

Does Racial Bias Affect NCI-Funded PIs' Willingness to Mentor Prospective Graduate Students?

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Abstract

Audit studies suggest that racial discrimination disadvantages black individuals in educational/professional advancement. We hypothesized that prospective black male doctoral students would experience greater disparity in responses when seeking access to National Cancer Institute (NCI)-funded principal investigators (PI) compared with prospective white males. Primary aim was to explore response and acceptance rates for black versus white men seeking cancer research mentorship. Identical e-mails were sent to 1,028 randomly selected PIs affiliated with 65 NCI-designated cancer

centers from "Lamar Washington" (black; $n = 515$) or "Brad Anderson" (white; $n = 513$). Primary outcomes: (i) responses within one week; and (ii) type of response. We used logistic regression to examine effects of condition (black/white) on primary outcomes. Approximately 48.3% and 50.0% of the sample responded to "Lamar" and "Brad," respectively. For responders, 40.9% and 43.7% and "agreed" to meet with Lamar and Brad, respectively. This design did not detect bias by PIs against black prospective male students. *Cancer Res*; 78(17); 4809–11. ©2018 AACR.

Introduction

Blacks are underrepresented in medical school (1) and medical sciences (2), and disadvantaged in terms of receiving NIH funding (3–4). Studies suggest that only 2.3% of oncologists are black (5). These inequities produce white–black racial disparities in cancer care (6–8). These inequities are the product of both implicit and explicit racial biases. Implicit biases are not accessible through introspection; they are activated involuntarily and without an individual's awareness or intentional control. Implicit biases are positively correlated with, but conceptually different from, explicit biases that are deliberately formed and self-reportable, and that individuals may choose to conceal, for example toward the goal of being socially/politically correct.

Although the National Cancer Institute (NCI) has identified mentorship as critical for diversifying the cancer research pipeline, little is known about access to cancer research mentorship for black scholars, especially graduate students (9). Examining mentoring in doctoral education broadly, Milkman and colleagues (10) found evidence of implicit bias against black students. Milkman and colleagues audited professors' willingness to grant face-to-face meetings to prospective doctoral students

to discuss research-related opportunities. These meetings offer informal mentorship, which can reduce racial disparities down the professional pipeline (4, 11). Milkman and colleagues found that professors responded more slowly, and granted fewer meetings, to blacks (vs. whites). We sought to replicate Milkman and colleagues, with select modifications, in the context of NCI-funded faculty associated with NCI-designated cancer centers.

Materials and Methods

Study design and procedure

We designed an audit study that received Institutional Review Board approval (participants were debriefed, including information about deception, three weeks after study completion). The two common types of field-experimental audit studies of racial bias are: (i) "paper" audits (as in this study), in which fictionalized paper/electronic application materials (e.g., resumes) are submitted online or by mail and differ only in racially identifiable names; and (ii) "in-person" audits, in which trained testers, who are racially dissimilar but otherwise matched in all other employment-related characteristics (e.g., demographics, clothing, qualifications, etc.), actually apply/interview for jobs. Audit-study approaches increase ecologic validity (12–14) and mitigate desirability and other unconscious biases (15). The NIH Reporter was used to identify 4,185 principal investigators (PI) with active (nontraining) grants from 65 NCI-Designated Cancer Centers (excluding PI institution of Oregon Health & Science University). We randomly selected approximately 25% of PIs from each center (maximizing statistical power while minimizing chances of study contamination, for example, PIs from same centers discussing and suspecting e-mails). Selected PIs were randomly assigned to one of two experimental email conditions. Borrowing from Milkman and colleagues (10), e-mails were authored by two fictitious PhD students to signal race: "Lamar Washington" (black) and "Brad Anderson" (white). People assume that "Lamar" + [common

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Note: Supplementary data for this article are available at Cancer Research Online (<http://cancerres.aacrjournals.org/>).

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Table 1. Any email response (yes/no) outcome

	OR (95% CI)	P
Condition	0.94 (0.73–1.20)	0.62
PI sex	0.82 (0.63–1.07)	0.15

NOTE: Outcome: 0 = No response, 1 = response; condition: Brad = 0, Lamar = 1; PI sex: Female = 0, Male = 1.

African-American surname, such as "Washington"] is "black" 90% of the time (16).

We created unique e-mail accounts for each using a single domain name purchased from a private company (alummail.net). E-mails were sent on a Monday between 9 and 9:30 am local time of recipient PIs. Automated replies indicating invalid emails, PI nonemployment, or PI sabbatical resulted in replacing PIs with other randomly selected PIs from the same institution. Aside from fictitious student names and PI names, e-mail content was identical across recipients and conditions. E-mails sought 10-minute meetings with PIs any time the following Monday (i.e., in one week; online Appendix A). Accounts were monitored for one week, with PI replies being responded to once within 24 hours with prefabricated responses as appropriate (online Appendix B). The final sample (excluding one PI requesting removal after debriefing) included 1,028 PIs who received either the Lamar ($n = 515$) or Brad ($n = 513$) e-mail.

Study variables

PI information was cross-referenced with institutional profiles using given names, surnames, and pictures to code PI race (black vs. other; Cohen's $\kappa = 0.97$) and sex (Cohen $\kappa = 0.98$). E-mail responses were coded for two outcomes: (i) any response within one week (yes/no); and (ii) type of response if received (agree to meet/not agree to meet; Cohen $\kappa = 0.92$). "Agreeing to meet" involved committing to actually meet either in person or over the phone anytime on the specified Monday. PIs who did not commit to meet on that day for whatever reason (e.g., claimed inability, such as being out of town, heavy workload, etc.) were coded as "not agree to meet."

Statistical analysis

Required sample size was estimated using published effect sizes in Milkman and colleagues (10). We focused only on male (vs. female) students and only on meetings one week out (vs. next day) because of previous robust effects for such conditions (10) and to maximize statistical power. We used logistic regression to examine the effect of experimental condition and PI sex on the two outcomes (PI race was excluded due to limited variability).

Results

The sample was 68% male, with few PIs coded as black (1.2%). Approximately 48.3% and 50.0% of the sample responded to the Lamar and Brad e-mails, respectively. Tables 1 and 2 show the adjusted ORs with corresponding 95% CIs. Condition and PI sex were not significant predictors of any response in either unadjusted or adjusted models. For PIs who responded to the e-mail,

Table 2. Response type (agree to meet vs. do not agree to meet) outcome

	OR (95% CI)	P
Condition	0.88 (0.61–1.27)	0.51
PI sex	1.54 (1.04–2.29)	0.03

NOTE: Outcome: 0 = not agree to meet, 1 = agree to meet; condition: Brad = 0, Lamar = 1; PI sex: Female = 0, Male = 1.

40.9% and 43.7% responded that they would meet with Lamar and Brad, respectively. Although Brad garnered more "agree to meet" responses than Lamar, the condition effect was not significant in either unadjusted or adjusted models and the effect size was much smaller than that reported by Milkman and colleagues (10). PI sex was a significant predictor, with males (45.8%) being more likely to "agree to meet" as compared with females (35.6%). This PI sex effect does not mean that women exhibited racial bias in the sense pursued in this article; rather, it only means that, overall, women were less likely to respond "yes" regardless of whether it was Lamar or Brad (A test for sex-related racial bias, i.e., the association between PI sex and condition, was nonsignificant).

Discussion

In the United States, there are widespread and pervasive inequities in access to quality education at the K-12 level that negatively and disproportionately affect students of color relative to whites; these inequities require that medical education engage strategically with K-12 systems to strengthen the pipeline for a diverse workforce. Moreover, creating equity in health care requires that medical education change the way it traditionally admits and educates students because the outcomes of traditional methods largely reinforce the status-quo.

Beyond that, the cancer research pipeline is hindered by a number of gateway barriers, a key one being lack of adequate mentorship (17–18). Empirical evidence of implicit racial bias in medical school admissions (19) and evaluation of students (20), as well as theories of homophily (i.e., the tendency to affiliate with similar others; ref. 21) and aversive racism (i.e., the tendency to avoid interaction with outgroups; refs. 10, 22), highlight racial biases that cumulatively and detrimentally influence black students' educational pathways (23–24). We sought to explore the effect of implicit racial biases on access to cancer research mentorship for white versus black students via email using name signaling. Black PIs are clearly underrepresented in NCI cancer centers (only 1.2% of our sample), as they are in cancer-care more generally (25). However, in contrast to Milkman and colleagues (10), our results suggest that implicit racial bias has a relatively small and nonsignificant effect on NCI-funded faculty members' responses to, or agreement to meet/mentor, prospective cancer researchers seeking application to graduate school.

Although our findings reflect well on NCI cancer center environments and their faculties relative to the general university settings studied by Milkman and colleagues (10), our study and findings are limited.

Paper/resume-audit studies do not measure discrimination at points beyond the entry level, and thus their findings are an estimate of only one type of bias. In-person audits include, and thus may expose, other estimates of bias. We did not analyze the emails we received from PIs qualitatively; it is possible that there were key differences in the e-mails sent to Brad versus Lamar, such as email tone and friendliness. Moreover, our results may also be a product of natural sampling variability, slight methodological differences relative to Milkman and colleagues (e.g., not oversampling minority faculty members or using sample weights in statistical models; ref. 10), and/or a lack of control for a range of other PI-level demographics (e.g., salary, rank) and region/geographic effects (e.g., local cultural or economic factors). Toward the goal of reducing racial disparities in cancer care, larger and

alternative study designs are needed to further understand pathway barriers contributing to the relatively small pipeline of black cancer researchers.

Disclosure of Potential Conflicts of Interest

No potential conflicts of interest were disclosed.

Authors' Contributions

Conception and design: J.D. Robinson, N. Dieckmann, E. Withers, D. Hassouneh, C.R. Thomas

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Analysis and interpretation of data (e.g., statistical analysis, biostatistics, computational analysis): J.D. Robinson, N. Dieckmann, E. Withers, D. Hassouneh, C.R. Thomas

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Administrative, technical, or material support (i.e., reporting or organizing data, constructing databases): J.D. Robinson, C.R. Thomas

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