



PNAS and prejudice

May R. Berenbaum , *Editor-in-Chief, PNAS*

On April 10, 2020, only about 2 months ago in this terrible year, PNAS published my editorial addressing the coronavirus disease 2019 (COVID-19) crisis (1), which, at that point, had killed more than 100,000 people around the world and more than 18,500 in the United States. The escalating spread, for which the United States was tragically unprepared, prompted a transformation in scientific publishing, undertaken in order to ensure “rapid communication of critically important scientific findings relating to the pandemic” that, in theory, could be applied to slow the spread of the virus and save lives. PNAS implemented several changes for COVID-related submissions, including expediting manuscript review and publishing COVID papers with a Creative Commons attribution (CC BY) license to allow widespread distribution. We weren’t alone in this effort; by May 13, Brainard (2) reported that an estimated 23,000 papers on COVID-19 had been published since January, to create “among the biggest explosions of scientific literature ever.” The social science community has successfully mounted an enormous effort to generate research on which recommendations for behaviors to minimize infection risk and spread could be based. Of the PNAS papers published or accepted on COVID-19 to date, for example, just over half (17 of 33) are in the social science arena.

The year 2020, however, had more death in store. On June 5, a video surfaced of the killing of George Floyd, an African American resident of Minneapolis, MN, by a law enforcement officer. In the wake of several other deaths of African Americans in 2020 caused by current or former law enforcement officers without provocation or due process, the death of George Floyd ignited protests across the country and ultimately the world, with demonstrations in more than 700 cities and towns across all 50 states and on all continents except Antarctica, demanding an end to systemic racism not just in law enforcement but in all aspects of culture, including the scientific establishment. On June 10, protest movements within the science community, including #Strike4BlackLives, #ShutDownSTEM, and #ShutDownAcademia, called for a 24-hour cessation of business as usual to show solidarity and to provide an opportunity for reflection and for designing constructive ways to address the persistent and pervasive inequalities

experienced by Black scientists and Black people in general.

In stark contrast with the response to COVID-19, however, there are virtually no calls for emergency allocations of funds to support research on how racism arises, spreads, and defies most if not all efforts at eradication anywhere, much less in the science community. Right now, as PNAS editor-in-chief, I’d like to be bracing for a flood of manuscripts relaying “critically important scientific findings” relating to racism and gearing up to expedite their review, but I’m just about positive there will be no flood, nor will there be a massive infusion of funds from federal funding agencies to support studies that identify the design features of diversity programs likely to be successful in breaking down barriers faced by Black, Indigenous, and People of Color (BIPOC) scientists.



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Barriers and Bias Have a Long History in Science

That systemic racism has created (and continues to create) barriers to BIPOC participation in STEM publishing and STEM careers is undeniable. There’s a long record of underrepresentation that has barely budged for decades. According to Lewis (3), the National Science Board reported that, in 1977, African Americans received 1.3% of doctoral degrees in natural sciences relative to 12% of African Americans in the United States; in 1997, that proportion had grown to 2.4% (3), and, as of 2017, it had increased only to 3% (4). As understated by Garrison (5) in his study of the slow rate of increase in earned doctorates by African Americans in science and engineering, “at this pace, it will take decades to eliminate the remaining disparities.” Barring a rapid fundamental transformation, those decades will be marked by anguish and frustration. Systemic racism has led to what Smith et al. (6) called “racial battle fatigue” in minority scientists, defined as the “cumulative result of a natural race-related stress response to distressing mental and emotional conditions”

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(brought on by experiencing bias, microaggressions, and social and professional isolation) that can undermine health and impede the academic progress of faculty and students of color.

Unfortunately, the kind of research that might yield insights into why racial equity has been such an elusive goal is not among the highest priorities for federal funding agencies. Examining racial disparities in the success rate of applicants for NIH RO1 grants between 2000 and 2006, Ginther et al. (7) found that, even controlling for education, country of origin, publication record, prior research awards, and employer characteristics, White applicants were still 10% more likely to receive funding than were African American/Black (AA/B) applicants. Based on data from a decade later, between 2011 and 2015, Hoppe et al. (8) determined that the success rate for AA/B applicants for RO1 funding, controlling for other variables, remained significantly lower than the success rate for White applicants (10.7% vs. 17.7%, respectively). A keyword search of more than 157,000 applications revealed that “topic choice” explained more than 20% of the funding gap. AA/B applicants were more likely to focus their proposals on research at the population and community levels (including, for example, disease prevention), areas with lower award rates than research at the cellular or molecular level. So, not only are AA/B biomedical scientist less likely to obtain NIH RO1 grants, jeopardizing their chances for advancement in academic jobs, the kind of research that could potentially provide insights into why racism persists in the science community is less likely to be carried out.

Dozens of papers, the majority of which involve social science research, have appeared in PNAS between 2010 and 2020 addressing a spectrum of race-related disparities, including but not limited to housing, obesity, romantic connections, pain assessments, death of family members, perceptions of economic status, hiring practices, pollution exposure, disciplinary actions in schools, speech recognition, and policing (see www.pnas.org/cc/research-in-racial-and-social-justice). A substantial proportion of these are letters to the editors, typically voicing criticism of methods or interpretations of these studies and attesting to the complexities of conducting research on this topic. Relatively speaking, at least in this sample of the literature, scientists themselves aren't often the subjects of these studies; given the long history of seemingly entrenched inequities within the scientific community, more intensive study is warranted.

Implicit Bias Is Inherently Unscientific

Although propped up by pseudoscience for the first half of the 20th century, the concept of human “races” as biologically distinct and genetically defined entities became scientifically untenable beginning with the rise of population genetics in the 1960s, followed by the emergence of genomics after the turn of the 21st century. The persistence of racial prejudice even among geneticists whose work facilitated the studies that have refuted absolute genetic definitions of “race” (e.g., ref. 9) is just one illustration of the sad fact that implicit bias against people of color is astonishingly durable. Payne et al. (10), for example, examined implicit bias—“mental associations triggered automatically on thinking about social groups”—in the context of past and current structural inequalities and found that, in counties and states that were more dependent on

slavery in 1860, Whites today (more than a century later) display greater levels of pro-White implicit bias than in counties and states that were less dependent on slavery. Moreover, recognizing implicit bias does not necessarily result in behavioral change. Even when brief interventions reduce implicit race preferences, the change may not last longer than a few days (11).

Actions and Interventions Must Be Evidence Based

As challenging as it may be to carry out studies that document biases and test intervention efficacy, such studies are essential. The National Academy of Sciences

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was chartered in 1863 to provide advice to the nation, and its tradition is that policy recommendations must be evidence based. There is thus an urgent need for deeper knowledge; policies designed in the absence of evidence of efficacy have the potential to perpetuate, rather than resolve, the problems (e.g., ref. 12). One recent consensus study can potentially serve as a model for obtaining the evidence needed for effecting change in the science community. On February 28, 2020, the National Academies of Sciences, Engineering, and Medicine released the consensus report, *Promising Practices for Addressing the Underrepresentation of Women in Science, Engineering, and Medicine: Opening Doors* (13). The study, sponsored by the NIH, the NSF, and L'Oreal USA, was motivated, in part, by the infuriatingly slow pace of progress in achieving gender parity in STEM and medicine (STEMM), despite a multitude of studies, reports, and programs. Although the focus was on gender equity, intersecting identities of women in STEMM amplified concerns about race equity, and many of the study's findings may apply equally well to discussions about race in academia irrespective of gender (although how applicable they are is best determined in a new, focused consensus study). From the Preface:

It is critical for us all to consider the lessons learned from the scholarly research . . . and to take note of the many success stories that are described, demonstrating that an intentional, evidence-based approach in implementing concrete policies, programs, and interventions can yield an incredibly positive impact in a relatively short period of time.

Based on studying the “success stories,” the committee produced a series of recommendations and implementation actions collectively aimed at developing targeted data-driven interventions for individual institutions and implementing policies to increase transparency and accountability. Yet, as important as it was for the committee to identify programs that succeeded in narrowing the gender gap in science, it was just as important to define “knowledge gaps”—to “determine the extent to which limitations on the available body of scholarship . . . constrain the development and adoption of interventions conducive to achieving full and

equitable participation . . . in STEMM” (ref. 13, p. 31). One of the gaps in knowledge is the effectiveness of many interventions on women of color. Research to date has focused predominantly on middle-class White women at R1 institutions, and, in its recommendations, the committee called for broader consideration of experiences of women of color.

Here at PNAS, on June 10, staff deliberated about actions that could reduce racial disparities, and made a number of valuable, actionable suggestions. Several can be easily implemented—we can and will continue to diversify our editorial board to the fullest extent possible given the composition of National Academy of Sciences, from the ranks of which the board is drawn, but we can make greater gains by diversifying the pool of guest editors and the reviewer community. We can highlight BIPOC scientists in our QnA interviews, increase the content in front matter that addresses race-related issues and features BIPOC

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researchers, and commission special features that directly address issues relating to race in science.

Frankly, however, we have no way of knowing how effective these actions will be on moving toward racial equity. It’s entirely likely that efforts to eradicate systemic racism, to date, have achieved limited success because no one has yet dedicated sufficient time, energy, and resources to determining what actually works and what doesn’t. It’s not a coincidence that America’s communities of color have suffered disproportionately from both the coronavirus pandemic and systemic racism in 2020. The exact numbers are elusive, given the chaos generated by the pandemic, but, as of June 12, one estimate places aggregated death rates of African Americans across all states at more than 61 deaths per 100,000, compared with 26 deaths per 100,000 of White Americans (<https://www.apmresearchlab.org/covid/deaths-by-race>). Any attempt

to understand the spread and virulence of COVID-19 in the United States will be incomplete without an effort to understand racism and its consequences.

The convergence of video-recorded racism manifested as police brutality with a pandemic virus that disproportionately afflicts communities of color has led many people to call racism a virus, too. But it’s unproductive to minimize the challenge of eliminating racism by likening it to a virus, at least in the 21st century. This metaphor has a long history of not really enlightening anyone. In an essay published 74 years ago, as the world was recovering from the “scientific racism” embraced by Nazis, Ashley Montagu (14) wrote,

With the monstrous unfolding of the Nazi racist policy of extermination of the Jews in Europe, and mounting racial tensions in this country, the very real seriousness of the problem at last broke in on many scientists, and as a result we have witnessed a considerable increase in the literature devoted to the examination of the causes of race tensions and prejudice, and the refutation of racist ideas and dogmas. By this means scientists have hoped to arrest, at least, the spread of the infection of racism. Ideally they would have liked to render immune those who stood in danger of acquiring it, and to cure those who had already been infected with the virus of racism.

Many if not most of those hopeful scientists, if they were still around, would probably be disappointed in us for having made so little progress on racial equity, even in our own profession. It assuredly won’t be a vaccine that ends racism and, as has been the case in addressing COVID-19, we shouldn’t delay investment and action in the expectation that a metaphorical vaccine will soon materialize to save us all.

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