.

Paper 1: Examining who gets left out in the Study of Race and Diversity

Turning to the seemingly objective domain of scientific research, in this first paper I examine the extent to which scientific research on race and diversity centers the experiences of White people relative to people from racially marginalized groups (Germano & Cheryan, *in preparation for submission*). Here I conduct an extensive review of the social psychological literature on race and diversity between 2008 – 2018 by coding abstracts and the participant demographic sections of articles published across the top three social psychology journals, *Journal of Personality and Social Psychology (JPSP)*, *Journal of Experimental Social Psychology (JESP)*, and *Personality and Social Psychology Bulletin (PSPB)*. Building off prior critiques of research on race (e.g., Roberts et al., 2020; Shelton, 2000), I examine how common scientific norms and research practices have led to fewer research articles focused on the experiences of people of color. In particular, I examine how sociocultural and historical features (e.g., historic segregation between Black and White people (Bobo, 2011), the continued colonization and invisibility of Native Americans (Fryberg et al., 2016)) have contributed to why it is that some racial minority groups are more and less likely to be studied in psychological research. I propose that these his sociocultural and historical features influence what types of research practices are considered normative and good science, perpetuating the same racial hierarchies and inequities seen outside of the lab.

Part II: Understanding How and Why Cultural Norms and Values Contribute to Inequity

Cultural norms and values may maintain inequity by influencing individuals' personal choices. Cultural ideas about what is the right way to be a woman (Diekmann & Eagly, 2000; Prentice & Carranza, 2002) may influence women at the individual level by determining the types of choices they feel are suitable to make for themselves, including which career paths they should take (Germano, et al., *in preparation for submission*) and what types of opportunities they should apply for (Germano, et al., 2021). In this second section, I examine how people's choices are influenced by their cultural contexts within the domain of education.

Paper 2: Why are Some Gender Gaps in STEM Greater Among those with the Most Opportunity?

While gender gaps in Science, Technology, Engineering, and Mathematics (STEM) education remain an important global issue (Charles & Bradley, 2009; Soylu Yalcinkaya & Adams, 2020), there is evidence that gender gaps between some women and men are larger than others. In this paper, my colleagues and I propose that gender gaps are largest within higher relative to lower opportunity contexts (Germano, et al., *in preparation for submission*). We define higher opportunity contexts as contexts where women are predominately White, from middle- to higher-socioeconomic backgrounds, come from racially advantaged groups and well-resourced nations. Using these metrics of comparison and multi-national datasets on national STEM achievement, data on racial differences in U.S. STEM degrees obtained, and comparisons between higher- and lower-socioeconomic school districts, we demonstrate that some STEM gender gaps are greater in higher relative to lower, opportunity contexts.

Paper 3: Do Diversity Awards Discourage Applicants from Marginalized Groups from More Lucrative Opportunities?

Within educational contexts, marginalized students (e.g., women, racial and ethnic minorities, first-generation college students) face greater academic challenges relative to students from dominant groups (Cheryan et al., 2009; National Center for Education Statistics, 2017; Stephens et al., 2012). To address these disparities, many educational equity initiatives focus on providing specialized opportunities to marginalized students to level the playing field (e.g., offering diversity awards). Yet, these initiatives rarely consider how broader cultural norms and values might influence the initiative's outcomes. In my third paper, my colleagues and I investigate whether offering diversity awards leads applicants from marginalized groups to be less likely to apply for more lucrative awards open to all student groups (Germano, et al., *in press*). Across four studies, we investigate how the context in which awards are offered can influence the choices marginalized students make about which awards to apply for. More specifically, we examine whether offering, versus not offering, diversity awards leads application pools for more lucrative unrestricted awards (i.e., awards open to everyone) to become less diverse. Here I investigate why applicants might select smaller diversity awards when offered in tandem with larger unrestricted awards and what can be done. By looking to understand how cultural contexts influence marginalized people's choices, this research can provide insight into how set up effective equity solutions that do not encourage marginalized applicants to miss out on bigger, more prestigious opportunities.

Taken together, each of these projects works to identify how features of our cultural contexts are intrinsically connected to inequity.

Part I: Identifying cultural norms and values

Who Gets Left Out When We Study Race?

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Abstract

We quantify the extent to which people of color's experiences and voices are excluded from research on race. Using a pre-registered coding scheme, we coded paper abstracts and demographics within U.S. articles published on race and diversity between 2008 – 2018 in the 3 top ranked social psychology journals (i.e., *Journal of Personality and Social Psychology*, *Journal of Experimental Social Psychology*, and *Personality and Social Psychology Bulletin*). We find that with respect to who gets chosen as participants and who research questions typically focus on, Native American, Multiracial, Latinx, Asian, and Black people are, in that order, the most understudied racial groups in U.S. research on race. We argue that current research practices: linking Whiteness with objectivity, “me-search”, focusing on perceivers versus targets, and the perceived unavailability of non-White participants collectively promote the marginalization of people of color within research on race. Considering why these research norms came to be, we examine the consequences to research on race and diversity when Black, Asian, Latinx, Multiracial, and Native American people's experiences are seen as comparatively less research-worthy than White people's experiences. We put forth suggestions for how researchers can increase the racial diversity of their research on race and diversity.

Keywords: race, diversity, inequity, metascience

Who Gets Left Out When We Study Race?

While social psychology in the U.S. has had a long history of researching interracial relations and growing U.S. racial diversity (Allport, 1979; Clark & Clark, 1947; Gaertner & Dovidio, 1986; Greenwald & Banaji, 1995; LeVine & Campbell, 1972), a cursory glance would reveal that much of this seminal work has been conducted primarily by White researchers and continues to remain so even today. With many notable exceptions (e.g., Eberhardt et al., 2004; Shelton et al., 2005), much of the research on race that the field continues to uphold as important has been led by predominately White researchers and/or focused on understanding White people's experiences with race (e.g., Apfelbaum et al., 2008; Craig & Richeson, 2014; Devine et al., 2012; Knowles et al., 2014). A close examination of how we study race and diversity in social psychology would likely reveal that our theorizing on race gives little attention to the experiences of racially marginalized people.

Critiques of how social psychologists conduct research on race are well documented. Scholars of race and diversity argue that studies on interracial relations are frequently designed such that power is placed into the hands of White people, whose thoughts and attitudes are captured in studies and questionnaires, relative to Black people, who are more likely to appear in studies and questionnaires as study stimuli or better put, as "tools" to make sense of White peoples' biases (Amir, 1969, p. 321; Shelton, 2000). The power dynamics of which racial groups are more likely to be deemed good participants, versus who is deemed good study stimuli, has been argued to mirror the same pro-White racial hierarchy seen outside of the lab (Shelton, 2000). This suggests that studies meant to uncover and understand racial biases may be inadvertently replicating those same biases through their design. In addition to critiques on power structures, researchers have also highlighted the importance of studying the psychological

experiences of different racially marginalized populations. In particular, researchers have called for greater research investigating the unique experiences of Latinx people (Dovidio et al., 2010), Multiracial people (Gaither, 2015), and Native American people (Fryberg & Eason, 2017). A recent excavation of the Social, Cognitive, and Developmental psychological literature found that not only were White participants more likely than participants of color to be included in research on race, but that the editors of these papers were more likely to be White as well (Roberts et al., 2020). It would seem that predominately White editors are setting the conversation on race leading there to be little, if any, attention to racially marginalized people's racial experiences. This raises the question of when racially marginalized people, particularly Asian, Black, Latinx, Multiracial, and Native American people, are included in research on race, to what extent are each of their perspectives included and excluded? Which racially marginalized groups more and less likely than others to be included? And, why despite decades of numerous calls for change, does research on race and diversity continue to center White experiences?

Using articles on race and diversity published between 2008 – 2018 in the *Journal of Personality and Social Psychology (JPSP)*, the *Journal of Experimental Social Psychology (JESP)*, and *Personality and Social Psychology Bulletin (PSPB)*, we examine the extent to which Asian, Black, Latinx, Multiracial, and Native American participants are underrepresented in research on race relative to White participants. While this paper is not the first to examine the absence of racial minorities in psychological research on race (e.g., Roberts et al., 2020; Shelton, 2000), we provide (1) the first empirical disaggregation of the extent to which Asian, Black, Latinx, Multiracial, and Native American people are marginalized in research on race and diversity and (2) the first empirically driven examination of why research on race looks as it currently does. We achieve this by not only examining the racial demographics of participants

across studies in papers, but by also quantifying which racial groups are more and less frequently included as topics of study. Gaining empirical insights into these areas is key not only for quantifying blind spots in theory building, but also in ensuring that the science researchers are conducting is reflective of the full scope of real-world racial dynamics.

Empirically understanding the discrepancies between different racial minority groups' representation in the social psychological literature is the first of many important steps to developing new field norms. Re-defining standard norms and practices of how research on race *should* look with how it *could* look is essential for conducting more comprehensive science. We argue that current research practices in the study of race and diversity render racial minority perspectives invisible by centering White people and their experiences at the forefront of research. In this paper, we provide a comprehensive review of the different systemic reasons research looks this way along with accompanying solutions for rectifying this troubling imbalance. We then examine the sociocultural and historic reasons why it is some racial minority groups are more and less likely to be represented in research on race. By reflecting on how current research norms and practices leave racially marginalized people's experiences virtually invisible in research on race, we aim to provide a blueprint for change that better incorporates racially marginalized perspectives within the research process, ultimately generating better psychological research.

Our Methodological Process

We investigated whether Asian, Black, Latinx, Multiracial, and Native Americans were less likely to be represented in research on race relative to White Americans, and if so, to what extent? Articles were included in our query if their title, abstract, or keywords made mention of race, racial diversity, diversity, or racial minorities and if the paper's research focused on U.S.

racial groups. We chose to limit our sample to just papers from the U.S. because of how conceptions of race and diversity vary across nations. From these criteria, we extracted 96 *JPSP*, 174 *JESP*, and 106 *PSPB* articles focused on race and diversity. Our exclusion criteria, coding scheme, research questions, and hypotheses were preregistered and be accessed at https://osf.io/5cfyd/?view_only=791df290864d47ff83f2174af234b594.

Coding Scheme

Our coding scheme had two goals: (1) to quantify the number of instances Asian, Black, Latinx, Native American, and White people appeared in a paper's abstract to capture who was more and less likely to be included as topics of research and (2) to record the number of Asian, Black, Latinx, Multiracial, Native American, and White participants recorded within every reported study's racial demographic section. Six coders, two per journal, and 1 tie-breaker who were blind to the study's hypotheses and purpose evaluated the racial breakdown of each article's abstract and study demographics.

Article Abstracts

Article abstracts were coded for the number of the racial groups explicitly mentioned in the abstract. Coders entered the number of groups mentioned ranging from 0 (no racial groups mentioned in the abstract) to the maximum number of racial groups mentioned. After entering the number of groups mentioned in the abstract, coders then recorded which racial groups were mentioned. The presence, or absence, of Asian, Black, Latinx, Native American, and White people in abstracts was coded from 0 (not mentioned) to 1 (mentioned).

For paper abstracts, we were interested in investigating who was most likely to be included in research on race overall and when racially marginalized people were included, which groups were most likely to be included? We predicted that above all, White people would be the

most mentioned racial groups across abstracts and that when racially marginalized people were mentioned in abstracts, they would be more likely to be Black people relative to Asian, Latinx, or Native American people.^{1, 2}

Racial Demographics of Participants in Studies

Because a single research article can contain a wide array of studies, with some focused on race and others on other aspects of identity, we coded each study's research questions, hypotheses, and methods to ensure that only studies focused on race were included in our analyses. Coders used a scale of 1 (study is focused on race) or 0 (study is not focused on race) and only studies focused on race were included in our analyses. From the participant demographic section of each study, coders recorded the number of participants in each study who were reported as – Asian, Black, Latinx, Multiracial, Native, and White Americans.³ If a paper's demographic section did not mention a given group, coders entered a 0 for that demographic.

Here we were interested in quantifying whose experiences are being recorded in research on race. We predicted that overall, White participants would be the most researched group on race and that when racially marginalized people were included, Black participants would be more likely to be included compared to Asian, Latinx, Multiracial, and Native Americans.⁴

What Did We Find?

¹ Our original pre-registered hypothesis only accounted for differences among racial minorities, where we predicted that Black people, relative to all other racial minorities, would be the most represented in abstracts. For these results, please see Supplement.

² We originally pre-registered doing comparisons between abstracts to see which two racial groups would be most likely to be featured in abstracts. We predicted that White people and Black people would be the most featured racial groups in abstracts. For these results, please see Supplement.

³ Coders also recorded the number of instances groups were reported as “minorities” or “people of color”, or reported as combined groups (e.g., 35 Black and Latino participants), and when reported as “other”. These groups were not included in our analyses but were coded for thoroughness.

⁴ Our original pre-registered hypothesis only accounted for differences among racial minorities, where we predicted that Black people, relative to all other racial minorities, would be the most represented as participants.

Article Abstracts

Because we were interested in examining which racial groups were most and least likely to be the topic of papers on race and diversity, we measured the number of instances Asian, Black, Latinx, Native American, and White people appeared in paper abstracts. As predicted, we found that across *JPSP*, *JESP*, and *PSPB*, White people were overall, the racial group abstracts were most likely to focus on, with White people being mentioned across 51 (53.13%) *JPSP* abstracts, 132 (75.86%) *JESP* abstracts, and 75 (70.75%) *PSPB* abstracts. Also in line with our hypothesis, we found that when came to examining which racially marginalized group researchers were most likely to focus on, Black people were the most mentioned racial group in abstracts with mentions across 54 (56.25%) *JPSP* abstracts, 117 (67.24%) *JESP* abstracts, and 54 (50.94%) *PSPB* abstracts. Of note was the extreme invisibility of Native American people as a research focus, with Native American people being mentioned only across 1 (1.04%) *JPSP* abstract, 1 (0.57%) *JESP* abstract, and in no *PSPB* abstracts, see Fig. 1 for all results.

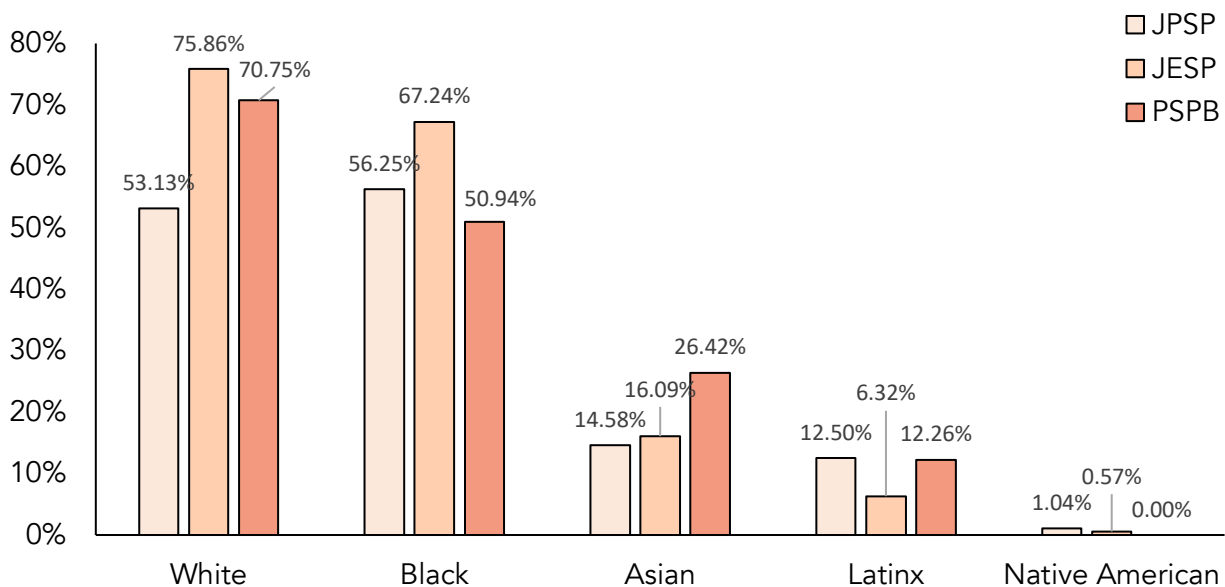


Fig. 1. Percentage of instances White, Black, Asian, Latinx, and Native American people were mentioned as research topics within *JPSP*, *JESP*, and *PSPB* article abstracts.

Racial Demographics of Participants in Studies

After identifying Asian, Black, Latinx, Multiracial, Native American, and White people's representation as participants across *JPSP*, *JESP*, and *PSPB*, see Fig. 2, we turned to our primary question, whose experiences with race are most likely to be studied and whose experiences with race are most likely to be left out? In chi-square tests of homogeneity comparing the two most represented groups, White and Black participants, we found that White participants were significantly more likely to be included in research on race compared to Black participants across all three journals, *JPSP*, $\chi^2(1, N = 23,444) = 9,187.2, p < .001, \phi = .15$; *JESP*, $\chi^2(1, N = 412,289) = 214,282, p < .001, \phi = .27$; *PSPB*, $\chi^2(1, N = 1,369,204) = 716,405, p < .001, \phi = .27$. Thus, our hypothesis that White participants and their experiences would be the most sampled in research on race was confirmed.

We next were interested in examining whether Black participants were significantly more likely to be represented in research on race relative to other racial minorities. Using a chi-square test of homogeneity comparing Black and Asian participants' representation in *JPSP* we found no difference in representation between either group, $\chi^2(1, N = 8,912) = 1.84, p = .18$, however, our hypothesis was confirmed when examining Black and Asian participant representation across *JESP*, $\chi^2(1, N = 71,911) = 25,888, p < .001, \phi = .13$ and *PSPB*, $\chi^2(1, N = 190,387) = 186,456, p < .001, \phi = .96$, such that Black participants were significantly more likely to be represented in research on race compared to Asian participants within these journals.

To identify which racial group's experiences were the least significantly likely to be sampled in research on race, we compared our two lowest represented racial groups, Multiracial and Native American people. In chi-square tests of homogeneity, we found that Multiracial participants were significantly more likely to appear as participants in research on race relative to

Native Americans, $JPSP$, $\chi^2(1, N = 1,373) = 863.74, p < .001, \phi = .40$; $JESP$, $\chi^2(1, N = 28,769) = 28,749, p < .001, \phi = 1.0$; $PSPB$, $\chi^2(1, N = 199) = 9.29, p < .01, \phi = .002$, suggesting that overall, compared to White, Black, Asian, Latinx, and Multiracial people, Native American people's experiences with race are the least represented and least sampled.

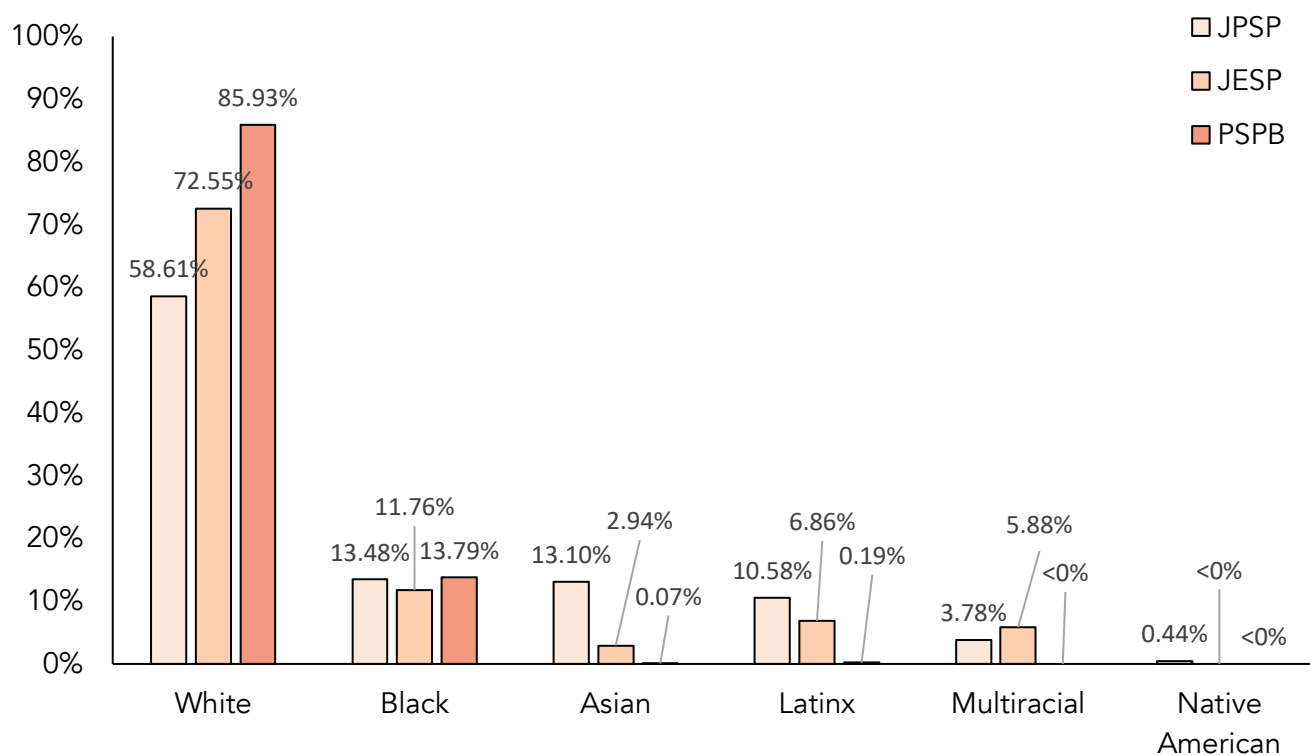


Fig. 2. Percentage of White, Black, Asian, Latinx, Multiracial, and Native American participants in research on race and diversity across $JPSP$, $JESP$, and $PSPB$.

Why are White experiences centered in research on race?

Expanding on previous work critiquing social psychological approaches to research on race (e.g., Roberts et al., 2020; Shelton, 2000), in this section we suggest that to understand why White participants and their experiences are most studied, it is necessary to first examine the research practices and norms that have transformed White thoughts and experiences into the default. We begin our investigation by reviewing four novel potential reasons, three that are

empirically-driven and one that is theoretically-driven, for this phenomenon: (1) White perspectives are regarded as normative, (2) the prevalence of White researchers using research as “me-search”, (3) Focusing on the racial experiences of perceivers opposed to targets, (4) The perceived unavailability of non-White participants. We suggest that these reasons collectively contribute to the current state of research on race.

White Perspectives are Regarded as Normative

Due largely in part to being a numeric majority (Colby & Ortman, 2015) and a group that holds the most social power (Knowles et al., 2014), White people represent the *typical* U.S. racial group (For research on typicality and its criteria, see Barsalou, 1985, 1987). This typicality leads White perspectives and experiences to be regarded as more normative than other racial groups, increasing the misattribution of Whiteness with objectivity. Indeed, explanations of differences between high- and low-status groups reveal that high-status groups are more likely to be considered the normative “backdrops” to which low-status groups are explained by (Hegarty & Bruckmüller, 2013; Miller et al., 1991). Viewing Whiteness as normative likely leads researchers to be more likely to include White participants as baseline and control groups in their research on race. Yet, this practice has several disadvantages.

When White experiences are treated as normative in psychological research, racially marginalized people’s psychological experiences are subsequently equated as non-normative. This presents a problem not just for the racially marginalized people whose experiences are regarded as peripheral, but also because it is factually incorrect. Psychological research on WEIRD (Western, educated, industrialized, rich, and democratic) samples reveal that the typical U.S. White participant’s psychological experiences are non-representative of most people’s psychological experiences (Cheon et al., 2020; Henrich et al., 2010; Medin, 2017), suggesting a

fallacy in linking Whiteness with normativity. Additionally, with current trends pointing to the U.S. becoming a majority-minority nation (Colby & Ortman, 2015), it may be necessary to rethink just how normative U.S. Whiteness is as a psychological experience.

How Can the Field Begin to Reverse this Practice?

Changing a cultural norm, particularly the prevalent norm of equating Whiteness with normativity will not be easy. However, it is not impossible. One step researchers can take to begin reversing this thinking is to stop equating Whiteness with objectivity in research. For instance, if researchers were to discontinue the common practice of using faces of White people's faces as "base" faces in their face perception studies, using White participants as their control groups and comparison groups to "explain" how racial minorities are psychologically different, and many of the other common research norms researchers engage in when studying race, it would begin to chip away at the notion that White people's experiences are normative in psychological research. Taking these steps, as well as others would help to disambiguate Whiteness with objectivity and normativity in research.

The Prevalence White Researchers Who "Me-search"

White experiences may also dominate research on race due to "me-search", or the common practice of generating research topics from one's own life experiences. While me-search can have benefits, such as allowing researchers to connect with their theories on a personal and lived level to generate novel research, it is by definition, limited to a researcher's own experiences. Thus, the demographics of who conducts research on race and diversity matters. Using me-search as a common research practice may pose a problem if instead of drawing on diverse set of life lived experiences, me-search instead repeatedly draws from the lived experiences of just one group – White researchers. Indeed, research on housing and

neighborhood segregation (Grigoryeva & Ruef, 2015; Lichter et al., 2015) and interracial relationships (Parker et al., 2015; Shelton et al., 2005) suggest that for many White people, their experiences are largely limited to just the White experience.

Research on race may be more likely to draw on White experiences because White researchers make up the largest proportion of social psychology researchers. Demographic reports from the Society for Personality and Social Psychology (SPSP) reveal that majority of its membership are White (62%), followed by Asian (14%), Latinx (5%), Multiracial (4%), Black (4%), and Native American (< 1%) members, see Fig. 3 (SPSP, 2019). These data suggest that White researchers account for the biggest demographic of social psychologists and perhaps, the most sampled “me-search” experiences when generating research on race.

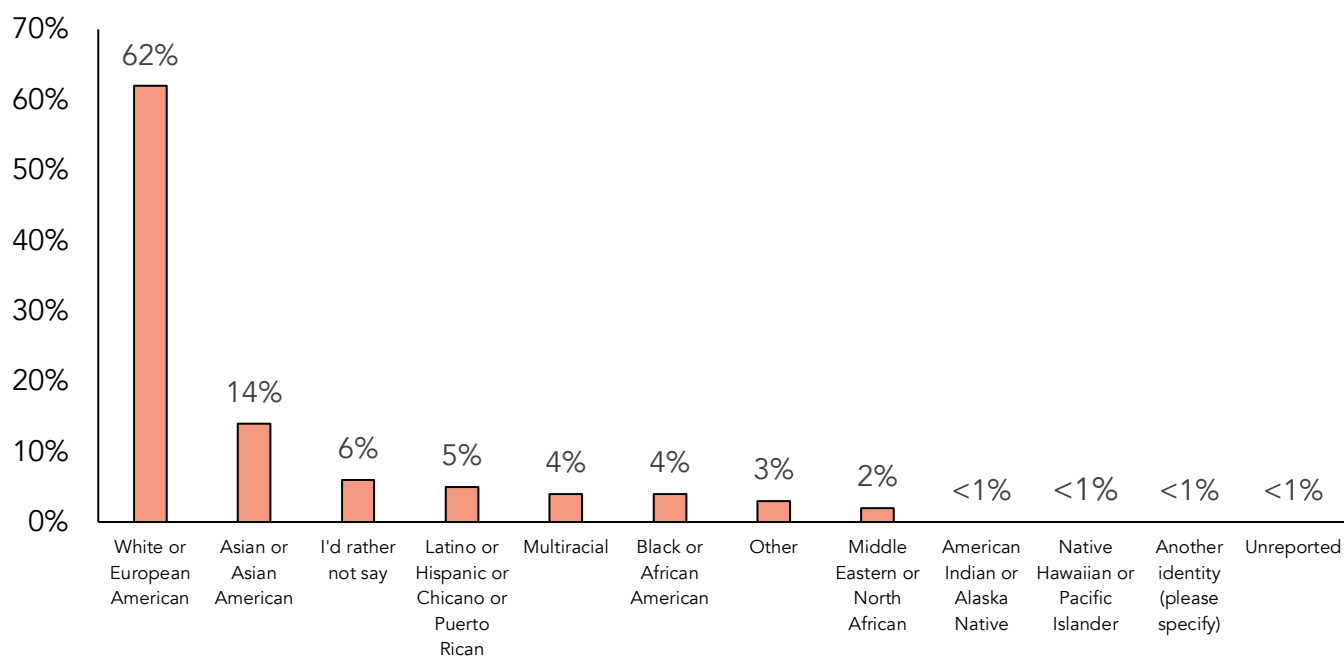


Fig. 3. Racial demographics of the Society for Personality Psychology’s 2019 membership in percentages.

But there may be caveats to drawing this conclusion. For one, SPSP does not disaggregate membership data by subfield (e.g., attention, morality, diversity). It may be that the subset of researchers who publish research on race are more likely to come from marginalized racial groups compared to SPSP's overall demographics. Yet, while plausible, it remains most likely that White researchers account for the largest proportion of researchers studying race and diversity simply because of how much greater their representation is within SPSP as a whole relative to other racial groups. Second, if we are to believe that me-search drives research on race purely by looking at demographics, it would follow that the second largest racial group in SPSP, Asian researchers, would also dominate research on race. Yet, this is not the case. According to our findings across JPSP, JESP, and PSPB, Black participants are the second most sampled participant group. It seems that while "me-search" is likely to be one reason why White experiences dominate research on race, it is likely just a piece and not the entire picture.

What Can the Field Do?

If "me-search" accounts for some of the reason why White perspectives are overrepresented in research on race, increasing the racial diversity of researchers in the field is an important first step. Actively recruiting and supporting early career scholars from underrepresented racial groups is a crucial to diversifying the types of personal experiences researchers draw upon and choose to study. However, simply recruiting scholars from underrepresented racial groups cannot be both the beginning and end to addressing the underrepresentation of racially underrepresented perspectives in research. Not only do racially underrepresented scholars need to be recruited into and promoted within the field of psychology, but the types of research questions that scholars from these groups choose to examine need to begin to be more valued. If the norms of what good research on race should look continue to

prioritize Whiteness, increasing the racial representation of racial minority scholars will not fix the problem. Indeed, just because a workplace becomes more diverse, it doesn't mean that the status quo won't continue to be maintained (e.g., Begeny et al., 2020). Scholars from racially underrepresented groups may be encouraged to continue examining questions focused on White people and their experiences if these are publication topics the field continues to value.

Addressing this issue will take a two-pronged approach. As racial diversity within the field of psychology increases, so too must types of research questions that are prioritized.

Focusing on the Perceiver Versus the Target

Similarly, if we look at how social psychology experiments are frequently conducted, researchers typically focus on measuring the psychological experiences of perceivers, people who are *observing* a particular psychological phenomenon, instead of targets, people who are the *subject* of a particular psychological phenomenon. For instance, in research on race, this commonly translates to measuring White people's beliefs and behaviors towards racially marginalized people. Indeed, when racially marginalized people appear in research on race, they are often portrayed as the stimuli that White participants are reacting to (Shelton, 2000). Shelton (2000) argues that measuring White people's reactions to stimuli of racially marginalized people maintains racially hierarchies seen outside of the lab where White people are seen as fully rounded individuals whose thoughts worth measuring, and racially marginalized people are seen passive objects who are only to be asked about. Focusing on the experiences of White perceivers has the ill intended consequence of pushing racially marginalized people's perspectives to the fringes of what is considered "typical" in science by centering the opinions and thoughts of just one group and casting the experiences of others to the side.

While this paper argues that centering White experiences in research on race is disruptive to scientific theory, taking White perceivers' perspectives in research is at times useful. Many influential interventions aimed at improving interracial dynamics and reducing racial biases have been developed as a result of taking White perceivers' perspectives (e.g., Czopp & Monteith, 2003; Devine, Forscher, Austin, & Cox, 2012; Lai et al., 2016; Paluck & Green, 2009). Because White people in the U.S. have historically been the perpetrators of racism and harmful social laws and policies targeting racially marginalized groups (e.g., Japanese internment (Takaki, 1989), slavery (Baptist, 2014), Native American genocide (Madley, 2016)), finding methods to reduce White Americans' racial biases is of great societal importance. It is likely that one of the reasons why our paper's findings demonstrate such great numbers of White participants in research on race is that much of this research has been focused on testing interventions to reduce White Americans' racial biases. Exploring our dataset to see if this is the case, we find that only 5% of the papers in our sample were focused on interventions to reduce racial prejudice. This finding suggests that it is not likely that White participants account for such a large proportion of participants because researchers are conducting so many interventions to reduce racial prejudice. While this work demonstrates the importance of understanding the perspectives of people who are often the racial oppressors in U.S. society, it should not be all that we study.

Looking beyond the perspectives of White perceivers is important because White people are not only U.S. racial group with racial biases. People from racially marginalized groups demonstrate similar anti-Black biases as White people (e.g., Florido, 2020) and have been known to support legal policies that would disadvantage fellow racially marginalized groups (Lee, 2021). These examples suggest that even if researchers were to continue focusing on

perceiver's racial attitudes, looking beyond White experiences could be theoretically and socially beneficial. Examining intraminority relations and attitudes could allow researchers to break new ground in our understandings of how different racial groups are perceived and understood.

What Can the Field Do?

Researchers could work to consciously reframe whose perspective they take in their work on race and diversity. One place to start would be by creating studies that center the psychological perspectives of racially marginalized people. Making this change would be bigger than swapping in a few studies in a manuscript that encompass multiple racial group's perspectives or by simply including a greater number of racial minority participants across a paper's studies. Instead, researchers will need to carefully consider whose psychological perspectives their work centers, not just in terms of who is featured in study materials and stimuli, but in whose experiences their research questions focus on. If researchers continue to ask research questions that take the vantage point of what White people think and feel, the inclusion of a greater number of racial minority participants won't de-center White experiences in research on race. To actually begin de-centering White experiences in research on race, researchers must evaluate each aspect of their research projects. Researchers could begin by thinking through their overarching research questions (e.g., does this research question take the perspective of racially dominate groups?) and working their way to their data analyses, interpretation, language, and visualization (e.g., who is framed as the comparison group vs baseline?; see Hegarty et al., 2010; Miller et al., 1991). Because taking White perspectives in research is the norm (see section on how White perspectives are regarded as normative), thinking through each of these steps will not be easy at first, however it necessary that researchers make this transition.

The Availability of White Participants

Last, another potential reason why White experiences dominate research on race could be due to the perceived availability of White participants relative to participants from racially marginalized groups. While recent U.S. census data reveals that White people are the majority racial group, the number of people in the U.S. who are racial minorities is still sizeable (Colby & Ortman, 2015). Data points to the U.S. becoming a majority-minority nation by 2044 (Colby & Ortman, 2015), suggesting that while White people may be a numeric majority within the U.S., racial minorities are growing in numbers as well. Even if U.S. researchers were to abide by the logic that focusing on White experiences makes sense because it is a way to measure a group whose experiences reflect majority of the U.S. population, this logic would be faulty. When collapsing across all each of the journals we examine in this paper, we find that White people are in fact overrepresented relative to their U.S. demographic proportions and every other racial minority group is underrepresented in research on race and diversity, see Fig 4. These findings suggest that while White people are a majority, they are not as much of a majority as their sampling in research on race and diversity would have it seem.

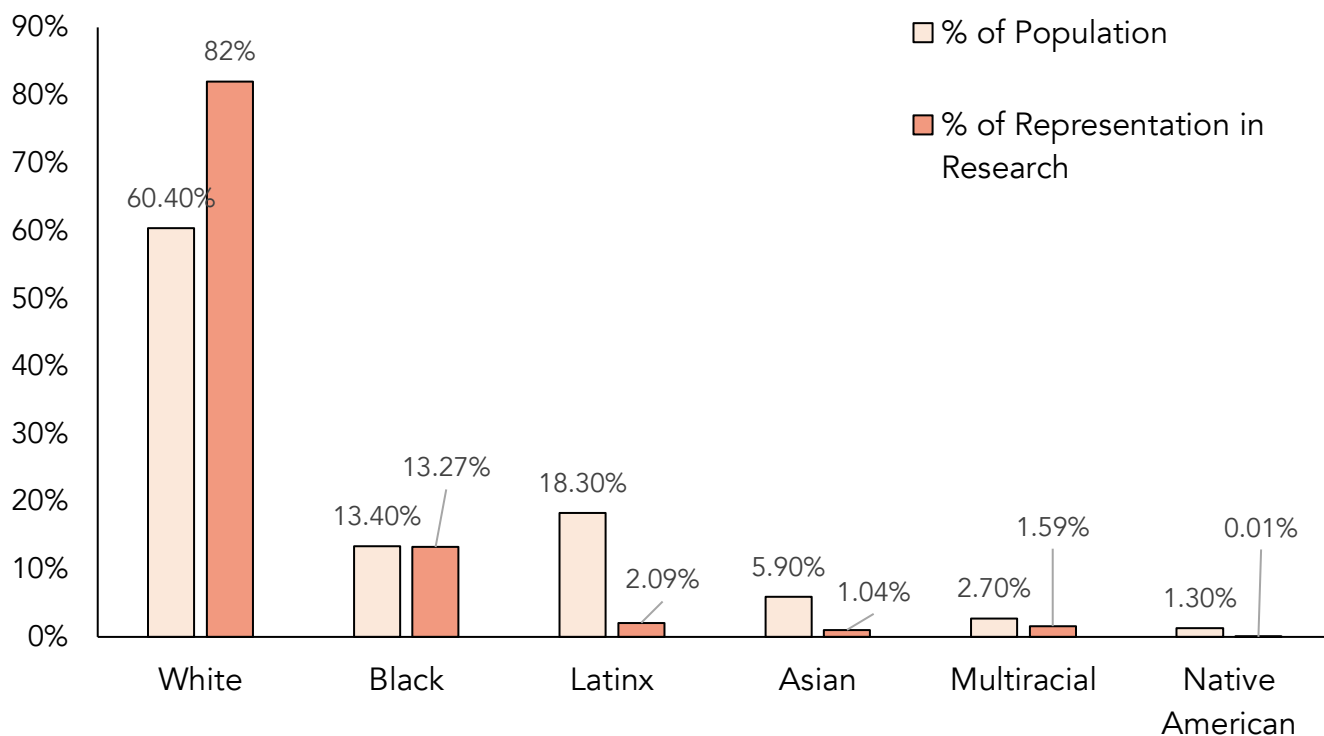


Fig. 4. Comparison of the percentage of White, Black, Latinx, Asian, Multiracial, and Native American people in the U.S. population versus each respective group's percentage of representation in research on race and diversity across *JPSP*, *JESP*, and *PSPB*.

Another factor that may account for the oversampling of White participants is if researchers at predominately White institutions rely on their department's psychology subject pools and on the communities surrounding their colleges and universities, it may feel as though getting access to participants who are not White is a hurdle. However, just because White undergraduate students may be more readily available to researchers, their experiences may not be the most generalizable (e.g., WEIRD samples; Henrich et al., 2010).

What Can the Field Do?

One way to address this issue is to increase cross-institutional research collaborations. Data from the U.S. Department of Education (2017) demonstrates that that there are great

numbers of Asian, Black, Latinx, and Native American students in U.S. higher education, and in many instances, at higher proportions than are being represented in research on race, see Fig. 5. Cross-institutional collaborations with universities in communities with large numbers of racial minorities could be one way for researchers to not only develop more generalizable research findings but to also increase the racial diversity of their samples. A second solution to increasing the diversity of research samples is to engage in more online data collection. Not without its own limitations (e.g., increased difficulty of collecting behavioral findings, limiting a sample to just participants with internet access), online data collection can give researchers the opportunity to collect data all over the country and increase racial minority representation in their samples. While neither of these solutions will completely remedy the lack of racial diversity in U.S. research on race, they could help begin new trends in data collection.

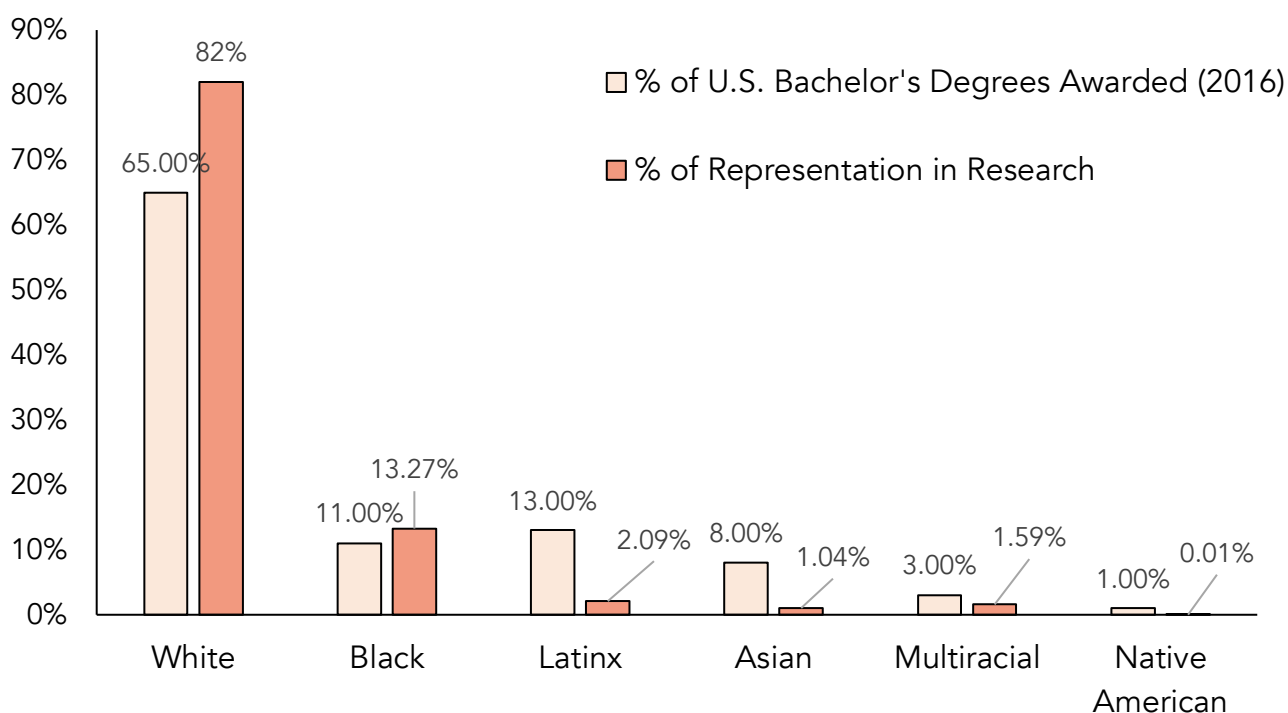


Fig. 5. Comparison of the percentage of White, Black, Latinx, Asian, Multiracial, and Native American students awarded U.S. Bachelor's degrees in 2016 versus each respective group's percentage of representation in research on race and diversity across *JPSP*, *JESP*, and *PSPB*.

When Racially Marginalized People's Experiences are Included in Research on Race, Why are Some Groups Much Less Visible than Others?

While all racially marginalized people are underrepresented in research on race, some racial groups are more and less likely to be represented in research on race than others. For instance, while Multiracial and Native American people are the most underrepresented groups in research on race and diversity, Black people are comparatively the most represented racial minority group in research on race. Why might this be? Here we deconstruct two possible explanations for these observed differences. Specifically, we examine (1) how each racial minority group's different racial histories and struggles for racial justice within the U.S. may have shaped how likely they are to appear in research on race and (2) if whether due to *Black Exceptionalism*, Black people are viewed as the racial minority group most distinct from White people, increasing their representativeness in research on race. Below we discuss how each of these factors may contribute to why some racially marginalized groups are much less visible in the literature compared to others.

Different U.S. Racial Histories

One reason why Black participants may be more frequently studied relative to other racial minority groups may be due to how strongly tethered Black Americans' struggles for racial justice are with the history of race in the U.S. While the antebellum era and civil rights movement are typically characterized as the critical points of racial tension between Black and White Americans in the U.S., early writings on life in Colonial America reveal that Black

Americans who arrived in Jamestown in 1619 were immediately segregated from White colonizers and categorized as servants (Bell, 2000). It wasn't until nearly 350 years later, with the 1954 *Brown v Board of Education* ruling, the Civil Rights Act of 1964, and the Voting Rights Act of 1965 that Black Americans finally began to experience full U.S. citizenship (Bobo, 2011; Citrin & Sears, 2014). With each of these gains, integration between Black and White people in the U.S. increased, subsequently increasing racial tensions (Shelton et al., 2013).

The dramatic societal shift of racial integration between Black and White Americans led social researchers to embark on new lines of research examining intergroup contact, relations, and prejudice, all focused on the experiences of Black Americans (Allport, 1979; LeVine & Campbell, 1972). With our findings demonstrating that Black participants account for the largest racial minority group in research on race, it is fair to say that this research focus is still important today. Indeed, it is likely that integration's hugely consequential shift in race relations, paired with the long history of anti-Black biases in the U.S., understanding the Black experience is crucial if one wants to understand U.S. racial dynamics. We propose that it for these reasons that we find relatively more research conducted on the issues facing Black people relative to all other racial minority groups.

Just as the U.S.' long history of anti-Blackness may have shaped how prevalent research is on this topic, it may also be the case that Native American people are the least represented racial group in research on race due to a long history of perceived "invisibility" within contemporary society (Fryberg & Eason, 2017; Fryberg & Stephens, 2010; Leavitt et al., 2015). Indeed, scholars theorize that when people think about Native Americans, they think of them as "frozen in time", or as relics of the past, rather than as living, breathing, contemporary people (Leavitt et al., 2015). Evidence of this effect can be found in media depictions of Native people,

which are both incredibly sparse, accounting for fewer than 0.4% of all primetime television characters over 20 years (Tukachinsky et al., 2015) and commonly of 18th and 19th century Native figures (e.g., Pocahontas) (Fryberg & Stephens, 2010). The invisibility of Native people within contemporary media paired with the ongoing and historic colonization of Native American people and their culture (Adams, 1995; Fryberg et al., 2016), may lead Native people to be ignored by researchers of race, creating a cycle that further perpetuates their invisibility. To break this cycle, more research needs to be conducted on and with Native American people. In particular, researchers should look to challenge the stereotypes that Native people are “frozen in time” and amplify contemporary Native perspectives in their work.

The second least studied racial group, Multiracial people, may be less represented in research on race due to the perception that they harder to racially categorize (Chen et al., 2018; Ho et al., 2020). It may be that when scholars of race and diversity are generating research ideas, Multiracial people are either overlooked because their identities may be considered “too complex”. While Multiracial people’s feelings about their identities are certainly complex (For examples see Albuja et al., 2019; Gaither, 2015; Garay et al., 2019; Remedios & Chasteen, 2013; Sanchez & Bonam, 2009; Townsend et al., 2012), these complexities should be reappraised as ways to increase our understandings of the boundaries and flexibility of racial categories, rather than as barriers. It may also be that Multiracial people are underrepresented as participants because researchers are more likely categorize Multiracial people via just one of their racial identities either based on researcher’s own categorizations (e.g., Ho et al., 2011) or by the omission of Multiracial categories in the demographic sections of their surveys (Townsend et al., 2009). Both of these omissions of Multiracial people would point to challenges in how researchers record race in their studies and publications. Indeed, it may be that researchers are

undercounting Multiracial people in research in race. Stronger field norms in allowing participants to select multiple racial categories in demographic surveys and in allowing participants to categorize their own racial identities could help remedy this issue.

The Potential Role of *Black Exceptionalism*

A second factor influencing which racial groups we study when we study race may be which racial minority groups are perceived as most distinct from White people. It may be that when researchers set out to study race and diversity, they are look to study the racial minority groups who feel the most distant from the norm (aka Whiteness). The theory of Black Exceptionalism provides a framework for understanding this question.

Sears and Savalei (2006) propose in their theory of *Black Exceptionalism* that relative to Black people, other racial minority groups (e.g., Asian and Latinx people) will have an easier time assimilating with the larger U.S. population. They argue that because Asian and Latinx people: (1) marry White people at higher rates than Black people (e.g., Livingston & Brown, 2017; Qian & Lichter, 2007), (2) reside in neighborhoods with closer proximity to White people (e.g., Lichter et al., 2015), and (3) have had different immigration histories in the U.S. relative to Black Americans (e.g., Fernández-Armesto, 2014; Gibson, 2019; Ngai, 2014; Takaki, 1989), Asian and Latinx people are more deeply integrated within White U.S. culture (Citrin & Sears, 2014; Sears & Savalei, 2006).⁵ Sears and Savalei propose that these factors have led Black people to be viewed as the racial minority group most distinct from White people (2006). To understand how distinctness from White people influences who we study when we study race, we turn to an examination of the permeability of the White/Non-White color line.

⁵ It is important to note that the theory of Black Exceptionalism has not yet compared the experiences of Black Americans with those of Native Americans. Relative to all other U.S. racial minority groups, Native Americans have had a contrasting history of settlement and immigration in the U.S. Using Sears and Savalei's theory of exceptionalism, more research should be done to compare Native Americans with other racial minority groups.

Historian Mathew Jacobson argues, “Caucasians are made not born” (1999). With this statement he suggests that the divisions commonly used to decide who is and is not White have been reshaped throughout U.S. history (Jacobson, 1999; Lopez, 2006). However, despite the constant reshaping of this line, Black people have never been allowed to cross it. In fact, some argue that it was the migration of Black Americans throughout the U.S. following the Civil War that led previously “non-White” European immigrant groups (e.g., Irish) to suddenly be “remade and granted the scientific stamp of authenticity as the unitary Caucasian race...”(Jacobson, 1999, "p. 7-8").⁶ It was also around this time U.S. courts ruled that Mexicans and Armenians could be counted as White and granted U.S. citizenship (Bell, 2000; Lopez, 2006). Evidence of the color line can also be found in an examination of *hypodescent*, or the one drop rule (Bobo, 2011), which has been used to legally delineate who is and isn’t White enough to reap White legal and social rewards. Evidence of hypodescent in U.S. culture can be found in early 1890 U.S. census records, where census categories included 1/4th and 1/8th Black options (Bobo, 2011) to ensure that anyone whose ancestry was partly Black was counted as so.⁷ The practice of quantifying someone’s Blackness to measure their distance from Whiteness illustrates the extent to which the color line has ruled U.S. society. This distinction gives insight as to why it might be that researchers are more likely to study Black participants when wanting to study a racial group perceived as the furthest from Whiteness.

The Problem of Leaving Racially Marginalized People Out of Research – What We Don’t Know

⁶ Similar arguments regarding the reconsolidation of Whiteness have also been made regarding the influx of Asian and Latinx immigrant groups during this era (Ngai, 2014).

⁷ In addition to Multiracial Black people, hypodescent has also been found to be applied to biracial Asian people (Ho et al., 2011). However, Native American people are more likely to experience the asymmetric effect of *hyperdescent*, where Multiracial Native American people are more likely to be classified by their Whiteness opposed to the Nativeness (Gullickson & Morning, 2011).

With Whiteness as the starting point for our theories and ideas, there remains much we do not know about the complexities of racial identity. While researchers have recently made great strides in understanding many important topics, such as expanding our understanding of the divergent forms of discrimination people from different racial minority groups face (e.g., Omissions and commissions Fryberg & Eason, 2017; The racial position model Zou & Cheryan, 2017), demonstrating new paths towards intraminority relations and coalitions (Craig & Richeson, 2012; Richeson & Craig, 2011), and racial categorization (Ho et al., 2020; Pauker et al., 2018; Young et al., 2021), there still remains much to be learned. For one, given how little research is being conducted with Native Americans, it is clear that more research could be done to understand Native racial identity in contemporary society, particularly among Native youth who face challenges with how to contend with their identity in a world where they are perceived as invisible (Chandler & Proulx, 2006; Covarrubias & Fryberg, 2015). It would also be beneficial for researchers to dispel with monolithic understandings of racial categories and approach race through a more nuanced lens. For instance, Latinx people with darker skin face different forms of race-based discrimination than Latinx people with lighter skin (Gonzalez-Barrera, 2019), the stereotype that Asian Americans are a “model minority” may lead people to overestimate Asian American’s wealth (Kuo et al., 2020), leading to decreased visibility of the growing wealth gap between different Asian American groups in the U.S. (Kochhar & Cilluffo, 2018), and depending on their racial identities, Multiracial people feel more and less affiliation with members of different racial groups (e.g., biracial people who are White and Native American or Black and Native American both say they have more in common with White or Black people, respectively, than they do with Native Americans, Parker et al., 2015). Each of these examples suggest that

unpacking racial categories in research could potentially lead to many new important insights on contemporary racial issues.

Constraints on Generalizability and Future Directions

There are limitations to the methodology of this research and its interpretability that could be addressed in future research. First, this research focused on studies conducted in the U.S. It may be the case that in other countries with different racial demographics and different histories between dominant and minority groups, the distribution of racial groups in research would look different. However, given the evidence suggesting that minority groups are typically marginalized across many different national contexts (e.g., religious minorities), it may be likely that research from other regions of world makes similar choices to center the majority group's experiences over the minority group's experiences. Future research should investigate this question. Second, in this review we only examined the top-three highest impact journals in social psychology and did not examine "specialized journals". It may be the case that specialized journals, e.g., *Psychology of Women Quarterly*, *Cultural Diversity and Ethnic Minority Psychology*, feature a greater number of racial minority participants due to their specific journal focuses. Yet, it may still be the case that even if racial minorities are more likely to be included in research on race and diversity within specialized journals, that this research may still be less likely to center the experiences of Multiracial and Native American people compared to Black, Asian, and Latinx people. It would be important for future researchers to examine whether more specialized research journals are in fact better at centering marginalized experiences or not. And last, a third limitation of this research is the use of homogenous racial categories (e.g., Multiracial) to describe diverse groups of racial minorities. Due to how racial demographic information is typically reported in publications, this paper was only able to examine racial

minority groups at their broadest (e.g., Asian) and unable to examine more specific and nuanced features of racial categorization (e.g., Southeast Asian, East Asian). One way to address this limitation is for future research to make a more concerted effort to record more specific racial demographic information. Doing this would not only better finetune our understanding of which racial groups are more and less represented in research on race, but also improve the interpretability of researcher's findings.

Conclusion

There are extreme racial disparities in both who is chosen to participate and whose experiences are valued in social psychological research on race and diversity in the U.S. We argue that the omission of racially marginalized peoples' experiences, particularly Multiracial and Native American people, is a detriment to science. We suggest that linking Whiteness with objectivity, the propensity for our majority White field to practice "me-search" when doing research, the field's historic tradition of focusing on the experiences of perceivers versus targets, and the perceived availability of White participants over participants of color collectively promote the marginalization of Asian, Black, Latinx, Multiracial, and Native American people's experiences with race in scientific research. We believe that addressing each of these topics head on to increase the representation of Asian, Black, Latinx, Multiracial and Native American people in research on race would have the potential to reshape our field's research norms, broadening our knowledge. We also propose that sociocultural and historical factors contribute to which racial minority groups are researched when researchers set out to study race. Our findings show that when researchers do conduct research with racial minorities, they are most likely to conduct studies with and on Black people and least likely to conduct research with and on Native American and Multiracial people. Different historical features of race in the U.S. and

the notion of which racial groups are most divergent from White people may play a role in who researchers select when they do include racial minorities in their studies. Yet despite these differences between different racial minority groups, our findings overall reflect a critical issue in the field – the understudying of racially marginalized groups’ experiences with race.

Ultimately, this paper serves as a call to action to social and personality psychologists studying race and diversity, and to the field of psychology more broadly. To fully comprehend the scientific intricacies of race and diversity, it is important for *all* researchers to work harder to include racial minority perspectives into their research. Predominately focusing on the experiences and opinions of White people severely limits researcher’s abilities to draw nuanced theories. Importantly, this practice also creates a permission slip for scientific blind spots on racially marginalized people’s experiences with race to persist. Failing to change our research norms and failing to expand our sense of what good science should look like will lead to persistent limitations to both science and to the greater public who use our findings to improve race relations in the world. If the goal of our research is to illuminate important unknown phenomena and to ultimately improve society, it is our hope that researchers of race and diversity will actively work to incorporate more racial minority perspectives in their research.

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Part II:

Understanding how
and why cultural
norms and values
contribute to
inequity

Why are Some Gender Gaps in STEM Greater Among Those with the Most Opportunity?

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Abstract

This empirical review demonstrates that gender disparities in STEM education (i.e., Science, Technology, Education, Mathematics) are largest between women and men in higher, vs lower, opportunity contexts. Compared to lower opportunity contexts, we identify higher opportunity contexts as predominately White, Western, and middle- to higher-social class contexts within well-financially resourced nations. Using cross-national datasets examining STEM participation and achievement and U.S.-based educational datasets, we provide evidence that some gender gaps in STEM participation and achievement appear to be larger in wealthier countries, that gender gaps in U.S. STEM degrees are largest between White women and men compared to women of color and men of color, and that gender gaps in U.S. standardized math scores are largest between girls and boys from higher socioeconomic contexts vs lower socioeconomic contexts. Drawing on literature from psychology and sociology, we investigate several possible explanations for why gender gaps between higher and lower opportunity contexts occur and put forth the argument that to better address gender disparities in STEM, it is essential that the practitioners and researchers look to what could be learned from women and men within lower opportunity contexts.

Keywords: STEM, gender gaps, social class, race, cross-national comparisons

Why are some gender gaps in STEM greater among those with the most opportunity?

For decades, U.S. policy makers, educators, and researchers have put forth solutions to reduce gender disparities in STEM education (i.e., Science, Technology, Education, Mathematics) (Cheryan et al., 2017; Diekman et al., 2015; UNICEF, 2020; Wang & Degol, 2017). Yet, men continue to outnumber women in STEM, suggesting that a new approach to understanding STEM gender disparities is needed. For instance, gender disparities in STEM may not look the same across all groups of women and men. In some instances, disparities may be larger for some groups of women relative to others. Using datasets from the U.S. Department of Education, comparisons of U.S. school districts, and cross-national comparisons, we demonstrate that some gender gaps in STEM are paradoxically greater in higher versus lower opportunity contexts, suggesting new paths for understanding and reducing gender disparities.

We define higher opportunity contexts as predominately White, Western, and middle- to higher-SES (i.e., socioeconomic status) contexts within well-financially resourced nations. Higher opportunity contexts differ from lower opportunity contexts in that women from these contexts are predominately women of color, women who reside in non-Western nations, and/or come from lower-SES communities and less-financially resourced nations. In this review we demonstrate that despite being less advantaged with fewer opportunities, women from lower opportunity contexts account for some of the smaller gender gaps in STEM relative to women from higher opportunity contexts. We demonstrate that less-financially resourced nations demonstrate smaller gender gaps in STEM education compared to well-financially resourced nations, that the gap in proportion between women and men of color pursuing STEM degrees is smaller than for White women and men, and that gender gaps in mathematics between girls and boys from lower SES school districts are smaller than those of girls and boys from higher-SES

school districts. Building off literature from economics, sociology, and psychology, we suggest several potential explanations for these effects and argue that higher opportunity contexts have much that could be learned from lower opportunity contexts in how to reduce gender disparities in STEM.

Gender Gaps Between Less- and Well-Resourced Nations

One may expect that well-resourced countries that score high on measures of gender equality would have fewer gender disparities in STEM aspirations and degree attainment than countries with fewer resources and less ostensible gender equality. However, gender disparities in STEM aspirations, participation, and performance are greater in many well-resourced countries with high gender equality compared to many countries that have fewer resources (e.g., lower per capita GDP) and score lower on measures of gender equality (Breda et al., 2020; Charles, 2017; Charles & Bradley, 2009; Stoet & Geary, 2018; Soylu Yalcinkaya & Adams, 2020; but see Richardson et al., 2020).

The U.S. and Western Europe are generally well-resourced countries that score fairly high on measures of gender equality (e.g., women's life expectancy, earnings; Breda et al., 2020; Stoet & Geary, 2018). Yet gender disparities in STEM aspirations, participation, and performance are greater in many of these countries compared to many countries in Eastern Europe, Middle East, Africa, and Asia that have fewer resources (e.g., lower per capita GDP) and score lower on measures of gender equality; Charles & Bradley, 2009). For example, the U.S., Finland, and Switzerland grant a significantly lower proportion of engineering degrees to women than many countries in Eastern Europe and the Middle East (e.g., Romania, Tunisia, Bulgaria; Charles & Bradley, 2009). Looking at STEM degrees overall reveals a similar pattern with larger gender gaps in Norway, Sweden, and the Netherlands than in Turkey, Algeria, and

Indonesia (Stoet & Geary, 2018). Math aspirations among 8th graders follow a similar pattern with wealthier nations (even those with significant social welfare programs) such as Sweden, Norway, and Hong Kong showing larger gender gaps than less wealthy countries such as Botswana, Ghana, and Indonesia (Charles, 2017). Gender disparities in STEM participation and achievement appear to be larger in wealthier countries with higher gender equality than many other countries around the world with fewer resources and less ostensible gender equality.

Gender Gaps in STEM Degree Attainment Between Students of Color and White Students

Moving next from comparing country-level differences to looking at race in the U.S., as a racial group, White Americans are among the most well-resourced (Assari, 2018; Perez & Hirschman, 2009; Riegle-Crumb et al., 2019). Historically, high opportunity White Americans have attended college in the greatest numbers and, until the early 1800s, did so in an almost entirely racially and socioeconomically isolated environment. Yet, despite having the advantage of greater resources and a longer history of academic achievement, gender gaps in STEM achievement are greater between White women and men than they are between women and men of color, see Fig. 1.

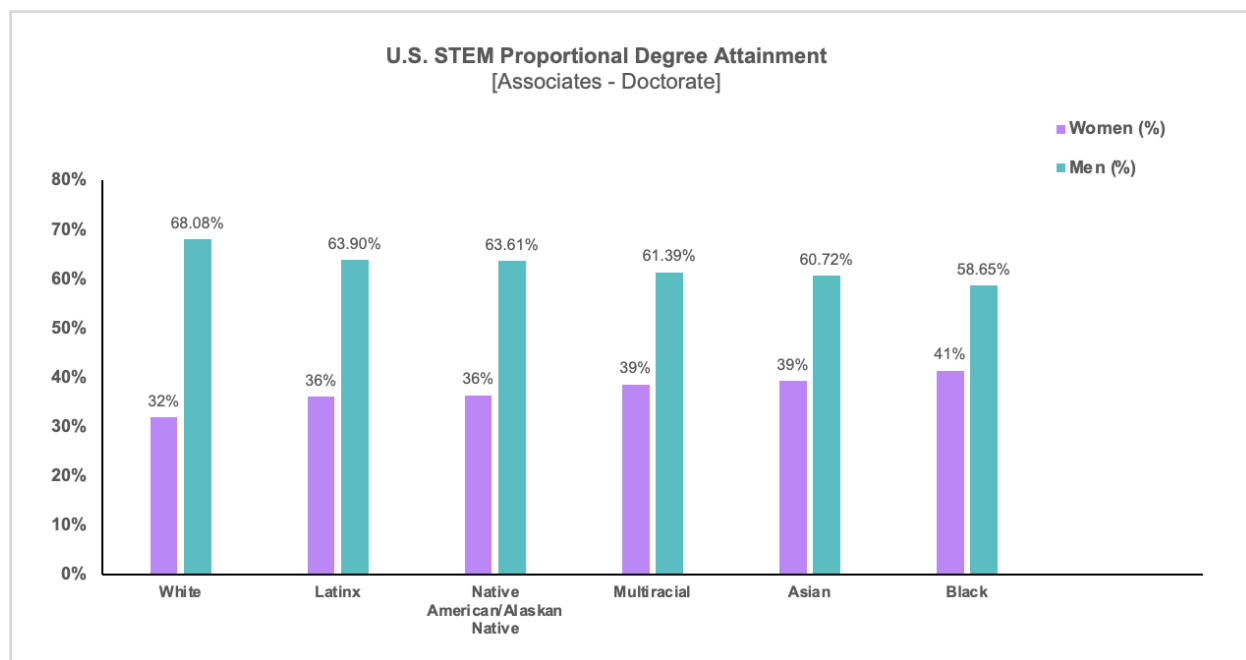


Fig 1. Gender gaps in U.S. STEM degree attainment among Asian, Black, Multiracial, Native American and Alaskan Native, Latinx, and White Associates, Bachelors, Masters, and Ph.D. degree holders.

Commonly, the focus on STEM achievement in the U.S. is on the gender gap between women and men (Astorne-Figari & Speer, 2018; You, 2013). At the country level, across all levels of higher education women earn just over a third (~35%) of the degrees in the Biological & Biomedical Sciences, Computer Science, Engineering, Mathematics, and the Physical Sciences when compared to men. In the most recent year for which data are available available (National Center for Education Statistics, 2018), White women earned just 19.96% of degrees in these same STEM fields compared to White men, who were granted just under half of STEM degrees at all levels of education (42.57%). However, this focus on country level differences has obscured an unexpected trend at the level of race. On the surface White women, compared to women of color, are still most likely to earn degrees of any kind in STEM fields like Biological

& Biomedical Sciences, Computer Science, Engineering, Mathematics, and the Physical Sciences ($n = 104,910$), followed by Asian & Pacific Islander ($n = 28,383$), Latina ($n = 24,181$), Black ($n = 16,710$), Multiracial ($n = 7,749$), and Native American and Alaskan Native ($n = 861$) women, see Fig 1. The numerical/proportional dominance of White women (and their underrepresentation relative to White men) takes on a different light when comparing the White gender gap to the gender gap in STEM achievement between women and men of color.

Though women of color often face more barriers in higher education due to the intersectional nature of their discrimination, the gaps between women and men of color are often smaller than those between White women and men. Across all levels of education, from Associates to Doctorate level STEM education, White women — the numerically largest group of women in this category — experienced the greatest gender gaps, receiving 55% fewer STEM degrees than White men. Latina women had smaller gender gaps than those seen between White

STEM graduates with 50% fewer STEM degrees going to female students. Native American/Alaskan Native and Multiracial women had gender gaps of 44% and 43% respectively, while Asian women and Black women both had overall gender gaps of just 40%.

Said another way, for every Black or Asian woman finishing a STEM degree roughly one or two Black or Asian men do; when comparing White women to White men the rate nearly doubles. For every White woman finishing a STEM program 3-4 White men do the same. While there is some evidence that gender gaps in math are larger among Asian American students and that in some grades African American boys outperform girls (see Lubienski et al., 2013), the overall pattern seems to suggest an unexpected barrier facing women in higher opportunity contexts. Across all levels of education, White women, despite generally having greater access to

resources and attending universities in greater numbers overall, experience larger gender gaps in STEM degree attainment than women from other racial backgrounds.

Gender Gaps in Early Math Education Between Lower- and Higher-SES School Districts

Having access to the opportunities that come alongside growing up in a higher-SES community should, in theory, promote young girls' success in STEM. Compared to girls from lower-SES communities, girls from higher-SES communities have greater access to educational resources (Chiodo et al., 2010; Lareau, 1987), are more likely to attend U.S. public schools with higher per-student funding (Morgan & Amerikaner, 2018), and to have the financial means to attend special after school programs and summer camps to broaden their access to STEM fields (e.g. summer coding camps). Yet, these many opportunities do not seem to add up to smaller gender gaps between girls and boys in higher-SES communities.

Data from standardized math exams conducted between the 2008 – 2009 to 2015 – 2016 school years across roughly 10,000 U.S. school districts demonstrates that school districts with the biggest gender gaps in standardized math performance exams were more likely to be higher- vs lower-SES (Reardon et al., 2019). School districts nested within predominately White, higher-SES, and suburban settings displayed larger gender gaps between 3rd – 8th grade girls and boys in mathematics compared to predominately Black and lower-SES school districts. These data suggest that despite being conferred more financially-driven opportunities for success in math, gender gaps are larger between girls and boys in higher- versus lower-SES school districts.

What Factors Contribute to Gender Gap Differences Between Lower and Higher Opportunity Contexts?

There could be many potential reasons why some gender gaps in STEM are smaller between women and men and girls and boys from lower compared to higher opportunity

contexts. Here we dissect several likely potential explanations, see Table 1 for comparison across all explanations.

Possible Explanations for Greater Gender Gaps in High Opportunity Contexts

Factor	Description	Country	Race	Class
Financial security	<i>Greater financial security may allow girls and women to pursue fields with less regard to income potential and job security.</i>	X	X	X
Cultural emphasis on individualistic self	<i>Cultural emphasis on individualism, personal choice, and self-expression may also contribute to gender gap differences.</i>	X	X	X
Perceptions of STEM's Competitiveness	<i>The perception that STEM is competitive and that women need to especially be good at it to do well may serve as a "gatekeeper" to women.</i>	X		
High opportunity men more likely to be in STEM	<i>Men in high opportunity cultural contexts are more likely to choose STEM.</i>		X	X
Whether STEM is labeled as feminine or masculine	<i>Whether STEM is culturally coded as feminine or masculine may influence women's entry into STEM fields.</i>	X	X	
Parental Modeling	<i>Having a mother in the labor force (rather than at home) makes it more likely that girls pursue STEM.</i>			X
Participation in Academic Extracurricular Activities	<i>Increased participation in academic extracurricular activities, provided that these activities themselves are gendered.</i>	X		X

Table 1. At a glance, a breakdown of whether each possible explanation accounts for greater gender gaps across the high opportunity contexts of country, race, or social class.

Financial Security

One explanation for greater gender gaps in higher opportunity contexts is that greater financial security in higher opportunity contexts may allow girls and women to pursue fields with less regard to income potential and job security (Stoet & Geary, 2018; Breda et al., 2020; Marsh et al., 2020; Soylu Yalcinkaya & Adams, 2020). STEM fields tend to offer a higher income and greater job security than the fields that girls and women in higher-opportunity contexts are more likely to choose (e.g., social sciences, humanities; Cheryan et al., 2017; Melguizo & Wolniak, 2012). At the country level, lower average reports of economic hardship (measured with a proxy of overall life satisfaction) predicted greater gender differences in STEM graduation rates (Stoet & Geary, 2018). In Armenia, India, and Malaysia, where gender gaps in engineering or computer science participation in college are relatively small or nonexistent, women commonly mention higher income and financial security as a reason for choosing these fields (Gharibyan & Gunsaulus, 2006; Varma & Kapur, 2015; Lagesen, 2008). Turning to race, financial motivations may be lower among White students than students of color due to White families greater wealth in the U.S. compared to Black Americans, Latinx Americans, and Asian Americans (U.S. Census Bureau, 2017)¹. Indeed, expected earnings are a weaker predictor of majors among White students than Black and Latinx students (Montmarquette et al., 2002). Examining social class, women from higher socioeconomic backgrounds are less likely to choose lucrative fields (e.g., tech, business) over less lucrative fields (e.g., social sciences, humanities) than women from lower socioeconomic backgrounds (Ma, 2009) who cite the importance of future financial security (Mullen, 2014). In sum, lower financial motivations may

¹ Using household income generates slightly different results, with Asian Americans having the highest median income when averaged across Asian American ethnic groups (U.S. Census Bureau, 2019). Financial motivations may thus not be the sole explanation for variability in gender disparities across racial groups.

play a significant role in explaining greater gender gaps in higher opportunity contexts but is likely not the only explanation.

Cultural Emphasis of an Individualistic Self

Cultural emphasis on individualism, personal choice, and self-expression (Charles, 2017; Iyengar & Lepper, 1999; Soylu Yalcinkaya & Adams, 2020) may also contribute to gender gap differences between women and men in higher versus lower opportunity contexts. Indeed, people in higher opportunity contexts are more likely to value individualism, personal choice, and self-expression relative to people in lower opportunity contexts. Cross-country comparisons find that countries that place lesser value on individualism and personal choice in selecting careers have lower gender gaps in STEM (Charles, 2017; Soylu Yalcinkaya & Adams, 2020).² Similarly, looking at race, compared to people of color, White people are more likely to value personal choice over choices made by others, including their family members, (Iyengar & Lepper, 1999). This is also true when looking at social class where research on the influence of individualism in educational spaces finds that people from higher- versus lower-SES contexts are more likely to place greater value on individualism and self-expression within education (Stephens et al., 2012). By encouraging women and men from higher opportunity contexts to look within themselves to express their interests and choose their career paths, the cultural values of individualism, choice, and self-expression may be helping to facilitate gender gaps. Indeed, because our inner-selves are gendered via everyday socialization (Bem, 1981; Crane & Markus, 1982), encouraging women and men to look within themselves to choose their educational interests and careers may be encouraging the women and men in higher opportunity contexts to make more stereotypically gendered educational and career choices, subsequently creating gender gaps in STEM (e.g.,

² It should be noted that Japan, a country with a typically more interdependent culture (Markus & Conner, 2014) is also grouped within the category of well-financially resourced nations with higher gender disparities in STEM.

Cech, 2013; Correll, 2001). It may also be the case that in less individualistic cultural contexts, family places a more central role in how personal decisions are made. Because of how much more integrated close family members are within one's self-view in less individualistic cultural contexts (see Markus & Kitayama, 1991, 2010), increased family input may lead more women to select STEM careers for themselves (Gupta, 2012). Taken together, cultural emphasis on individualism and looking inward to make personal choices may lead to greater gender gaps in higher versus lower opportunity contexts.

Perceptions of STEM's Competitiveness

Relative to women in lower opportunity contexts, women in higher opportunity contexts may perceive STEM to be more competitive or in other words, that they will need greater talent to do well in these majors relative to other college majors. For instance, when ranking U.S. students from lowest to highest in achievement, Cimpian et al. (2020) found that a larger proportion of low-achieving men (≤ 1 st percentile) registered for STEM courses at rates equivalent to high achieving women (80th percentile). These data suggest that women and men in higher opportunity contexts may have different perceptions of how much talent they need to do well in competitive STEM majors. This may be related to women's own stereotypes about their ability to do well in STEM. Indeed looking at race, while research with predominately White families supports that White parents are more likely to endorse the common Western stereotype that boys are better at science and math than girls (e.g., Jacobs et al., 2005), research with Black American families finds that Black parents viewed girls, opposed to boys, as being more capable at math and science (Kizzie Rouland et al., 2013). This suggests that perhaps the gender differences we observe between lower and higher opportunity contexts may be due in part

to how women in these contexts have come to think about their own abilities in relation to STEM.

Men in Higher Opportunity Contexts Are More Likely to be in STEM Fields

Gender gaps between women and men in higher versus lower opportunity contexts may be larger because these men in higher opportunity contexts are more likely to pursue STEM. At the country-level, it may be the case that more men pursue STEM degrees in well-resourced nations because being in STEM is more clearly linked to masculinity in these nations compared to less-resourced nations (Diekman et al., 2010; Mellström, 2009). However, cross-national comparisons are needed to better identify whether this indeed the case. Looking at race in the U.S., White men face much lower rates of discrimination within the U.S. Compared to men of color (Navarrete, McDonald, Molina, & Sidanius, 2010) and have more positive educational experiences compared to people of color more generally (e.g., Cheryan et al., 2009; Walton & Cohen, 2007). With respect to social class in the U.S., men from higher-SES contexts may be more prevalent in STEM simply because they have more financial opportunity to pursue degrees in STEM relative to men from lower-SES contexts. Data on U.S. college enrollment demonstrates that students from lower-SES contexts are less likely to enroll in college than students from higher-SES contexts (National Center for Education Statistics, 2019). The unique differences between men in higher and lower opportunity contexts, particularly with respect to differences in the experience of discrimination, may collectively contribute to why it is that gender gaps are larger within higher relative to lower opportunity contexts.

Differences in Whether STEM is Labeled as Feminine or Masculine

Cultural factors influence what kind of work gets labeled as “feminine” or “masculine”. It is possible that gender differences in STEM between countries, are reinforced by country-level

stereotypes about which kinds of work is and is not, “women’s work.” These stereotypes influence not only how these fields are portrayed, but also send a message about who belongs in a given careers. For instance, in the U.S., computer science is a male dominated field that is also a stereotypically male occupation (Cheryan et al., 2017; Dasgupta & Stout, 2014). By contrast, in countries where computer science is not perceived as masculine (e.g., Malaysia, Lagesen, 2008; Mellström, 2009) and is categorized as a good career for women (e.g., Gupta, 2012), women are employed in far larger numbers. Turning to race, recent work investigating how beliefs about who scientists are and what they do shows that holding more counter-stereotypical beliefs about who are scientists (e.g., being less likely to endorse that scientists are geeks or nerds) predicts intentions to pursue STEM majors (Nguyen & Riegler-Crumb, 2021). Here researchers found that half of Black and Latinx reported counter-stereotypical beliefs about scientists and that this effect was strongest among Black girls. Believing that scientists are less likely to be geeks or nerds may buffer Black girls more so than White girls against the common associations that STEM majors and careers are for geeky men (Cheryan et al., 2009). With respect to social class, we did not find evidence that women in higher-SES contexts are more or less likely to view STEM as masculine, suggesting a greater need for research on this topic.

Gendered Division of Labor Among Parents

Parents in higher opportunity contexts may model more traditional division of labor arrangements than parents in lower opportunity contexts (Breda et al., 2020; Clawson & Gerstel, 2014). Traditional division of labor arrangements in two parent heterosexual households may shape their children’s aspirations (Croft et al., 2014). Children in higher income households are more likely to have mothers who stay home or earn relatively less than their partners compared to children in lower income households (Chetty et al., 2016; Reardon et al., 2018). However,

across countries, fewer mothers in the labor force may not predict larger gender gaps. Countries with lower gender equality (e.g., those with fewer women in the labor force; World Economic Forum, 2021) have smaller gender gaps in STEM than those with more higher gender equality (Stoet & Geary, 2018). Across U.S. racial groups, the evidence is mixed. In support of gendered division of influencing these gender gaps, the racial group with the greatest share of mothers with children under 18 in the workforce (78% of Black American mothers) has smaller gender gaps than White Americans (72% of White mothers). However, White Americans have larger gender gaps than Asian and Latinx Americans, both of whom have a smaller proportion of mothers in the workforce (66% of Asian mothers and 65% of Latinx mothers; U.S. Bureau of Labor Statistics, 2020). Children with fewer mothers in the labor market may help to explain greater gender gaps among higher incomes families but may do a less good job of explaining gender gaps by country or race.

Extracurricular Activities

Greater gender gaps in higher opportunity contexts may also be due to greater access to formal and informal STEM-related extracurricular activities than in lower opportunity contexts. Participation in STEM-related extracurricular activities may contribute to gender gaps in STEM if participation in these activities is gendered. For instance, American parents tend to encourage greater participation by their sons than daughters in some STEM activities such as computing (Simpkins et al., 2005) and explain more to their sons than daughters at science museums (Crowley et al., 2001). STEM extracurricular activities (e.g., math club in high school) predict higher STEM GPAs and greater likelihood of selection of STEM major in college (Gottfried & Williams, 2013; Heath et al., 2018; Lipscomb, 2007). At the country level, number of hours children spend in leisure activities and organized extracurriculars is greater in higher opportunity

countries in the West than in lower opportunity countries (Larson & Verma, 1999; see also Fischer et al., 2014). Turning to race, White students are more likely than Black students to be involved in academic extracurricular activities, and Black students are more likely to participate in academic extracurriculars than Latinx students (Wimer et al., 2006; Meier et al., 2018; Peguero, 2011). Greater participation in extracurricular activities by White compared to Black and Latinx students may help to explain Whites' greater gender disparities in STEM to the extent that White boys are more likely than White girls to be getting experiences in STEM. However, Asian American students are even more likely to participate in academic extracurricular activities than White students (Wimer et al., 2006; Meier et al., 2018; Peguero, 2011), providing counterevidence that greater extracurricular participation contributes to greater gender disparities. More research is needed on the specific types of extracurriculars involved (e.g., STEM vs. non-STEM) and how gender interacts with race to shape participation (e.g., extracurricular participation by some groups may be less gendered than other groups). Examining social class, in line with the idea that extracurricular participation causes gender gaps in STEM, students in households with more socioeconomic resources are more likely to participate in organized extracurricular activities than students from households with fewer socioeconomic resources (Heath et al., 2018; Meier et al., 2018; Moore et al., 2014; Wimer et al., 2006). In sum, access to more extracurricular activities in higher opportunity contexts may contribute to greater STEM gender gaps, though more work is needed to understand these dynamics especially at the levels of country and race.

Conclusion and Future Directions

Re-examining how we think about gender disparities in STEM and particularly what might lead them to be larger among some women and men compared to others is a crucial for

better understanding the causes of gender disparities in STEM. Here we present evidence that STEM gender gaps are larger between women and men in higher compared to lower opportunity contexts. After reviewing multiple possibilities for this effect, it is likely that these differences are being driven by greater financial security and individualism in higher opportunity contexts, see Table 1 for all examined explanations. With less concern for job security (Stoet & Geary, 2018; Breda et al., 2020; Marsh et al., 2020; Yalcinkaya & Adams, 2020) and a greater emphasis on selecting careers and majors able to fulfill one's personal interests (Cech, 2013; Charles, 2017; Correll, 2001; Yalcinkaya & Adams, 2020), it would seem that higher opportunity contexts have created the perfect storm for larger gender disparities in STEM education.

To address these disparities, people in higher opportunity contexts have much that they could learn from people in lower opportunity contexts. For one, people in higher opportunity contexts could de-emphasize their self-interest when choosing a major or career and instead consider options that might benefit their family and community. While selecting a major or career that matches their personal interests may seem important, there is evidence that a passion for work can be grown over time (Chen et al., 2015). Second, reframing STEM from being a mostly masculine to a more gender-neutral field could also reduce gender disparities in higher opportunity contexts. Because some less-financially resourced countries are more likely to label things like computer science as women's work, moving the dial from seeing STEM as mostly masculine to more gender neutral in places like the U.S., could potentially increase women's representation. Last, while the gendered division of labor among parents was only able to potentially explain gender gaps within higher-SES contexts, being in households where girls in higher opportunity contexts are able to see women working outside of the home might help as well. While none of these recommendations would be the perfect solution, it is possible that a

combination of these could help to decrease the sizable gender gaps in higher opportunity contexts. It is also important to note that some of the reasons why gender disparities are lower in lower opportunity contexts are not necessarily positive to these communities (e.g., fewer men from lower-SES backgrounds in college overall). As gender disparities in STEM continue to be a major setback for all people around the world, it is important to disentangle the good from the bad and to identify solutions able to remedy this important issue.

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Do Diversity Awards Discourage Applicants from Marginalized Groups from More Lucrative
Opportunities?

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Abstract

Four studies reveal that offering diversity awards, i.e., awards for applicants from marginalized groups, have unintentionally negative implications for equity. When two unrestricted awards were offered, applicants from marginalized groups were more likely to select the more lucrative award (MTurk adults in Study 1, $N = 168$; college students in Studies 2 - 4, N range = 152 – 628). However, the presence of a less lucrative diversity award caused applicants to apply for and prioritize diversity awards over more lucrative unrestricted awards. Fit, or how much applicants felt the award was for someone like them, best mediated their increased likelihood of applying for diversity over unrestricted awards. These findings suggest that diversity awards may inadvertently siphon applicants from marginalized groups out of application pools for unrestricted awards. Greater examination of unrestricted awards is needed to increase their attractiveness and fit, especially in instances when diversity awards are also offered.

Keywords: diversity, marginalized groups, academic awards, fit, inequity

Statement of Relevance

Organizations frequently offer diversity awards, such as scholarships for students from underrepresented minority groups. These awards are intended to help offset systemic funding biases and increase winning opportunities for applicants from marginalized groups. However, offering diversity awards may come with unintended negative consequences. We provide experimental evidence that offering diversity awards leads application pools for lucrative unrestricted awards to become less diverse. This research illuminates an important dilemma: the siphoning of competitive applicants from marginalized groups away from more lucrative unrestricted award pools. We suggest that addressing this issue should not focus on changing the behavior of people from marginalized groups or on eliminating diversity awards altogether. Instead, we propose that solutions should focus on making changes to awards themselves (e.g., changing the program announcements and aims of unrestricted awards to more explicitly value diversity) to increase equity.

Do Diversity Awards Discourage Applicants from Marginalized Groups from More Lucrative Opportunities?

With rising tuition costs (National Center for Education Statistics, 2019), scholarships able to offset the cost of college have become increasingly important to students and their families. Within the past decade, the total amount of all educational scholarships offered in the U.S. increased by 64%, totaling to \$129.4 billion in 2018 alone (College Board, 2019).

While designed to increase opportunity, an examination of who wins awards reveals that White applicants are more likely to win than applicants of color (Ginther, Kahn, & Schaffer, 2016; Ginther et al., 2011), and men are more likely to win than women (Hechtman et al., 2018; Lincoln, Pincus, Koster, & Leboy, 2012). To offset systemic funding biases (Hoppe et al., 2019) and increase winning opportunities for groups less likely to receive awards, organizations have historically offered *diversity awards*, i.e., awards for applicants from marginalized groups (e.g., NIH National Research Service Award to Promote Diversity). However, despite their helpful intent, offering these awards may come with negative consequences. Diversity awards may lead applicants from marginalized groups to be less likely to apply for *unrestricted awards*, leaving those applicant pools considerably Whiter and more male. Diversity awards may be inadvertently siphoning applicants from marginalized groups out of the applicant pool for unrestricted awards.

The Benefits and Costs of Diversity Awards

Diversity awards provide many beneficial opportunities to students from marginalized groups including networking, recognition as a top scholar, and feelings of belonging within academic contexts where they may be more likely to face discrimination and contend with feelings of not fitting in (e.g., Stephens, Hamedani, & Destin, 2014). Yet, at the same time,

diversity and unrestricted awards are not viewed equally. When evaluating which award was more high-status, undergraduates were more likely to select unrestricted over diversity awards (Germano & Cheryan, 2020). Students may not have the time and resources to apply for both diversity and unrestricted awards or may be explicitly prohibited from applying for both awards (e.g., the Swiss National Science Foundation prohibits women from applying for both the PRIMA women's award and Eccellenza unrestricted award). With their many benefits, diversity awards may also have costs.

Why Choose Diversity Awards Over Unrestricted Awards?

Offering diversity awards may lead applicants from marginalized groups to choose diversity over unrestricted awards due to perceptions of fit. Individuals prefer contexts that provide high fit between how they see themselves and who is prototypical in that particular context (Cheryan & Plaut, 2010; Niedenthal, Cantor, & Kihlstrom, 1985). Because people from marginalized groups are frequently reminded of the ways in which they do not fit and are not typical (Eagly & Carli, 2007; Heilman, 1983), particularly in academic contexts (Cheryan, Plaut, Davies, & Steele, 2009; Good, Rattan, & Dweck, 2012; Walton & Cohen, 2007), diversity awards may provide a unique space for applicants to feel increased fit.

Fit is a strong behavioral motivator (e.g., Oyserman, Brickman, Bybee, & Celious, 2006). Women's estimations of fit between themselves and who they perceive as the prototypically "successful person" in a particular context can influence the educational and vocational opportunities they select (Barbulescu & Bidwell, 2013; Bian, Leslie, Murphy, & Cimpian, 2018; Cheryan et al., 2009). For example, many women are more interested in workplaces that value feminine versus masculine attributes, ultimately leading them to select more feminine over masculine jobs (Diekmann, Brown, Johnston, & Clark, 2010; Gaucher, Friesen, & Kay, 2011). In

the pursuit of fit, applicants from marginalized groups may be similarly motivated to apply for educational opportunities, i.e., diversity awards, matching their self-views.

Aside from fit, there may be alternative explanations drawing applicants toward diversity awards. For instance, because fewer people are eligible for diversity awards, applicants may perceive an increased likelihood of winning. Applicants may believe that committees evaluating diversity awards will be less discriminatory (Kaiser et al., 2013) or value their identities more (Plaut, Thomas, & Goren, 2009; Purdie-Vaughns, Steele, Davies, Dittmann, & Crosby, 2008). Applicants may also perceive that diversity awards are easier to apply for. We examine these, and other, alternative explanations.

Present Research

Across four studies, we tested whether the presence of a less lucrative (i.e., smaller) diversity award deters applicants from marginalized groups from applying for a more lucrative (i.e., larger) unrestricted award. Study 1 tested diversity awards for underrepresented racial minorities (URMs), while Studies 2 – 4 tested diversity awards for women. In a mini-meta analysis, see Supplement, we reported every study conducted to test our hypothesis regarding how the presence of a diversity award influences applicants, totaling 8 studies. Studies conducted between 2014 – 2015 with smaller sample sizes are described in the Supplement.

Study 1

In Study 1, we predicted that the presence of a diversity award would deter URM applicants from applying for a larger unrestricted award.

Method

Participants

Only participants who indicated being members of URM groups typically underrepresented in college (e.g., Black, Latinx, Native American, and other non-White and non-Asian racial minorities) were permitted to complete the survey. Our initial sample consisted of 196 Amazon Mechanical Turk workers living in the U.S. who completed the online study for monetary compensation. After removing 26 participants who failed the eligibility check and 2 participants who indicated not being a URM, 168 remained (94 women, 71 men, 3 another gender; 89 Black, 58 Latinx, 9 Native American, 7 Multiracial, 2 another racial group unlisted, 1 Aboriginal American, 1 Middle Easterner, 1 Pacific Islander). The mean age was 29.03 years ($SD = 9.87$).

Materials and Procedure

Participants first completed demographic items to determine their eligibility as URM for the study. If eligible, participants next read descriptions of two counterbalanced awards, one valued at \$5,000 and another valued at \$2,500. The larger award (Scholarship F) was always framed as an unrestricted award. Participants were randomly assigned to learn about one of two smaller awards (Scholarship J): a diversity award open to just URM applicants (*experimental condition*) or an unrestricted award (*control condition*). Across conditions, award descriptions were otherwise identical in terms of the judging criteria and the requirements for applying, see Table 1 for award descriptions. Thus, participants were choosing between a larger unrestricted award and smaller diversity or unrestricted award. Procedures for this, and subsequent studies, were reviewed and approved by the IRB.

Table 1

Participants saw either unrestricted or diversity descriptions for the smaller \$2,500 award (Studies 1 – 3) and for the smaller \$20 award (Study 4). All participants also saw a larger unrestricted award (\$5,000 in Studies 1 – 3 and \$30 in Study 4) open to everyone (not included in table).

	Unrestricted Award (Control Condition)	Diversity Award (Experimental Condition)
Study 1	<u>Who:</u> This scholarship is available to anyone. <u>What:</u> This award provides each recipient with a scholarship of \$2,500.	<u>Who:</u> This scholarship is available to members of an underrepresented ethnic or racial minority. <u>What:</u> This award provides each recipient with a scholarship of \$2,500.
Study 2	<u>Who:</u> This scholarship is available to freshmen, sophomores, juniors and seniors. <u>What:</u> Four men and four women will be selected to receive this award, which provides each recipient with a scholarship of \$2,500.	<u>Who:</u> This scholarship is available to women who are freshmen, sophomores, juniors and seniors. <u>What:</u> Four women will be selected to receive this award, which provides each recipient with a scholarship of \$2,500.
Study 3	<u>How:</u> ... Last year about 400 students applied. <u>Who:</u> This scholarship is available to freshmen, sophomores, juniors and seniors. <u>What:</u> Four students will be selected to receive this award, which provides each recipient with a scholarship of \$2,500.	<u>How:</u> ... Last year about 400 students applied. <u>Who:</u> This scholarship is available to women who are freshmen, sophomores, juniors and seniors. <u>What:</u> Four students will be selected to receive this award, which provides each recipient with a scholarship of \$2,500.
Study 4	<u>How:</u> ... Last year about 400 students applied. <u>Who:</u> This scholarship is available to students who participate in the Psychology Subject Pool. <u>What:</u> This award provides the recipient with a scholarship of \$20.	<u>How:</u> ... Last year about 400 students applied. <u>Who:</u> This scholarship is available to women who participate in the Psychology Subject Pool. <u>What:</u> This award provides the recipient with a scholarship of \$20.

Note. In the “How” section of the awards in Studies 2 and 3, all participants saw, “Recipients are selected on the basis of scholastic achievement, leadership activities, community service and financial need. Last Year about 400 students applied.”

Eligibility check. As an eligibility check, participants were asked after each award, “Are you eligible for scholarship F/J?” with the option to select either “Yes” or “No.” Only participants who indicated “Yes” for both awards were considered to have passed the eligibility check. Following Studies 2 and 3’s pre-registrations, only participants in Studies 1-3 who successfully passed this eligibility check were included in analyses.

Manipulation and attention checks. To test whether participants were attending to the details of each condition, participants were tested on who the award was for (i.e., everyone, only URMs) and each award’s value (i.e., \$5,000, \$2,500) after seeing each award’s description. If a participant answered one of these questions incorrectly, the award description was presented again, and participants were given a second chance to answer the question correctly.

Award choice. As a primary test of our hypothesis, we examined which award participants would choose to apply for and their likelihood of applying for either award. As a measurement of award choice, participants were asked, “If you could only apply for one of these scholarships, which would you choose to apply for?” with the option to only select either the smaller or the larger award. Participants’ likelihood of applying for each award was measured via the item, “How likely would you be to apply for Scholarship F/J?” on a Likert scale of 1 (*very unlikely*) to 7 (*very likely*).

Why choose diversity awards over unrestricted awards? As a preliminary understanding of why participants might select diversity awards over similarly valued unrestricted awards, we administered five exploratory Likert items. These items included our proposed mediator, *fit*, “Scholarship J is for people like me.” on a scale of 1 (*strongly disagree*) to 7 (*strongly agree*) and four alternative items measuring: similarity, “How similar do you think you are to other applicants for Scholarship J?” on a scale of 1 (*not at all similar*) to 7 (*very*

similar); competitiveness, “How competitive do you think Scholarship J is?” on a scale of 1 (*not at all competitive*) to 7 (*extremely competitive*); prestige, “How prestigious do you think Scholarship J is?” on a scale of 1 (*not at all prestigious*) to 7 (*extremely prestigious*); and finally, likelihood of winning, “If you were to apply for Scholarship J, how likely do you think it is that you would get it?” on a scale of 1 (*very unlikely*) to 7 (*very likely*).

To understand which award participants felt they had the best chance of winning, participants were asked the forced-choice item, “Which scholarship do you think you would have the best chance of getting?” with the option to only select either the smaller or the larger award.

Other items. Participants also answered other items beyond the scope of the hypotheses: how likely they would be to apply for *both* awards and the strength of their racial identification, using a modified version of the four-item importance to identity subscale of the Collective Self-Esteem Scale (Luhtanen & Crocker, 1992). These other items were the same across Studies 1 and 2. In Study 3, only the importance to identity subscale was included. In Studies 2 and 3, the importance to identity scale measured participants’ gender rather than racial identity.

Results

Eligibility Check

Twenty-six participants were excluded from Study 1’s analyses for not passing eligibility checks. An analysis with these participants included revealed similar chi-square results on award choice, $\chi^2(1, N = 194) = 17.52, p < .001, \phi = .30$. However, including them did change the results of our 2 (award amount: larger, smaller; within) $\times$ 2 (award type: diversity award, unrestricted award; between) ANOVA on URM’s likelihood of applying for the smaller award, such that we found a main effect of award amount, $F(1, 192) = 7.55, p = .01$, and no interaction between award amount and type, $F(1, 192) = .001, p = .98$.

Manipulation and Attention Checks

Five of 168 participants did not correctly recall either the award's value or who the award was for on their second attempt. Examining Study 1's data with these participants removed did not change the overall pattern of findings in our chi-square test, $\chi^2(1, N = 163) = 19.03, p < .001, \phi = .34$, but the interaction in our 2 (award amount: larger, smaller; within) $\times 2$ (award type: diversity award, unrestricted award; between) ANOVA on URM's likelihood of applying for the smaller award was no longer statistically significant, $F(1, 161) = 3.56, p = .06$.

Award Choice

In line with our hypothesis, when both awards were unrestricted awards, the vast majority of participants selected the larger award over the smaller award (87.0%). However, when the smaller award was a diversity award, significantly fewer URMs selected the larger unrestricted award (55.3%), $\chi^2(1, N = 168) = 21.02, p < .001, \phi = .35$, see Fig. 1.

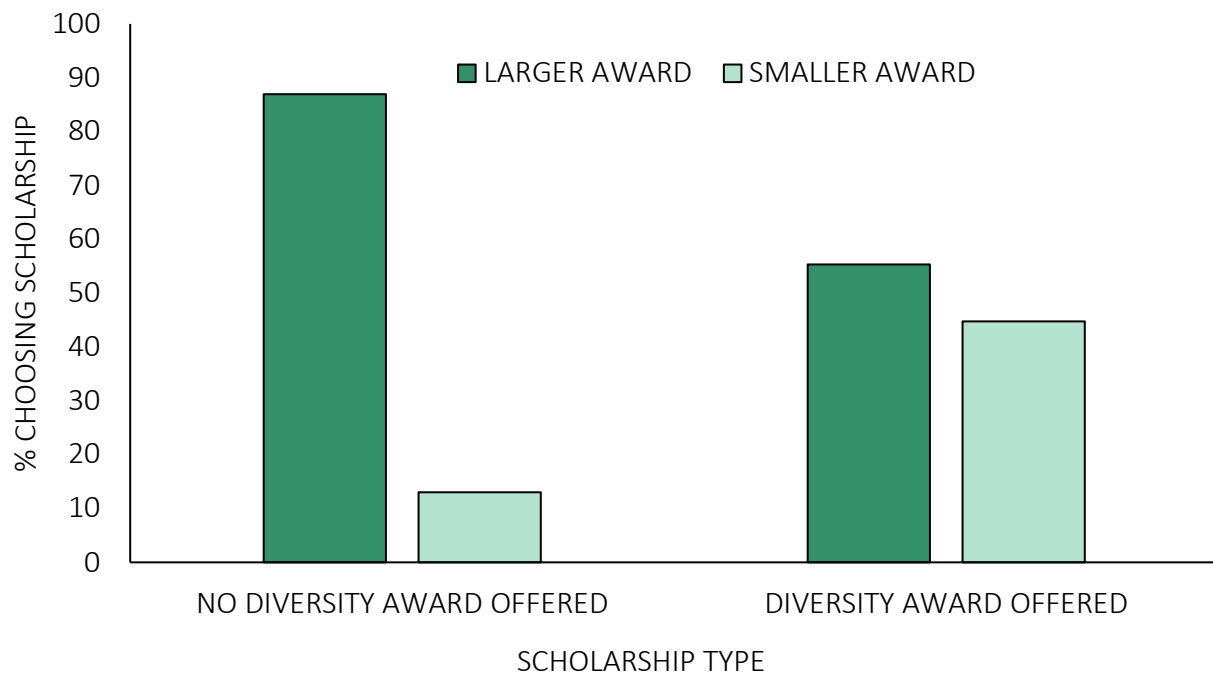


Fig. 1.

Percentage of underrepresented racial minorities choosing to apply for larger and smaller awards when the smaller award was framed as either a second unrestricted award (No Diversity Award Offered) or as a diversity award (Diversity Award Offered) in Study 1.

As an examination of participants' likelihood of applying for either award, we conducted a 2 (award amount: larger, smaller; within) $\times$ 2 (award type: diversity award, unrestricted award; between) ANOVA. Results revealed no main effects of award amount, $F(1, 166) = 2.12, p = .15$; or award type, $F(1, 166) = 0.88, p = .35$; but a significant interaction between award amount and type, $F(1, 166) = 4.34, p = .04$, see Fig. 2. When both awards were framed as unrestricted awards, URMs reported being more likely to apply for the larger award ($M = 5.99, SD = 1.46$, 95% CI [5.69, 6.29]) relative to the smaller award ($M = 5.54, SD = 1.56$, 95% CI [5.22, 5.87]), $F(1, 166) = 6.92, p = .01, d_{av} = .29$. However, when the smaller award was framed as a diversity award, URMs reported being no more likely to apply for the larger award ($M = 5.91, SD = 1.58$, 95% CI [5.55, 6.27]) over the smaller award ($M = 5.99, SD = 1.31$, 95% CI [5.69, 6.29]), $F(1, 166) = 0.18, p = .67$. In a 2 (award amount: larger, smaller; within) $\times$ 2 (award type: diversity award, general award; between) $\times$ 2 (award order: larger award presented first, smaller award presented first; between) ANOVA, we found that this interaction was moderated by the order in which participants saw each award, $F(1, 164) = 15.90, p < .001$, however, this order effect did not occur again in other studies.



Fig. 2.

Underrepresented racial minorities' likelihood of applying for larger and smaller awards when the smaller award was framed as either a second unrestricted award (No Diversity Award Offered) or as a diversity award (Diversity Award Offered) in Study 1. Error bars represent standard error.

Why Choose Diversity Awards Over Unrestricted Awards? An Exploratory Analysis.

We conducted a one-way MANOVA to test the effect of award type on our proposed mediators and detected a statistically significant effect, Pillai's trace = .08, $F(5, 162) = 2.87$, $p = .02$. In a series of separate univariate ANOVAs, we found significant condition differences on our proposed mediator, fit, such that URMIs who saw the smaller diversity award felt greater fit with the smaller award ($M = 5.82$, $SD = 1.16$, 95% CI [5.55, 6.08]) relative to URMIs who saw the smaller unrestricted award ($M = 5.26$, $SD = 1.44$, 95% CI [4.96, 5.56]), $F(1, 166) = 7.36$, $p = .01$, $d = .42$. There were no differences between URMIs who saw the smaller award framed as

either a diversity or unrestricted award in how similar they expected to be to the other winners of the smaller award, $F(1, 166) = 2.30$ $p = .13$, how competitive they perceived the smaller award to be, $F(1, 166) = 3.27$, $p = .07$, how prestigious they perceived the smaller award to be, $F(1, 166) = 1.20$, $p = .28$, or how likely they would be to win the smaller award, $F(1, 166) = 2.25$, $p = .14$. While similarity and fit are sometimes brought into one construct (Cheryan et al., 2009), we did not find high correlation between these two items and tested each individually, see Table 2 for correlations.

Table 2
Means, Standard Deviations, and Correlations Between Potential Mediators in Study 1

Smaller Award	<i>M</i>	<i>SD</i>	2	3	4	5
1. Fit	5.51	1.34	.53	.12 ^{NS}	.19*	.55
2. Similarity	5.05	1.48		.07 ^{NS}	.15 ^{NS}	.37
3. Competitiveness	5.37	1.47			.33	-.02 ^{NS}
4. Prestige	4.49	1.48				.14 ^{NS}
5. Own Odds	4.70	1.62				

Note. All correlations significant at the .01 value (2-tailed) unless otherwise noted.

* Indicates a correlation significant at the .05 value (2-tailed) and ^{NS} Indicates a non-significant correlation.

When asked which award they felt they had a better chance of winning, the smaller or the larger award, participants who saw both awards as unrestricted were somewhat more likely to choose the smaller award (58.7%). However, participants who saw the smaller award as a diversity award were overwhelmingly more likely to indicate that they had a better chance of winning the smaller (84.2%) over the larger award, $\chi^2(1, N = 168) = 12.96$, $p < .001$, $\phi = .28$.

Discussion

When no diversity award was present, URMs were more likely to select the larger award over the smaller award. However, when the smaller award was a diversity award, URMs were significantly less likely to select the larger award. URMs felt increased fit with and a greater

chance of winning the diversity versus unrestricted award. We investigated these and other mechanisms in Study 2.

Study 2

Study 2 had four aims. First, we investigated whether results would generalize to members of another marginalized group. Second, we investigated whether women would select smaller over larger awards even when the number of potential women winners for each award was controlled. Third, we conducted a pre-registered test of our hypothesis. Fourth, we explored possible mechanisms motivating women's likelihood of applying for diversity over unrestricted awards.

Method

Participants

Six hundred and eighty-eight students who identified as women recruited through the psychology participant pool completed an online study in exchange for course credit. After removing participants who failed the eligibility check, 628 remained (627 women, 1 participant who identified as both a woman and a man; 324 Asian, 182 White, 52 multiracial, 34 Latinx, 17 Black, 17 another racial group unlisted, 1 Native American, 1 no racial group provided). Sample size (including power analyses), procedure, hypotheses, and analyses were preregistered and can be accessed at <https://osf.io/2cdk7/>.

Our pre-registered target sample was “at least 580” participants who passed eligibility checks. We collected an additional 48 participants to surpass our minimum target. We did not analyze the data when it approached or exceeded the target *N* of 580 until data collection was complete.

Materials and Procedure

Procedures were identical to Study 1 except that more mediator questions were included, and the award descriptions differed in two primary ways. First, the diversity award was for women. Second, all award descriptions included an additional statement that out of the expected 400 applicants, either four women (*experimental condition*) or four men and four women (*control condition*) would be selected as winners. See Table 1 for award descriptions.

Eligibility check. Participants answered the same eligibility check items as in Study 1.

Manipulation and attention checks. Participants answered similar manipulation check items as Study 1 that were modified to be specifically about gender, as well as two additional items testing participants' recall of the number of each award's previous applicants and total number of winners.

Award choice. Participants completed the same forced-choice items as Study 1. Likelihood of applying to the larger and smaller awards was measured via two items, "How likely would you be to apply for Scholarship F/J?" measured on a scale of 1 (*very unlikely*) to 7 (*very likely*) and "How interested would you be in applying for Scholarship F/J?" measured on a scale of 1 (*not at all interested*) to 7 (*very interested*); larger award $\rho = .89$, smaller award $\rho = .89$.

Understanding the motivation to apply for diversity awards over unrestricted awards. We administered items measuring our proposed mediator: participants' feelings of fit with the award. As alternative mediators, we measured participants' perceptions of how likely evaluators of diversity or unrestricted awards would be to understand and care about them,¹ how biased they expected diversity and unrestricted award committees to be, the perceived ease with

¹ Due to a programming error, the evaluator's care measure in the control condition included one repeated and one original item. This error was corrected in Study 3.

which applicants could imagine what they would write in an application for a diversity or unrestricted award, participants' perceived odds of winning each award compared to other award applicants (i.e., other women or other women and men), how proud and empowered participants' would feel to win a diversity or unrestricted award, how risky it would feel to apply for a diversity or unrestricted award, and the perception that winners of diversity and unrestricted award would be members of their gender. All items were measured on seven-point Likert scales. For a complete list of all scale measures and reliabilities, see Table 3.

Table 3
Items and Scales for the Smaller Award in Studies 2 and 3.

Construct	Reliability	Items	Study	
			2	3
Fit	Study 2: $\alpha = .95$ Study 3: $\alpha = .95$	Scholarship J is a good match for someone like me.	X	X
		Scholarship J is for people like me.	X	X
		Scholarship J is a good fit for me.	X	X
		Scholarship J is looking for someone like me.	X	X
		I am the kind of person Scholarship J is looking for.	X	
Evaluators Care	Study 2: $\alpha = .91$ Study 3: $\alpha = .88$	I have a lot in common with other applicants for Scholarship J.	X	X
		I feel a sense of connection with Scholarship J.	X	X
		Winners of Scholarship J will be students similar to me.	X	X
		I would feel comfortable applying for Scholarship J.	X	
Evaluators Biased	Study 2: $\rho = .65$ Study 3: $\rho = .83$	People who care about someone like me will be evaluating Scholarship J.	X	X
		People who understand my experiences will be evaluating Scholarship J.	X	X
		People who value my experiences will be evaluating Scholarship J.	X	X
		The evaluation committee of Scholarship J will not discriminate against applicants of my gender.	X	
Ease of Applying	Study 2: $\rho = .82$ Study 3: $\rho = .80$	I expect the evaluation committee of Scholarship J to be fair.	X	
		The evaluation committee of Scholarship J will discriminate against applicants of my gender.	X	X
		The evaluation committee of Scholarship J will be biased against applicants of my gender.	X	
		In an application for Scholarship J, I think I'd be able to sell myself well.	X	X
High Odds	Study 2: $\alpha = .82$ Study 3: $\alpha = .89$	In an application for Scholarship J, it is easy for me to imagine what I would write.	X	X
		It is easy for me to imagine what I would write in an application for Scholarship J.	X	
		I think my odds of winning Scholarship J are high.	X	X
		I am likely to get Scholarship J if I apply.	X	X
Empowered	Study 2: Winning Scholarship J would feel like a proud achievement to me.	I am likely to win Scholarship J based on the quality of other applicants.	X	X
		If you were to apply for Scholarship J, how likely do you think it is that you would get it?	X	
		Based on the quality of applicants for Scholarship J, I am likely to win.	X	
		How competitive do you think Scholarship J is?	X	
		Someone like me is likely to receive Scholarship J.	X	

	$p = .89$	Winning Scholarship J would feel empowering.	X
Risk		Applying for Scholarship J feels like a risky application choice.	X
Same Gender		The winners of Scholarship J will be students of my gender.	X

Following these items, participants reported demographic information.

Results

Eligibility Check

Following our pre-registration, 60 participants who indicated they were not eligible for one or more of the awards were excluded from analyses. Our findings were similar regardless of whether these participants are included or not, see Supplement for analyses.

Manipulation and Attention Checks

On a second attempt, 13 participants did not correctly recall either: the award's value, who the target population was for the award, how many people had previously won, or how many people were eligible to win one or both the awards presented. Per our pre-registration, these 13 participants were still included in analyses. However, excluding these participants does not alter our results, see Supplement for analyses.

Award Choice

As predicted, and consistent with the pattern in Study 1, when both awards were unrestricted awards, a majority of women selected the larger award (73.0%). When the smaller award was a diversity award, only a minority of women selected the larger award (38.1%), $\chi^2(1, N = 627) = 77.25, p < .001, \phi = .35$, see Fig. 3.

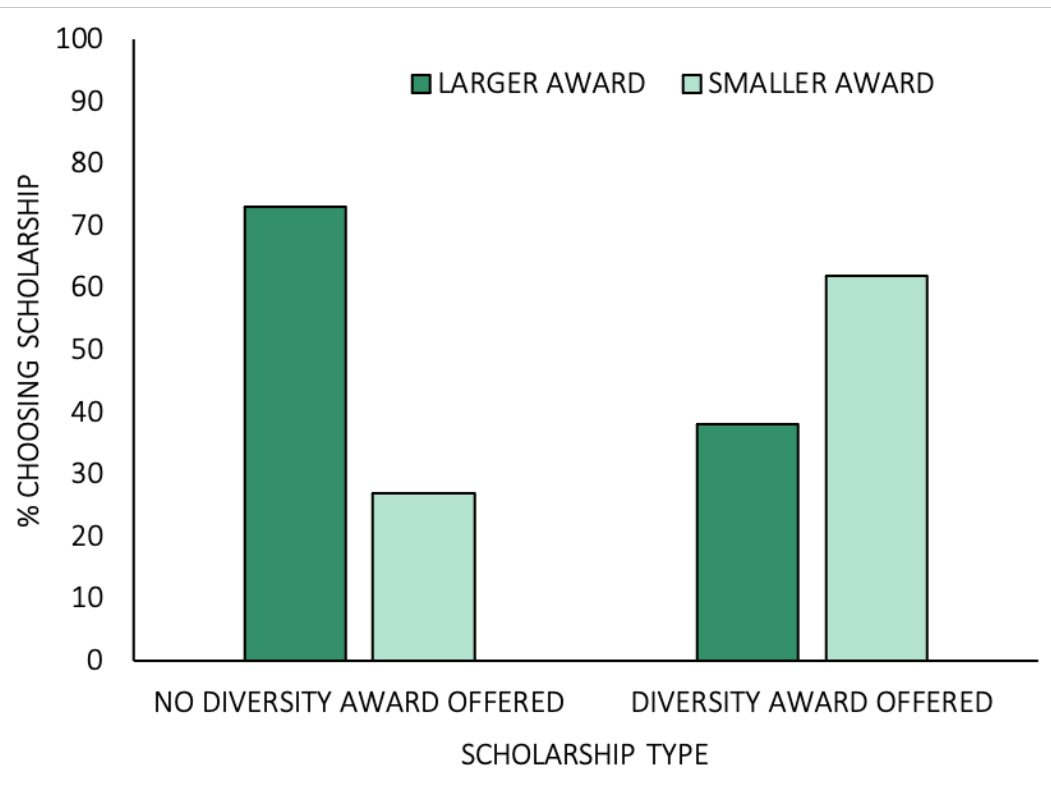


Fig. 3.

Percentage of women choosing to apply for larger and smaller awards when the smaller award was framed as either a second unrestricted award (No Diversity Award Offered) or as a diversity award (Diversity Award Offered) in Study 2.

As predicted, a 2 (award amount: larger, smaller; within) $\times$ 2 (award type: diversity award, unrestricted award; between) ANOVA on the likelihood of applying for the smaller award revealed no main effect of award amount, $F(1, 626) = .02, p = .88$, or award type, $F(1, 626) = 0.20, p = .65$, but a significant interaction between award amount and type, $F(1, 626) = 30.68, p < .001$, see Fig. 4. As predicted, when the smaller award was an unrestricted award, women were more likely to apply for the larger award ($M = 5.23, SD = 1.51, 95\% CI [5.06, 5.39]$) over the smaller award ($M = 4.96, SD = 1.52, 95\% CI [4.79, 5.13]$), $F(1, 626) = 16.25, p < .001, d_{av} = .18$. However, when the smaller award was a diversity award, women were less likely

to apply for the larger award ($M = 5.02$, $SD = 1.63$, 95% CI [4.84, 5.20]) relative to the smaller award ($M = 5.27$, $SD = 1.59$, 95% CI [5.09, 5.45]), $F(1, 626) = 14.46$, $p < .001$, $d_{av} = .16$. This effect was not moderated by the order in which participants saw each award, $F(1, 624) = .93$, $p = .34$.

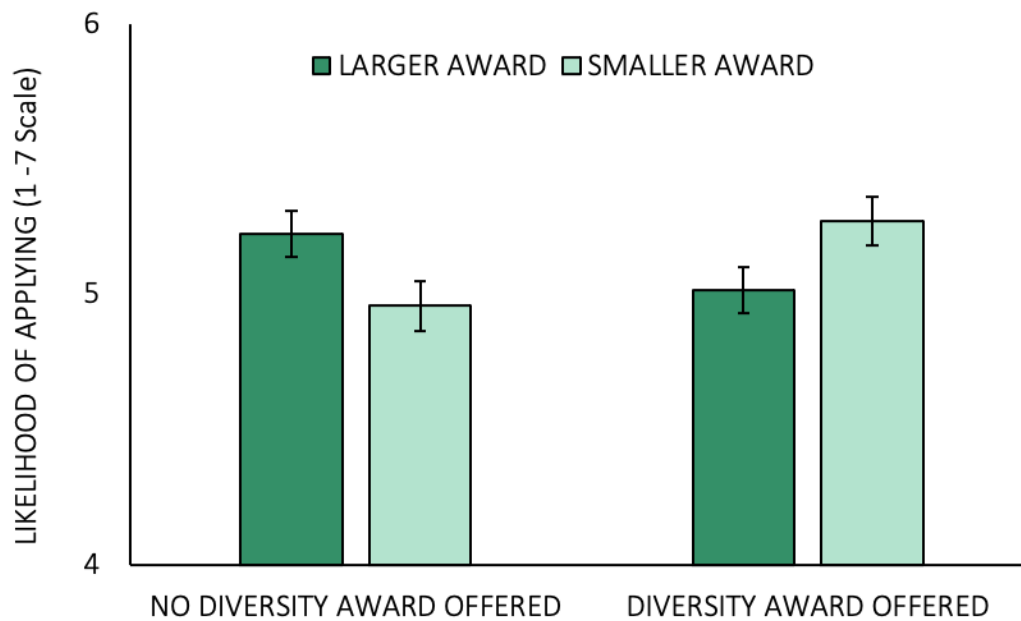


Fig. 4.

Women's likelihood of applying for larger and smaller awards when the smaller award was framed as either a second unrestricted award (No Diversity Award Offered) or as a diversity award (Diversity Award Offered) in Study 2. Error bars represent standard error.

To uncover whether our observed effects were stronger for women of color relative to White women, we conducted an exploratory 2 (award amount: larger, smaller; within) $\times$ 2 (award type: diversity award, unrestricted award; between) $\times$ 2 (race: women of color, White women; between) ANOVA comparing women of color's and White women's likelihood of applying for diversity and unrestricted awards. We found no interaction between award type,

amount, or race, $F(1, 623) = .002, p = .97$. One caveat is that we collapsed across women of color, who were predominately Asian in our sample. Our sample size did not enable us to make statistical comparisons between racial minority groups.

Understanding the motivation to apply for diversity awards over unrestricted awards (not pre-registered)

To investigate whether women's feelings of fit between themselves and diversity awards motivated their likelihood of applying for a smaller diversity versus smaller unrestricted award, we conducted a multiple mediation analysis, see Table 4 for correlations.

Table 4
Means, Standard Deviations, and Correlations Between Potential Mediators in Study 2

Smaller Award	<i>M</i>	<i>SD</i>	2	3	4	5	6	7	8	9
1. Fit	4.97	1.18	.59	.20	.25	.69	.72	.39	-.17	.21
2. Evaluators Care	4.72	1.27		.40	.44	.43	.54	.35	-.02 ^{NS}	.29
3. Evaluators Biased (Non Discriminatory)	5.50	1.42			.49	.10	.13	.24	-.11	.38
4. Evaluators Biased (Fair)	5.67	1.22				.21	.25	.33	-.04 ^{NS}	.19
5. Ease of Applying	4.86	1.32					.65	.34	-.22	.08 ^{NS}
6. High Odds	4.17	1.03						.23	-.12	.12
7. Empowered	5.89	1.07							.01 ^{NS}	.26
8. Risk	3.71	1.53								-.04 ^{NS}
9. Same Gender	5.49	1.44								

Note. All correlations significant at the .01 value (2-tailed) unless otherwise noted.

^{NS} Indicates a non-significant correlation.

Before running a multiple mediation analysis, we first determined if we could rule out any potential mediators based on a lack of condition differences between women who saw the smaller award framed as a diversity versus unrestricted award. Using a one-way MANOVA, we found a significant main effect, Pillai's trace = .45, $F(9, 617) = 56.59, p < .001$. In a series of separate univariate ANOVAs, we found no significant condition differences in how empowered participants would feel to win the smaller award, $F(1, 625) = 3.56, p = .06$, how easy it would be to complete the smaller award's application, $F(1, 625) = .16, p = .69$, and how risky it would feel

to complete an application for the smaller award, $F(1, 625) = .37, p = .54$. The differences between conditions were significant for all other potential mediators.

We ran a multiple mediation with 10,000 resampled bootstraps (SPSS PROCESS macro, 3.4) to examine what mediated women's greater likelihood of applying for the smaller award when it was framed as either a diversity versus unrestricted award, see Fig. 5. The specific indirect effect of fit was significant, $b = .32 (.09)$, 95% CI = [.16, .50], such that women's increased likelihood of applying for the diversity versus unrestricted smaller award was mediated by women's increased feelings of fit with the smaller award. The specific indirect effects of how likely the evaluators of the award would be to care about and value women's experiences, $b = .02 (.03)$, 95% CI = [-.04, .09], how high women's odds of winning would be, $b = .02 (.02)$, 95% CI = [-.01, .06], the likelihood of the winner of the award being a woman, $b = -.01 (.08)$, 95% CI = [-.18, .14], how nondiscriminatory evaluators would be toward women, $b = -.03 (.03)$, 95% CI = [-.08, .02], and how fair women expected evaluators to be, $b = -.00 (.01)$, 95% CI = [-.02, .02], were not significant.

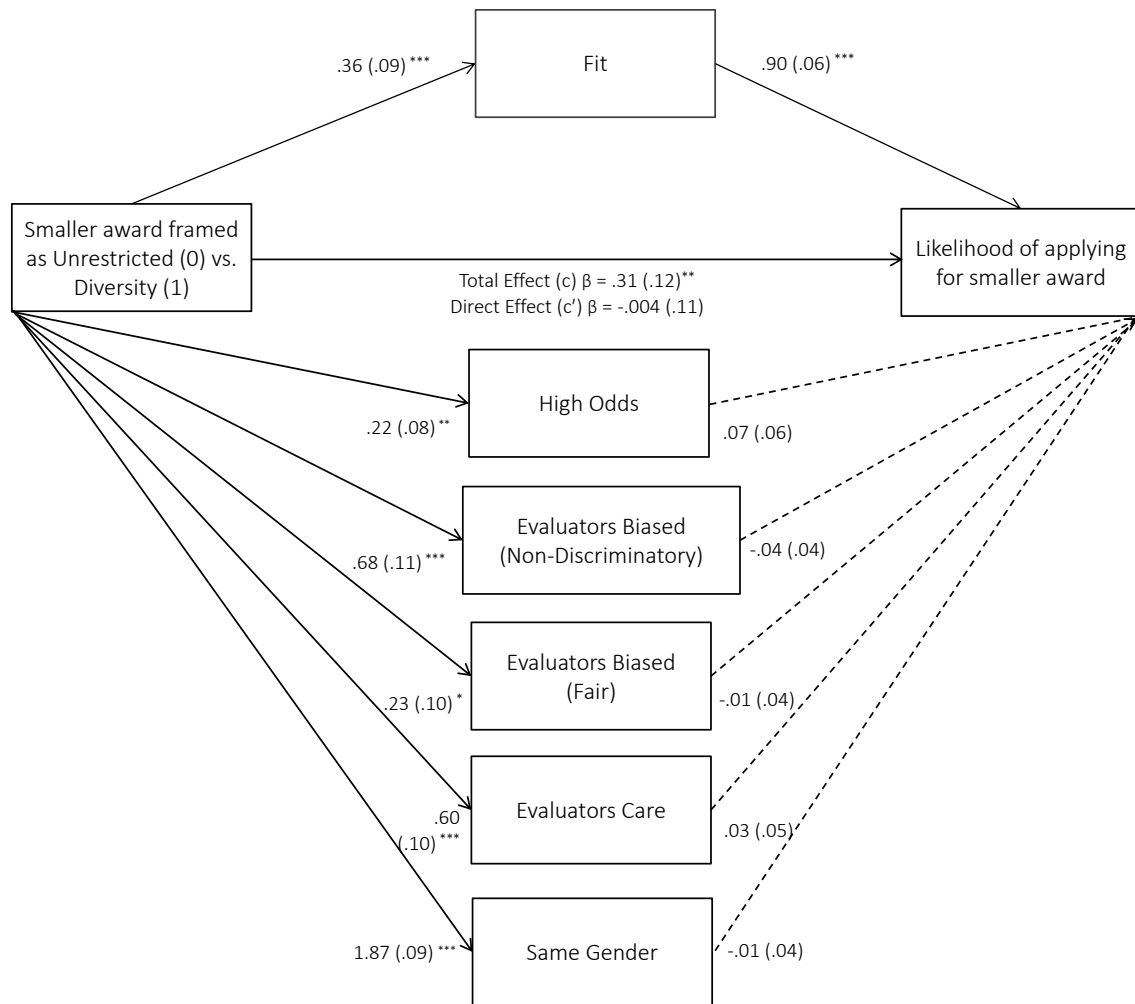


Fig. 5.

Women's greater likelihood of applying for the smaller award when it was framed as a diversity versus unrestricted award was best mediated by fit in Study 2. * $p < .05$, ** $p < .01$, *** $p < .001$.

Turning to our measure of which award participants felt they had best chance of winning, about half of participants who saw the smaller award as an unrestricted award believed they had a better chance of winning it (52.7%) over the larger award. In contrast, a larger proportion of participants who saw the smaller award as a diversity award believed they had a better chance of winning it (68.6%) over the larger award, $\chi^2(1, N = 167) = 16.58, p < .001, \phi = .16$.

Discussion

Even with equal numbers of women winners, the presence of a diversity award caused women to select this award over a more lucrative unrestricted award. When no diversity award was offered, women were more likely to choose the lucrative award. Women's increased likelihood of applying for the smaller diversity, versus unrestricted, award was best mediated by fit.

Study 3

Study 3 had two goals. First, we conducted a pre-registered test of our hypothesized mechanism, fit. Second, we tested our hypothesis using another method of controlling likelihood of winning by providing the number of total students, not just women, able to win each award. We predicted that even with the same number of winners, when a diversity award was available, women would select and be more likely to apply for it over an unrestricted award, and that this choice would be mediated by women's increased perceptions of fit.

Method

Participants

Undergraduates were recruited through the psychology participant pool in exchange for course credit ($N = 501$) and voluntarily in public campus spaces ($N = 130$). After removing 50 participants who failed the eligibility check, 581 remained (580 women, 1 participant who identified as both a woman and non-binary; 321 Asian, 153 White, 46 multiracial, 30 Latinx, 19 Black, 9 another racial group unlisted, 3 no racial group provided). Sample size (including power analyses), procedure, hypotheses, and analyses were preregistered and can be accessed at <https://osf.io/54wzq/>.

Materials and Procedure

Study 3 closely mirrored the procedures of Study 2 with one change. Specifically, the award descriptions for both the larger and smaller awards included the total number of winners with the statement: “Four students will be selected to receive this award...”.

Eligibility, Attention, and Manipulation Checks. Participants completed the same items as in Study 2.

Award Choice. Participants completed the same items used in Study 2. Reliabilities for the likelihood of applying items: larger award $\rho = .90$; smaller award $\rho = .91$.

Mediation. To test for a mechanism, participants answered a series of Likert items on five different potential mediators about each award – fit, perceived odds of winning, ease of applying, perceptions that evaluators will be biased, and perceptions that evaluators will value their experiences. All items were measured on a seven-point Likert scale of 1 (*strongly disagree*) to 7 (*strongly agree*), see Table 3 for all measures and reliabilities and Table 5 for correlations between all Study 3 mediators.

Table 5
Means, Standard Deviations, and Correlations Between Potential Mediators in Study 3

Smaller Award	<i>M</i>	<i>SD</i>	2	3	4	5
1. Fit	5.15	1.20	.54	-.04 ^{NS}	.66	.48
2. Evaluators Care	4.89	1.09		-.09*	.44	.43
3. Evaluators Biased	2.28	1.27			.01 ^{NS}	.09*
4. Ease of Applying	4.89	1.24				.52
5. High Odds	3.49	1.29				

Note. All correlations significant at the .01 value (2-tailed) unless otherwise noted.

* Indicates a correlation significant at the .05 value (2-tailed) and ^{NS} Indicates a non-significant correlation.

Following these items, participants completed demographics.

Results

Eligibility Check

Following our pre-registration, 50 participants who indicated that they were not eligible for one or more of the awards were excluded from our analysis. Similar to Study 2, including these participants in analyses did not change our findings, see Supplement for analyses.

Manipulation and Attention Checks

Five participants run in lab did not correctly recall either: the value, target population, number of applicants per year, or the number of winners of one or both of the awards that they saw on the second attempt. While these participants were included in our analyses, excluding them does not alter our findings, see Supplement for analyses.

Scholarship Choice

When both the smaller and larger awards were framed as unrestricted awards, most women were more likely to select the larger award (73.6%); however, when the smaller award was framed as a women's diversity award, women were significantly less likely to select larger award (38.6%), $\chi^2(1, N = 577) = 71.96, p < .001, \phi = .35$, see Fig. 6.

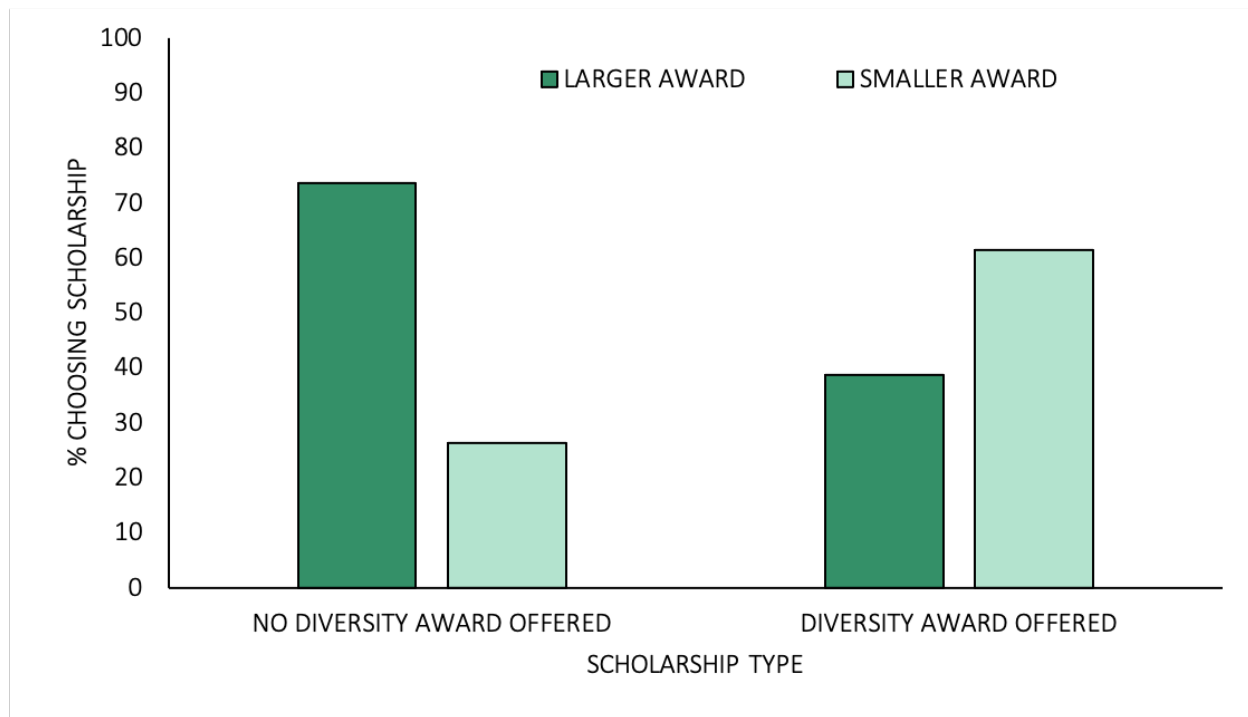


Fig. 6.

Percentage of women choosing to apply for larger and smaller awards when the smaller award was framed as either a second unrestricted award (No Diversity Award Offered) or as a diversity award (Diversity Award Offered) in Study 3.

To determine whether seeing the smaller award framed as either a diversity award or unrestricted award would influence women's likelihood of applying for it, we conducted a 2 (award amount: larger, smaller; within) $\times$ 2 (award type: diversity award, unrestricted award; between) ANOVA. As seen in Fig. 7, we found a main effect of award amount, $F(1, 579) = 8.62$, $p = .003$; no main effect of award type, $F(1, 579) = 1.29$, $p = .26$; and a significant interaction between award amount and type, $F(1, 579) = 47.07$, $p < .001$. When both awards were unrestricted awards, women were more likely to apply for the larger award ($M = 5.29$, $SD = 1.44$, 95% CI [5.12, 5.45]) relative to the smaller award ($M = 4.89$, $SD = 1.51$, 95% CI [4.72, 5.06]),

$F(1, 579) = 48.58, p < .001, d_{av} = .27$. However, when the smaller award was a diversity award, women reported being more likely to apply for the smaller award ($M = 5.30, SD = 1.45, 95\% \text{ CI } [5.13, 5.47]$) relative to the larger award ($M = 5.14, SD = 1.51, 95\% \text{ CI } [4.96, 5.32]$), $F(1, 579) = 7.61, p = .01, d_{av} = .11$. The order in which the smaller and larger awards were presented to participants did not moderate this effect, $F(1, 461) = .08, p = .78$.



Fig. 7.

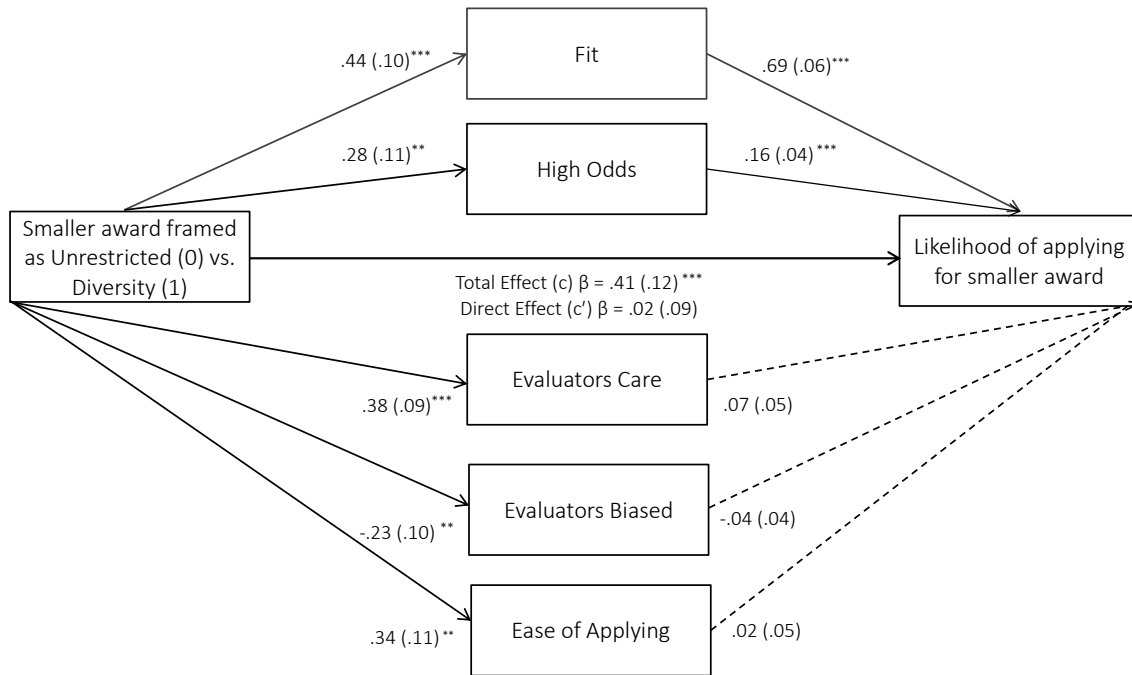
Women's likelihood of applying for larger and smaller awards when the smaller award was framed as either an unrestricted award (No Diversity Award Offered) or as a diversity award (Diversity Award Offered) in Study 3. Error bars represent standard error.

Mediation

Similar to Study 2, prior to running a multiple mediation analysis, we tested for condition differences between participants who saw the smaller award framed as either a diversity or unrestricted award on each of our proposed mediators using a one-way MANOVA, see Table 3 for all tested Study 3 variables. We found a significant main effect of award type on the

mediators, Pillai's trace = .05, $F(5, 575) = 5.89$, $p < .001$ and in separate univariate ANOVAs found significant differences between conditions for all potential mediators.

We conducted a multiple mediation using 10,000 bootstraps (SPSS PROCESS macro, 3.4) testing whether women's increased likelihood of applying for a smaller award when framed as a diversity, relative to an unrestricted, award was mediated by our pre-registered mediator, fit, or by alternative mediators, see Fig. 8. The specific indirect effects of women's feelings of fit, $b = .31$ (.07), 95% CI = [.17, .46], and perceived higher odds of winning, $b = .04$ (.02), 95% CI = [.01, .09], were both significant, such that women's greater likelihood of applying for the diversity versus unrestricted smaller award was mediated by both women's increased feelings of fit and perceived higher odds of winning the smaller award. However, women's feeling of fit was the stronger predictor of this relationship, $b = .26$ (.07), 95% CI = [.13, .41]. The specific indirect effects of how likely the evaluators of the award would be to care about and value women's experiences, $b = .03$ (.02), 95% CI = [-.02, .08], how biased evaluators of the award would be toward women, $b = .01$ (.01), 95% CI = [-.01, .04], and perceptions of how easy it would feel to apply for the award, $b = .01$ (.02), 95% CI = [-.04, .05], were not significant.

**Fig. 8.**

Women's greater likelihood of applying for the smaller award when it was framed as a diversity versus unrestricted award was best mediated by fit in Study 3. * $p < .05$, ** $p < .01$, *** $p < .001$

Discussion

Even with an equal number of winners, when the smaller award was a diversity award, women were less likely to apply for the larger unrestricted award. However, when the smaller award was unrestricted, women were more likely to select the larger award. Women's feelings of fit and their perceived odds of winning the diversity award best mediated their increased likelihood of applying for it over an unrestricted award, with fit being the stronger predictor.

Study 4

Study 4's goal was to demonstrate that Studies 1 – 3's findings were not limited to participants' imagined behavior but had important behavioral consequences. In this study, women completed real applications (e.g., including writing essays) for two awards.

Method

Participants

One hundred and fifty-two undergraduate women (75 Asian, 53 White, 6 Black, 2 another racial group unlisted, 4 Latinx, 2 Native American, 10 multiracial) recruited through the online psychology participant pool participated in a study in lab in exchange for course credit.

Materials and Procedure

As in Studies 1 – 3, women read descriptions of two awards presented in a counterbalanced order. However, in this study, women had the chance to apply and actually win these awards. In the *experimental* condition, women read about two awards, one \$30 unrestricted award and one \$20 diversity award for women. The *control* condition differed only in that the \$20 award was an unrestricted award rather than a diversity award, see Table 1 for award descriptions.

Essays. Participants were given the opportunity to enter a raffle to win either one or both of the scholarships by writing unique 500-word essays. Both the essay prompts (either on one's past achievements or one's goals) and order of the presentation of the larger and smaller awards were counterbalanced.

Participants were asked to choose which, if any, application they would like to work on first. After completing the first essay, participants were prompted with the option to either work on the second award's essay or to leave the study having applied to just one award. Of primary interest was which essay, the essay for the larger or smaller award, participants prioritized and chose to work on first when the smaller award was presented as a diversity versus unrestricted award.

Manipulation Check. Participants were asked the same test items as Studies 1-3 regarding who each award was for and each award's value. Unlike Studies 1-3, participants who answered incorrectly were not re-prompted with the questions again.

Other Items. Before and after completing application essays, participants completed items, such as: "How much would/did applying for the Hughes/Carter Scholarship allow you to express the kind of person you are?"; and "How much would/did you enjoy applying for the Hughes/Carter Scholarship?" Results for these items can be found in the Supplement.

Last, participants completed demographic items and were debriefed. Award winners were randomly selected and paid.

Results

Essays

Thirty-one percent of participants ($n = 47$) chose to leave without completing either essay, 37% of participants ($n = 56$) completed one essay, and 32% ($n = 49$) completed both essays. Whether participants completed none or at least one of the essays did not differ between conditions, $\chi^2(1, N = 152) = 1.79, p = .18$. We had a sample of 105 women who completed at least one essay.

We conducted a chi-square test to examine which of the two awards women were most likely to prioritize. When both awards were unrestricted awards, the vast majority of women (87.7%) prioritized applying for the larger award. However, when the smaller award was a diversity award, only half of the women prioritized the larger award (50.0%), $\chi^2(1, N = 105) = 17.82, p < .001, \phi = .41$, see Fig. 9.

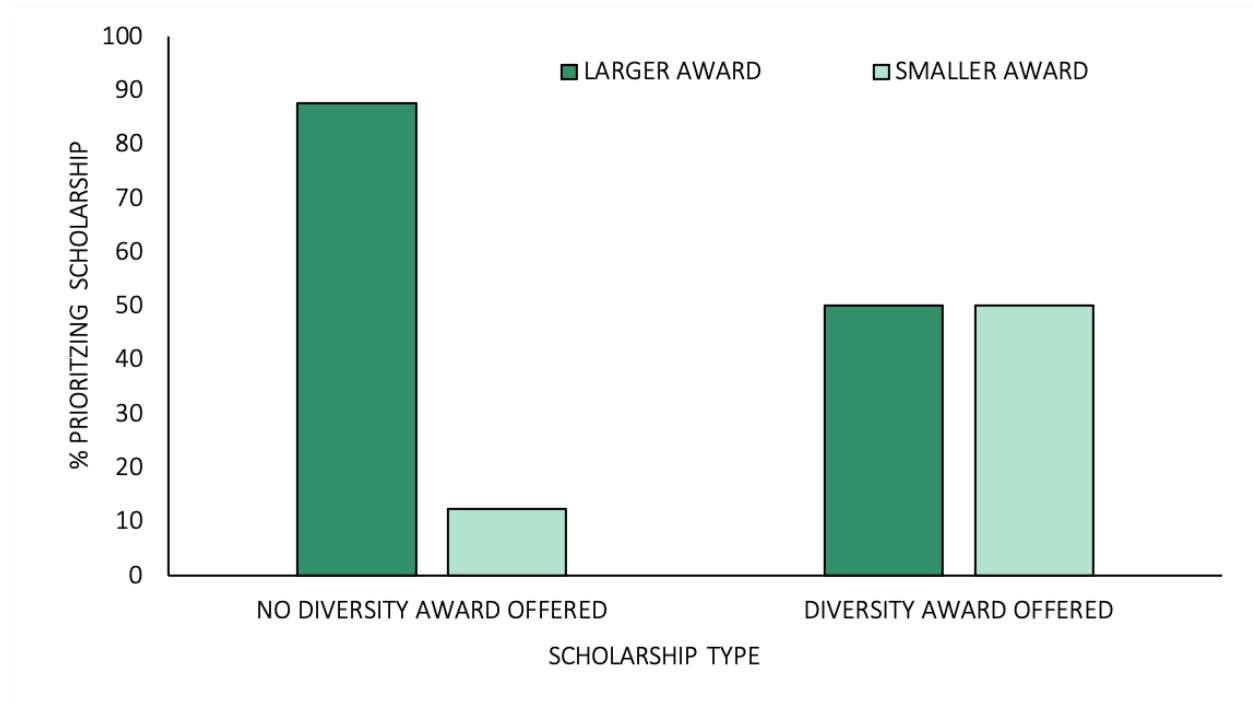


Fig. 9.

Percentage of women who prioritized applications for larger and smaller awards when the smaller award was framed as an unrestricted award (No Diversity Award Offered) or a diversity award (Diversity Award Offered) in Study 4.

Of interest was whether women who opted to complete just one essay ($n = 56$) were more likely to choose to complete the larger or smaller essay when a diversity award was either offered or not offered. When no diversity award was offered, 90.9% of women elected to apply for the larger award. However, when a diversity award was offered, only 39.1% of women elected to apply for the larger award, $\chi^2(1, N = 56) = 17.19, p < .001, \phi = .55$.

Discussion

Even with real money at stake and completing real award applications, when a diversity award was offered, women were more likely to prioritize and complete applications for diversity

over larger unrestricted awards. In contrast, women selected the larger award when the diversity award was not offered.

General Discussion

Diversity awards provide applicants from marginalized groups with increased winning opportunities and belonging within institutions frequently biased against them. However, offering these awards can have drawbacks. When two unrestricted awards were available, applicants from marginalized groups were more likely to apply for the larger award. However, the presence of a smaller diversity award caused applicants from marginalized groups to apply for and prioritize the diversity award over the larger unrestricted award. This pattern held even when students prepared real award applications, the odds of winning were equal, and when awards were for URM and women. Offering diversity awards may prevent applicants from marginalized groups from applying for unrestricted awards, even when the unrestricted award is more lucrative.

Fit, or the perception that the diversity award is a good match for someone like them, predicted applicants' likelihood of applying for diversity awards. Fit was the strongest predictor of this relationship even when accounting for: applicants' perceived odds of winning, perceptions that award committees would be less biased or more likely to value their identity, how easy it would be to apply, how empowering it would feel to win, how much less risky it would be to apply for the award, and how likely someone of their gender was to win.

This research illuminates an important dilemma: the siphoning of talented applicants from marginalized groups away from unrestricted award pools. Imagine two awards where 100 women and 100 men each apply. Using the proportion of women who applied for unrestricted awards, we can model the gender distribution of applicant pools when diversity awards are and

are not offered, see Fig. 10. Using Study 2's data, if a smaller diversity award is offered in conjunction with a larger more lucrative unrestricted award and 38 women and 100 men (who are ineligible for the diversity award) apply for the unrestricted award, 28% of the applicants would be women. However, if no diversity award is offered and both awards are unrestricted, 73 women would apply for the larger unrestricted award. Even if all 100 men apply for the larger award, women would account for 42% of applicants. This illustration suggests that offering diversity awards can skew unrestricted applicant pools towards male applicants, perhaps counterintuitively providing a financial leg-up to already high-status groups.

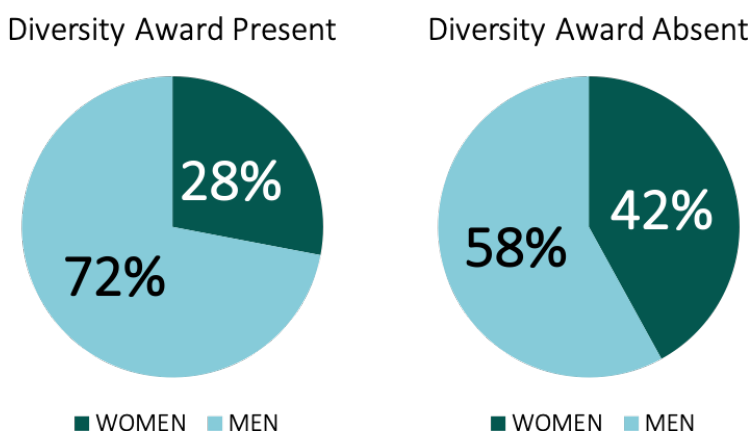


Fig. 10.

Models of unrestricted award applicant pools if men had also applied.

Given the disparities that offering diversity awards can create, what can be done? First, we believe that addressing this issue should not focus on changing people from marginalized group's behaviors or on eliminating diversity awards altogether. Instead, we propose four possible solutions: 1. Create automatic entry into unrestricted pools. When award committees offer two awards and one is a diversity award, the application submitted for diversity awards could be automatically entered into unrestricted award pools. 2. Unrestricted awards should more explicitly value diversity. Because our findings show the importance of fit in making decisions,

unrestricted awards should alter their program announcements to increase fit with people from marginalized groups. 3. Increase the perceived prestige of diversity awards. Increasing the financial value of diversity awards may enhance their perceived prestige and overall net-benefit to applicants, serving as a mechanism to decrease historic wealth gaps between people from marginalized and non-marginalized groups (e.g., Kraus, Rucker, & Richeson, 2017). 4. Selection committees from unrestricted awards could reduce their biases so that they are equally likely to select applicants from marginalized groups, even when they account smaller proportions of the applicant pool. One method could be to broaden how award committees define “merit” to encompass a greater range of experiences. While these solutions do not remedy the systemic inequality spurring the original need for diversity awards, they offer local structural solutions that could be paired with larger systemic solutions to reduce bias toward people from marginalized groups.

Future research could address potential constraints on the generalizability of our findings. It is unclear whether our effect would generalize to awards targeted to members of high-status groups, such as men, or if our effect is specific to applicants from marginalized groups. One possibility is that men may be less likely to feel a sense of fit with same-gender awards than women because their gender identification tends to be weaker (Rudman & Goodwin, 2004). Additionally, future research could examine whether applicants from marginalized groups perceive funding agencies and universities that do and do not offer diversity awards differently.

While offering diversity awards can have many benefits to applicants from marginalized groups, they may also have unintentional drawbacks. Because of better perceived fit between themselves and diversity awards, offering diversity awards led applicants from marginalized groups to forego applying for higher value, and often more prestigious, unrestricted awards.

Common diversity opportunities warrant closer examination to ensure they do not have negative consequences for equity.

Open Practices Statement

Study 1 was not pre-registered; a pre-registration for Study 2 can be accessed at <https://osf.io/2cdk7/>; a pre-registration for Study 3 can be accessed at <https://osf.io/54wzq/>; Study 4 was not pre-registered. De-identified data (<https://osf.io/vtpf8/>) and study materials (<https://osf.io/t8bnx/>) are available on OSF for all studies.

Funding Disclosure

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SUPPLEMENTAL ONLINE MATERIAL

Section A. Mini-Meta Analysis and Details for Studies Not Included in Manuscript

Section B. Eligibility and Manipulation Checks from Studies 2 and 3 of Manuscript

Section C. Description of Analyses from Study 4 of Manuscript

Section A. Mini-Meta Analysis and Details for Studies Not Included in Manuscript

We conducted a mini-meta analysis using procedures outlined in Goh, Hall, and Rosenthal (2016) to better estimate the size of our hypothesized effect that when a diversity award was present, versus absent, marginalized groups would be more likely to choose this award over a more lucrative unrestricted one. Using data from eight studies: Studies 1 – 3¹ from the main manuscript and five other studies not included in the manuscript, we found that participants from marginalized groups who saw the smaller award framed as a diversity award were more likely to select it over a larger unrestricted award than participants who saw a smaller unrestricted award, $OR = 4.82$, $CI [3.95, 5.88]$, $Z = 15.45$, $p < .001$. See Table S1 for details on studies not included in manuscript.

¹ Unlike all our other studies, participants in Study 4 did not complete a forced choice item asking which scholarship they would choose to apply for. Thus, Study 4 was not included in these analyses.

Table S1. Sample Size and Chi-Square Results for Studies Not Included in Manuscript

Studies not included in manuscript	Total sample size, <i>N</i>	When no diversity award offered , % picking larger award	When diversity award offered , % picking larger award	χ^2	Effect size, ϕ
Study S.1	85	73.7%	36.2%	11.87	.37
Study S.2	194	84.5%	48.5%	28.34	.38
Study S.3	73	77.1%	28.9%	16.96	.48
Study S.4	86	72.1%	32.6%	13.47	.40
Study S.5	100	79.5%	40.0%	15.65	.40

Note. All studies were conducted with undergraduate women participants between 2014 - 2015 examining diversity awards for women. Total sample size determined using the same exclusion criteria as studies in manuscript. All χ^2 significant at $p < .001$ level.

Section B. Eligibility and Manipulation Checks from Studies 2 and 3 of Manuscript

Below are analyses for participants in Studies 2 and 3 of the manuscript who did not meet our pre-registered eligibility check or who on a second attempt, failed our manipulation checks. In both studies we found that including (eligibility check) or excluding (manipulation check) these participants did not alter the overall pattern of our findings.

Manuscript Study 2

Eligibility Check

Including the 60 participants who did not meet our eligibility check generated similar findings. The chi-square results for women's award selection remained significant, $\chi^2(1, N = 687) = 81.99, p < .001, \phi = .35$, and the 2 (award amount: larger, smaller; within) $\times$ 2 (award type: diversity award, unrestricted award; between) ANOVA on women's likelihood of applying for the smaller award revealed no main effect of award amount, $F(1, 686) = .01, p = .92$, or award type, $F(1, 686) = .04, p = .84$, but a significant interaction between award amount and type, $F(1, 686) = 33.04, p < .001$.

Manipulation Check

On their second attempt, 13 participants did not pass our manipulation check. Excluding these participants generated similar results. The chi-square results for women's award selection remained significant, $\chi^2(1, N = 614) = 72.60, p < .001, \phi = .34$, and the 2 (award amount: larger, smaller; within) $\times$ 2 (award type: diversity award, unrestricted award; between) ANOVA on women's likelihood of applying for the smaller award revealed no main effect of award amount, $F(1, 613) = .10, p = .75$, or award type, $F(1, 613) = .25, p = .62$, but a significant interaction between award amount and type, $F(1, 613) = 29.49, p < .001$.

Manuscript Study 3

Eligibility Check

Fifty participants indicated not being eligible for one or more of the awards. When these participants were included in analyses, our analyses did not change. The chi square analysis on which award women selected remained significant, $\chi^2(1, N = 627) = 71.43, p < .001, \phi = .34$, and the 2 (award amount: larger, smaller; within) $\times 2$ (award type: diversity award, unrestricted award; between) ANOVA maintained the same findings, revealing a main effect of award amount, $F(1, 629) = 10.53, p = .001$; no main effect of award type, $F(1, 629) = 1.26, p = .26$; and a significant interaction between award amount and type, $F(1, 629) = 49.81, p < .001$.

Manipulation Check

We found that on a second attempt, five participants did not pass the manipulation check. When these participants were excluded, our results remained similar. The chi square analysis on which award women selected remained significant, $\chi^2(1, N = 572) = 72.07, p < .001, \phi = .35$, as did the 2 (award amount: larger, smaller; within) $\times 2$ (award type: diversity award, unrestricted award; between) ANOVA, maintaining a main effect of award amount, $F(1, 574) = 8.76, p = .003$; no main effect of award type, $F(1, 574) = 1.46, p = .23$; and a significant interaction between award amount and type, $F(1, 574) = 47.29, p < .001$.

Section C. Description of Analyses from Study 4 of Manuscript

Before and after the essay tasks in Study 4, women completed measures assessing an array of motivations for selecting diversity and unrestricted awards. Because this study was conducted prior to Study 3 in the manuscript, the pre-essay measures did not include our proposed mechanism, fit.

Materials and Procedure

Pre-essay measures. After reading each award's description, participants answered a series of items unrelated to our hypothesis about each award. These items consisted of:

A single item on the ease of applying for either award, "How difficult would it be to apply for the Hughes/Carter Scholarship?" on a scale of 1 (*not at all difficult*) to 7 (*very difficult*).

A single item assessing the odds of applying for either award, "If you were to apply for the Hughes/Carter Scholarship, how likely do you think it is that you would get it?" on a scale of 1 (*very unlikely*) to 7 (*very likely*).

A six-item scale assessing how much applying for each award would allow applicants to express their identities included items such as, "How much would applying for the Hughes/Carter Scholarship reflect who you are as a person?" and "How much would applying for the Hughes/Carter Scholarship allow you to express the kind of person you are?" were each measured on a scale of 1 (*not at all*) to 7 (*very much*). Reliabilities for each award were: larger award $\alpha = .95$; smaller award $\alpha = .95$.

Additional items included, "How competitive do you think the Hughes/Carter Scholarship is?" on a scale of 1 (*not at all competitive*) to 7 (*very competitive*); "How much would you enjoy applying for the Hughes/Carter Scholarship?" on a scale of 1 (*not at all*) to 7 (*very much*); "How interested are you in applying for the Hughes/Carter Scholarship?" on a scale

of 1 (*not at all interested*) to 7 (*very interested*); and “How qualified do you think you are for the Hughes/Carter Scholarship compared to other applicants?” on a scale of 1 (*much less qualified*) to 7 (*much more qualified*).

Post-essay measures. After each essay, participants next completed exploratory Likert post-essay measures. These included the same pre-essay single measure assessing participants’ ease of applying for either award, the same single measure determining how much participants enjoyed applying for either award, the same six-item scale measuring how much applying for either award would allow participants to express their identity; larger award $\alpha = .96$; and smaller award $\alpha = .94$, and a new item assessing how confident participants felt about their application to either award, “How confident are you about your application for the Hughes/Carter Scholarship?” on a scale of 1 (*not at all confident*) to 7 (*very confident*).

Results

Pre-Essay Measures. To determine condition differences on our pre-measures, we conducted a one-way MANOVA and obtained a significant effect, Pillai’s trace = .11, $F(7, 144) = 2.47, p = .02$. Separate univariate ANOVAs assessing for condition differences on our potential mediators revealed that women who saw the smaller unrestricted award found the smaller award less competitive ($M = 3.25, SD = 1.55, 95\% \text{ CI } [2.90, 3.60]$) relative to women who saw the smaller diversity award ($M = 3.85, SD = 1.56, 95\% \text{ CI } [3.50, 4.21]$), $F(1, 150) = 5.80, p = .02, d = .39$. Results also revealed that women who saw the smaller unrestricted award felt they were less qualified applicants for it ($M = 4.26, SD = .97, 95\% \text{ CI } [4.04, 4.48]$) relative to women who saw the smaller diversity award ($M = 4.63, SD = 1.11, 95\% \text{ CI } [4.37, 4.88]$), $F(1, 150) = 4.73, p = .03, d = .36$. However, there was no significant difference between women who saw the smaller unrestricted or diversity award in how difficult they thought it would be to apply

for the smaller award, $F(1, 150) = 3.74, p = .05$, or how much they would enjoy applying for the smaller award, $F(1, 150) = 3.73, p = .06$. We found no differences between women who saw the smaller unrestricted or diversity award in how interested they were in applying for the smaller award, $F(1, 150) = 2.18, p = .14$, how likely they felt they were to win the smaller award, $F(1, 150) = .004, p = .95$, or in how much applying for the smaller award would allow them to express their identity, $F(1, 150) = .07, p = .80$.²

² Because participants had the choice to leave the study before each of the essays, our sample who completed post-measures is considerably smaller and thus not included in analyses.

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Conclusions and Future Directions

Understanding how cultural norms and values influence racial and gender inequity is essential for creating more effective inequity solutions. Across these three papers, I demonstrate how cultural norms and values deemed objective and even beneficial can result in inequity for marginalized people. First, I show the importance of identifying norms and values to uncover hidden inequities by demonstrating in my first paper how scientific research norms meant to generate important understandings on interracial dynamics present a one-sided picture of race by privileging the perspectives of White people over people of color. Next, I demonstrate the importance of understanding how and why cultural norms and values contribute to inequity by uncovering how a social context's norms and values influence personal choices. In my second paper, I show that some STEM gender gaps are larger in higher vs lower opportunity contexts, such that women and men with the most social and cultural advantages represent the largest gender gaps in STEM. And last, in my third paper I show how the context in which diversity awards are offered can lead applicants from marginalized groups to choose diversity awards over more lucrative awards open to everyone. Together, each of these lines of work present evidence of the influence of cultural norms and values on inequity. More details on each of these papers' findings and relationship to cultural norms and values are below.

Norms in Scientific Research Replicate the Same Racial Inequities Seen in the World

In paper 1, I find that with respect to who gets chosen as participants and who research questions typically focus on, Native American, Multiracial, Latinx, Asian, and Black people are, in that order, the most understudied racial groups in U.S. research on race (Germano & Cheryan, *in preparation for submission*). Research on race reflects the same biased preferences seen outside of the lab, where White people's thoughts and ideas are most valued. I theorize that this

phenomenon occurs due to U.S. cultural preferences favoring Whiteness. I propose that these pro-White preferences spill into psychological research norms, dictating how good research on race should look and what research questions are valued, subsequently influencing the seemingly objective field of scientific research. I suggest that current field practices such as: associating Whiteness with objectivity, the propensity for the majority White field of social psychology to practice of “me-search”, the field’s focus on the perceivers of racial inequities opposed to the targets, and the perceived unavailability of participants of color collectively contribute to this overall field bias. In addition to understanding how norms influence the prevalence of Whiteness in research, I examined the sociocultural and historical factors that contribute to which racial minority groups are more and less likely to be the focus of research on race. This research provides an important step in breaking down the broader ideas that surround what good research *should* look like and identify what it *could* look like when more people’s racial experiences are included. Importantly, it also demonstrates how broader cultural ideals can influence spaces meant to be free of bias and replicate real-world inequities. Illuminating this phenomenon is important not just for improving science, but also the real-world initiatives spurred from this area of research, such as workplace diversity trainings.

Gender Gaps in STEM are Larger in Higher Versus Lower Opportunity Contexts

Understanding how different cultural features that in theory should be advantaging women, may be disadvantaging them generates important insights into how elements of cultural can promote inequity. In this paper my colleagues and I demonstrate that gender gaps are paradoxically largest in STEM between women and men who have been conferred the most social and cultural advantages (Germano et al., *in preparation for submission*). After examining multiple cultural features that could explain this phenomenon: differences in financial security,

cultural emphasis on individualism and choice, differences in perceptions of STEM as competitive, that maybe men in higher opportunity contexts are more likely to be in STEM, differences in whether STEM is labeled as feminine or masculine work, gendered division of labor within families, and children's extracurricular STEM activities, we suggest that differences in financial security and a greater cultural emphasis on individualism and personal choice contribute to larger gender gaps in higher opportunity contexts. Using a cultural lens, this research provides an important critical examination into gender gaps in STEM education and illuminates how norms and values within a cultural setting that seem beneficial can be a hinderance to the same people they are meant to advantage. Importantly, this research also demonstrates the necessity of turning to lower opportunity cultural contexts for insights on how to better reduce gender gaps in STEM.

Educational Equity Initiatives for Marginalized Students Lead to Financial Inequity

Across 4 empirical studies I found that offering, versus not offering, diversity awards leads application pools for more lucrative unrestricted awards (i.e., awards open to everyone) to become less diverse (Germano, et al., 2021). These results suggest that when both a diversity award and unrestricted award are simultaneously offered (e.g., NIH National Research Service Awards), diversity awards may be inadvertently siphoning marginalized applicants out of applicant pools for unrestricted awards. By not considering the context in which diversity awards are offered, diversity awards may maintain inequity between student groups by leaving larger, more lucrative awards to be won by primarily men and White students. I propose that addressing this issue should not focus on changing marginalized people's behaviors or on eliminating diversity awards. Instead, solutions should focus on changing awards themselves (e.g., changing the program announcements of unrestricted awards to value marginalized applicants'

experiences). These changes would focus on expanding the cultural ideals of who is seen as a desirable candidate, rather than “fixing” marginalized people’s choices.

Future Directions

Examining how cultural norms and values influence inequity can provide a new framework for understanding why inequity continues to persist even after solutions are enacted. Initiatives that do not consider the norms and values of the broader cultural contexts they are nested within may fail to remedy inequities. Indeed, changing just one feature of inequity (e.g., offering an anti-bias workshop) may not be enough to create real change if an individual’s broader cultural context continues to shape their behavior in ways that reinforce inequity. Below I present a few future research directions that could continue investigating how norms inadvertently contribute to inequity and what can be done.

First, future research could expand who is viewed as normative in different social contexts. Because higher level cultural norms can influence concepts like who is prototypical, examining who the prototypical person is in particular contexts could be beneficial for reducing inequity. Indeed, because research finds that prototypes can be expanded to include marginalized group members (Danbold & Bendersky, 2020), this same theory could be applied to new contexts. For instance, turning back to diversity awards, if award committees were to explicitly expand the prototype of who the normative winner of an unrestricted award is (e.g., place information in program announcements saying that they will now not only view GPA and awards, but also students’ commitment to their communities and service), marginalized applicants may be just as likely to apply for these awards as diversity awards. Similarly, if researchers were to expand who the normative research participant is for research on race to also include racial minorities, particularly the groups we found to be least represented (i.e.,

Multiracial people and Native American people, Germano, et al., *in preparation for submission*), research on these group's racial experiences may also increase. While changing norms of who is prototypical is difficult, it is not impossible. Using the culture cycle to identify different instances in which certain groups are seen as more normative compared to others could be one way to access different layers of culture and expand norms of typicality.

Second, future research could bridge from understanding how cultural norms lead to inequity to developing stronger and more effective solutions. For instance, in previous research my colleagues and I theorized that traditional academic interventions (e.g., growth mindset interventions, which encourage students to see academic challenges as opportunities for growth) would be more effective if their motivational content were tailored to match students' self-views (Brady et al., 2017). We theorized that amending growth mindset interventions with culturally interdependent oriented messages such as, "Growing your intelligence helps you to help your people," as opposed to independent messages such as "Growing your intelligence helps you reach your goals," may better resonate with students from culturally interdependent backgrounds (e.g., first-generation college students, racial and ethnic minority students). While this is just one example within the domain of education, amending existing equity interventions (e.g., anti-racism interventions) to increase their cultural fit could have long lasting benefits to the groups they intend to help.

Last, future research should work to predict which norms and values lead to inequity and which ones do not. Here I have presented different contexts in which broader cultural norms supported inequity, but it is likely that not all cultural norms support inequity. Some norms may be more beneficial or more neutral than others, such as those that define what it means to be a good person via helping or supporting others. Identifying which norms and values inhibit and

exhibit inequity is an important next step. To do this, researchers should identify examples of instances where equity has been or is close to being achieved in typically inequitable contexts (e.g., identifying why some STEM fields are more gender balanced than others; Cheryan et al., 2017). After identifying these instances, researchers could then experimentally manipulate the contexts that they hypothesize either led to or inhibited equity. Predicting and experimentally testing which norms and values aid in creating or maintaining equity would be valuable for developing effective equity interventions.

Taken together, the data and theories I present here support the need for a new more integrated model of culture and its influence on inequity. It is my hope as a researcher to continue illuminating how norms and values contribute to and maintain inequity.

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