Skin-Tone Bias and Bias Self-Correction Processes

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Abstract

Evidence suggests that, much like racial biases, the consequences of feature-based biases (e.g., skin-tone and Afrocentric biases) are prevalent and detrimental. This study examines people's ability to detect and correct for skin-tone bias within the context of hiring decisions. Participants (N = 233) were randomly assigned to rate a lighter- or darker-skinned Black target on how well they fit a job position. Participants also rated whether features of the target influenced their hiring decisions and were randomly assigned to receive either a general (referring to the target's appearance) or a specific (indirectly referring to the target's skin-tone) warning to not let features of the target influence their judgment before rating the target again. I predicted that (1) initial ratings would be more favorable for the lighter- vs. darker-skinned candidate, (2) warnings about bias could lead to different changes in evaluations for lighter- vs. darker-skinned candidates, though it was not clear whether more specific warnings about bias might be necessary to induce them, and (3) measures of theories of bias (i.e., perceived or expected biases) would predict how people attempted to correct for possible biases of target features. Results suggest some instances of skin-tone bias, such as participants initial ratings showing a greater likelihood of offering the job to the lighter-skinned participant. However, this tendency was not consistent across different hiring-related ratings. Also, mostly inconsistent with expectations, participants' ratings shifted positively after correction instruction, regardless of skin-tone or type of bias warning. This study may have implications for the limitations of bias correction research regarding skin-tone bias to be considered in future studies.

Introduction

The United States has a long and continuous history of racial inequity and racist ideologies. The foundation of this nation was formed on the backs of African slaves, and post-slavery America was not much better for Black Americans: with forced sterilization (see Reilly, 1987), Jim Crow laws, and "separate-but-equal" justifications for segregation (see Ficker, 1999), Black people have struggled and suffered throughout the history of America.

Black Lives Matter (BLM), a social movement initiated in 2013 following the acquittal of 17-year-old Trayvon Martin's murderer, fights against white supremacy, police brutality, and racially motivated violence against Black people. During the summer of 2020, BLM became one of the largest social justice movements in American history, following the murders of Breonna Taylor, George Floyd, Ahmaud Arbery, and Elijah McClain. The tragedies that advanced the movement were horrific. As such, the intricacies of racial discrimination and its wide-reaching impacts can no longer be ignored or swept aside. One of these intricacies includes the impact of racial phenotypicality bias and the variety of factors contributing to it.

Racial Phenotypicality Bias

According to racial phenotypicality bias, members of racial groups whose appearance most closely matches our representation of the traditional category member are more likely to be evaluated and stereotyped as such (Maddox, 2004). Black individuals considered to have more prototypic appearances elicit a greater amount of negative stereotypic trait impressions, negative associations, and suffer harsher penalties in the criminal justice system (Strom, et al., 2012; Maddox, 2004). Racial phenotypicality biases can even have a stronger impact on the perceptions and judgments of Black people than racial biases, as people are generally more

aware of — and therefore more capable of avoiding — racially-based biases rather than the more subtle phenotypicality biases (Maddox, 2004; Strom, et al., 2012; Blair, et al., 2004).

Racial phenotypicality bias serves as an umbrella term encompassing the various biases and theories that may contribute to prejudiced beliefs or discriminatory treatment resulting from differences in facial features and characteristics associated with various racial groups. Racial phenotypicality bias includes factors such as skin-tone bias, Afrocentric bias, perceptual prejudice theory (which asserts that the influence of phenotypic variation is cue-based affective responses rather than conceptual knowledge), and physical attractiveness (Marira & Mitra, 2013; Maddox, 2004). The current study focuses on skin-tone bias.

Skin-Tone Bias

Skin-tone bias, also known as colorism, is defined as a discriminatory process that favors light-skinned over dark-skinned people of color (Hunter, 2007). Central to this perspective of racial phenotypicality bias is the assumption that of the many phenotypic features used to determine racial category membership — such as hair texture, nose width, and lip fullness — skin-tone is of primary salience and importance (Maddox, 2004). Skin-tone bias is one symptom of the larger, systemic issue of racism and is practiced by Black and White individuals alike.

The foundation for skin-tone bias is white supremacy, which asserts that dark skin represents "savagery, irrationality, ugliness and inferiority," whereas white skin is representative of the opposite: "civility, rationality, beauty and superiority" (Hunter, 2007, p. 239). All Black people are likely to experience various forms of discrimination as a result of their race. Yet, the intensity, frequency, and consequences of this discrimination are more severe for darker than lighter individuals.

Evidence of skin-tone bias has been present throughout American history, with lighter-skinned slaves receiving more favorable treatment than darker-skinned slaves — such as working in the house rather than the field, occasional opportunities to read and learn, and even rare chances to be freed by the enslaver (Hunter, 2007). Consequentially, white supremacy and skin-tone bias continue to hold significant impacts not only on the way that society perceives Black people: they impact the way that Black people perceive themselves, as well.

Favorability toward light-skinned individuals and negativity toward dark-skinned individuals is apparent throughout Black communities, and the origins and mechanisms of this internalized racism can be explained by Hall's (1995) proposed Bleaching Syndrome. Hall describes the Bleaching Syndrome as pathological self-denigration resulting from the internalization of a white ideal, which in turn places a higher value on people of color who more closely resemble the white ideal (e.g., lighter skin, Eurocentric features) than those who do not (e.g., darker skin, Afrocentric features). The consequences of this internalized racism are apparent both within Black communities and throughout society. For example, lighter Black women with more Eurocentric features are often considered higher in value as they are believed to be more beautiful than darker Black women with more Afrocentric features (Hall, 1990; Hunter, 2007). Darker-skinned Black men are subject to a similar form of devaluation, often regarded as more sinister and threatening than lighter-skinned Black men (Hall, 1990; Hunter, 2007).

Black individuals with lighter skin also earn higher salaries, have higher socioeconomic statuses, spouses of higher statuses, higher family income, occupations of greater prestige, and complete more years of schooling than those with darker skin (Hughes & Hertel, 1990; Hunter, 2007). In contrast, Black individuals with darker skin have less income and privileges, more negative experiences with workplace environments, and are given lower social status than those

in the same group with lighter skin (Hughes & Hertel, 1990; Hunter, 2007; Marira & Mitra, 2013). Darker-skinned people are also more likely to report having experienced discrimination than those with lighter skin (Maddox, 2004).

Relatedly, Harrison and Thomas (2009) found that white subjects were more likely to recommend and hire a lighter-skinned Black man with lesser skills and qualifications (a bachelor's degree and limited job experience) over a darker-skinned Black man with greater skills and qualifications (a master's degree, bachelor's degree, and greater job experience). Seeman (1946) found that Black schoolchildren valued lighter over darker skin, with social acceptability scores of their classmates decreasing as they moved from those described as "very light brown" to "very dark brown" (p. 318). Similarly, Averhart and Bigler (1997) found that Black children better remembered stories in which light-skinned Black characters possessed positive traits and dark-skinned Black characters possessed negative traits rather than the reverse.

Further illustrating the impact of skin-tone bias, Hughes and Hertel (1990) calculated comparisons on multiple socioeconomic status variables between Black and White Americans and light- and dark-skinned Black Americans using data collected from the U.S. Census Bureau and a national survey of Black Americans. Findings revealed that the education and occupation gaps between light and dark were nearly identical to those between Black and White, suggesting that "darker-skinned blacks suffer much the same disadvantage relative to light-skinned blacks that blacks, in general, suffer relative to whites" (p. 1112).

Skin-tone bias is a result of racist ideologies and history. Concerningly, though many can recognize and control for racial biases, many remain unaware of their preferences for lighter skin because skin-tone bias is often overlooked in conversations surrounding racial discrimination — though it is ingrained in our culture (Hunter, 2007). Because skin-tone bias is so prevalent and

problematic, it would be helpful to understand whether and when people try to correct for this bias.

Bias Correction

The process by which individuals self-correct for their biases has been theorized and conceptualized in a multitude of perspectives. Theorizing in the bias correction domain suggests that people who are motivated to consider whether their judgments are being influenced by their personal biases are more likely to attempt to correct for their bias (see Petty, 1994). However, although this may be effective in some situations, it is also possible for thoughtful judges to fail to adequately correct for factors that they perceive to be impacting their judgments (Wegener, Clark, & Petty, 2006) In fact, more thoughtful processing of the biasing information itself can even result in the creation of *stronger* stereotype-consistent judgments, ones that are resistant to change and more likely to influence future thinking and behavior (Wegener et al., 2006).

Subtraction theories, such as the set-reset approach (see Martin, 1986) and the inclusion-exclusion model (see Schwarz & Bless, 1992), conceptualize bias correction as a method of "'subtracting' information or reactions that are identified as coming from the biasing factor instead of the target" (Chien et al., 2014, p. 275). Such theories only aim to account for assimilation effects — biases that lean towards the context (Chein et al., 2014), but those biases are the type most typically discussed in the stereotyping and prejudice domains. A more general approach would also account for corrections of contrast effects — biases that move away from the context. Petty and Wegener (1993) conceptualize the bias correction process as less static than assumed by subtraction theories. Instead, they consider bias correction to be guided by theories of bias and propose the flexible correction model.

Flexible Correction Model

According to the flexible correction model (FCM), "corrections occur when judges are motivated and able to adjust assessments of targets according to their naïve theories of how the context affects the judgments of the targets" (Wegener & Petty, 1995, p. 36). The flexible correction model asserts that people are more flexible in their corrections than assumed by subtraction theories, as it considers and examines both contrast and assimilation effects in default (uncorrected) judgments. Targets may be perceived as "more or less like the context depending on whether the context is viewed as making assimilation or contrast more likely" (Petty & Wegener, 1993, p. 155). To illustrate assimilation and contrast effects, here is an example from Wegener and Petty (1995): contrast effects would be likely when rating how desirable weather is in midwestern cities while thinking about desirable vacation spots, which may make midwestern weather seem worse than normal. Assimilation effects would be likely when thinking about the weather in desirable vacation spots while rating perceptions of job satisfaction in those vacation spots. The flexible correction model posits that corrections can be for perceived assimilation or to contrast from the context, depending on which is perceived by the individual.

Such perceptions of bias are referred to as "naïve theories of bias" in the flexible correction model. According to the FCM, perceivers often utilize their naïve theories of bias (i.e., one's beliefs about how a given factor is likely to impact a specific judgment in a specific context) when attempting to correct for their perceived bias. As the direction and strength of perceived biases appear to guide correction attempts, perceivers' naïve theories of bias may predict how they correct for biases (Wegener & Petty, 1995). Corrections may occur for perceived biases even when there is no actual bias present (Wegener & Petty, 1995).

If people are motivated and able to correct for skin-tone bias and recognize that skin-tone would bias a judgment they are making, they should confer with their theories of bias about skin-tone to determine how to correct for the bias. As such, successful correction would only be expected if people are motivated and able, if they identify the potential biasing factor, and if they have theories in the correct direction and of the correct magnitude.

Present Research

The present research aims to consider the impact of skin-tone bias on bias correction processes, specifically within the context of hiring decisions. The study involved the manipulation of the skin-tone of a job candidate and a warning about potential bias (to be either generally about anything that might bias them or a warning that might clue people into appearance-related features as biasing). The study also included ratings of the target both before and after the warning, and a measure of theories of bias after the initial ratings but before the warning about potential bias.

The questions this study was intended to answer were: (a) will the job candidate's skin-tone influence the perceiver's initial judgments of them, (b) will the specificity of the correction instruction impact the correction attempts, and (c) will measured theories of bias predict correction attempts. My predictions were that: (a) the initial ratings of the lighter-skinned candidate will be higher than that of the darker-skinned candidate, (b) there would not be a strong difference between correction instructions, though a more specific warning could be necessary to make skin-tone salient, and (c) the measured theories of bias might or might not indicate awareness of skin-tone bias, but people who perceive such bias should be more likely to correct for it.

Methods

Participants

Two hundred and thirty-three undergraduates participated in exchange for course credit. Participants' ages ranged from 18 to 39, with the majority of participants (40%) being 18. This sample consisted of 52.1% males, 47.9% females, and was predominantly White (73.9%). The remainder of the sample included 11.1% Asian, 6% Black, 4.7% Mixed, 2.1% Hispanic, 0.4% Native American, and 0.8% other or undisclosed.

Design

The design employed for this study was a 2(Skin-Tone: lighter-skin target vs. darker-skin target) x 2(Warning Condition: general vs. specific) x 2(Time of Rating: initial vs. corrected) mixed design with initial target evaluations and post-warning ratings as dependent variables.

Procedure

After providing informed consent, participants were given the cover story that the purpose of this study was to examine people's decision-making processes when considering applicants for a position. Before random assignment to the light- or dark-skinned target condition, participants were told that they would be shown images in groups of five, representing internship candidates. These images, and which individual would be selected to be rated, were preselected; however, participants were told they were randomly selected by a computer to avoid suspicion about the true nature of the study. After reading the job description and the resume of each "target" candidate, participants then rated the target candidates of each group using the job selection ratings measure. Participants were shown four groups in total; three groups were held constant across conditions, the fourth being the manipulated skin-tone group. The measure of naïve theories of bias was administered next, with instruction to complete it in reference to the

manipulated target. Participants were then randomly assigned to see one of the two bias warning instructions, after which they rated the manipulated target again. Finally, participants were debriefed and thanked for their participation.

Measures and Manipulations

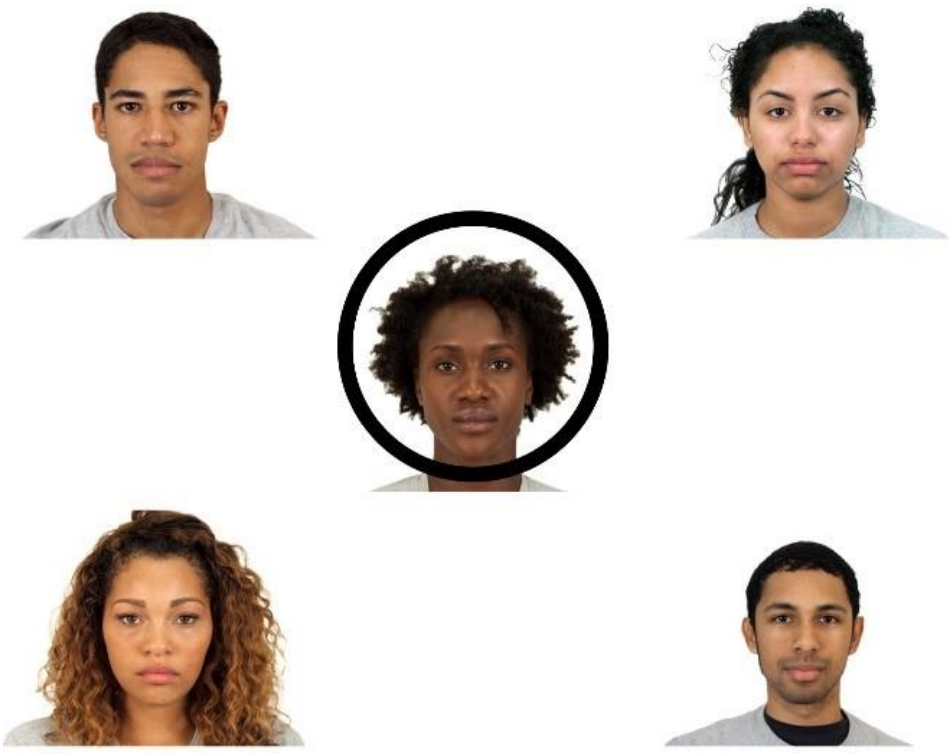
Skin-Tone Manipulation

All study materials were created using Qualtrics and were presented on a computer screen. Participants were shown four groups of images. Each image contained pictures of five people, and one of these people would be selected for participants to rate (denoted by the target's picture being circled). For each target, participants were shown a fictitious resume, and participants were asked to rate how fit each candidate was for a specified job. The first two and final groups (which included images of people of various races) were included to be distractors and were the same across conditions. The third group was where the skin-tone manipulation took place. Participants were randomly assigned to one of two conditions: a group of dark-skinned individuals with one light-skinned target, or a group of light-skinned individuals with a dark-skinned target. Information provided on both candidates remained constant. As with the distractor targets, participants rated the extent to which these critical job candidates were fit for the job.

Stimuli

Images were chosen from the Chicago Face Database (version 2.0.3). Shown are the group images of the two skin-tone conditions.

Darker-Skinned Target Group.



Lighter-Skinned Target Group.

Job Description

Position: Administrative Intern
Job Description: The intern will play a key support role in the daily functions of the office. This role is critical for administrative support and communications between departments. Tasks may include:

- Fulfill tasks set out by supervisors from several departments.
- Attend meetings and take minutes.
- Providing feedback and assistance on projects.
- Updating employee database.
- Learns and becomes proficient on internal software systems.

Minimum Requirements:

- Third year undergraduate student or higher
- Proficient in Microsoft Office

Preferred Skills/Qualifications:

- 2+ years of relevant work experience
- Attentive to detail
- Excellent written and oral communication skills

Resume

Shown is the resume of the manipulated skin-tone candidate, presented alongside their image.

Candidate Number: 3

Resume Objective: College student seeking administrative work.

Education Level:

- College Junior
- Marketing Major
- Years of Relevant Experience: 1

Qualifications:

- Attentive to detail
- Basic software training
- Moderate writing skills

• Proficient in Microsoft Excel, Word and PowerPoint	

Correction Warning Manipulation

Participants were randomly assigned to receive one of two warnings against biased ratings before rating the target a second time. The general warning stated in broad terms to avoid biased ratings: *Warning: It is important that people try to remain objective during hiring decisions. If some factor related to the candidate's appearance is influencing your judgment of their fitness for the internship position, try not to let it impact your decision.* The specific warning stated to avoid biased ratings regarding variances in appearance across members of the manipulated group, aimed at making skin-tone variations more salient without directly revealing them: *Warning: It is important that people try to remain objective during hiring decisions. Comparisons in physical appearance across individuals may be an influencing factor. If the candidate's appearance differs from the others in their group and is influencing your judgment of their fitness for the internship position, try not to let it impact your decision.*

Job Selection Ratings Measure

Self-report measures adapted by Powell (2017) from Stevens and Kristof (1995) were used to measure participant's ratings of fitness and favorability of the job candidates. Participants were asked to indicate on a scale the extent to which they agreed with the following statements: "This applicant is qualified for the job," "This applicant seems like a good candidate for this position," "I regard this applicant highly," "I would offer this applicant an interview," and "I would offer this applicant the job," (7-point scale, 1 – *Strongly Disagree* to 7 – *Strongly Agree*). Higher levels of agreement indicate more favorable perceptions of the candidate; responses were aggregated and averaged ($\alpha = .93$).

Naïve Theories of Bias Measure

Based on the Wegener et al. (2006) measure to assess naïve theories of bias, a self-report measure was used to assess participants' naïve theories of bias regarding skin-tone, with the addition of several other topics to distract from the main purpose of the measure. Before completing this measure, participants were shown the group with the manipulated skin-tone target again. Participants were then asked to indicate the extent to which they agreed that the following factors influenced their rating of the candidate: the candidate's image, physical appearance, physical attractiveness, race, ethnicity, facial features, gender, skin-tone, skin color, hair texture, and hair length, (7-point scale, -3 – *This factor made me rate the candidate more unfavorably* to 3 – *This factor made me rate the candidate more favorably).* The order of these statements was randomized.

Results

Differences in Job Selection Ratings Across Skin-Tone Conditions

It was predicted that the lighter-skinned target would be rated more favorably than the darker-skinned target, at least for initial ratings. Mean initial ratings of the lighter-skinned target (M = 5.05, SD = .74) were not significantly higher than those of the darker-skinned target (M = 4.93, SD = .76), $t(231) = -1.22$, p = .23, 95% CI [-.3132, .0743], d = -.16[1]. Mean corrected ratings of the lighter-skinned target (M = 5.23, SD = .81) also were not significantly different from those of the darker-skinned target (M = 5.22, SD = .95), $t(231) = -.15$, p = .88, 95% CI [-.2437, .2098], d = -.02.

Differences in Job Selection Ratings Across Warning Conditions

I did not have a strong expectation of differences across warning conditions, though I figured it may require a more specific warning to make skin-tone salient. To examine shifts in ratings, I created a shift score by subtracting the pre-warning ratings from the post-warning ratings (so positive values reflect a shift after the warning to become more favorable toward the target). Then, I used the skin-tone and warning variables and their interaction to predict the shifts. Though the shifts did not differ based on skin-tone condition (p = .22) or warning type (p = .68), the overall shift from pre- to post-warning (M = .24; SD = .64) did significantly differ from zero (no shift), $t(231) = 5.67$, $p < .001$. Thus, it seems that the warnings did prompt people to correct, though not in the predicted ways.

[1] Though no overall effect on the composite initial ratings suggesting skin-tone bias, participants were significantly more likely to give the lighter candidate a job offer, $t(231) = -2.101$, p = .037, and considered the lighter more qualified to a nearly significant degree, $t(231) = -1.866$, p = .063.

Predictability of Shifts in Ratings by Theories of Bias

It was predicted that theories of bias ratings would predict correction attempts. Skin-tone theories of bias were calculated by averaging responses to "skin-tone" and "skin color" prompts, $r(232) = .64$, $p < .001$. One possible reason that no differences in shifts occurred is that participants did not report differences in how skin-tone affected their ratings based on whether they saw a light-skinned ($M = .07$; $SD = .29$) or dark-skinned target ($M = .04$; $SD = .20$), $t(231) = -.90$, $p = .37$. A t-test was also performed on race-related theories of bias, calculated by averaging responses to "race" and "ethnicity" prompts, $r(232) = 0.42$, $p < .001$. Participants also did not perceive race-related biases as affecting their ratings based on whether they saw a light-skinned ($M = .08$; $SD = .25$) or dark-skinned target ($M = .05$; $SD = .20$), $t(231) = -.84$, $p = .4$.

Though the mean level of reported influence did not differ across skin-tone conditions, variations in perceptions of bias could still relate to shifts in target ratings. Regression analyses were performed to further analyze this. In the first, I used skin-tone condition, theories of bias related to skin-tone, and their interaction to predict shifts in ratings from pre- to post-warning. This analysis produced no main effect of skin-tone, $b = .11$, $se = .08$, $t(229) = 1.28$, $p = .20$, 95% CI [-.06, .27]. There was also no main effect of skin-tone theories of bias, $b = -.04$, $se = .20$, $t(232) = -.195$, $p = .34$, 95% CI [-.44, .36]. There was also no interaction between skin-tone condition and skin-tone theories of bias, $b = .43$, $se = .36$, $t(229) = 1.18$, $p = .24$, 95% CI [-.29, 1.14].

When theories of bias related to race instead of skin-tone were used, the results were similar. This analysis produced no main effect of skin-tone condition, $b = .10$, $se = .08$, $t(229) = 1.24$, $p = .22$, 95% CI [-.06, .27]. There was no main effect of race-related theories of bias, $b = .02$, $se = .24$, $t(232) = .08$, $p = .93$, 95% CI [-.45, .49]. There was also no interaction between

skin-tone condition and race-related theories of bias, b = .095, se = .38, $t(229)$ = .25, p = .80, 95% CI [-.65, .84].

Discussion

The purpose of this study was to examine how people detect and correct for skin-tone bias within the context of hiring decisions. No effects emerged in support of the predictions: initial ratings did not differ overall between the lighter- and darker-skinned target, there were no differences in shifts from pre- to post-warning depending on skin-tone, and reported theories of bias did not interact with skin-tone to predict shifts from pre- to post-warning. Perhaps warnings did not produce different shifts, and skin-tone- and race-related theories of bias did not predict shifts in ratings of the candidate, because participants on average reported that these factors did not influence their judgments. Despite no overall effect on the composite initial ratings suggesting skin-tone bias, there was some evidence from the initial ratings suggestive of favorability towards the lighter- vs. darker-skinned candidate. Participants were significantly more likely to give the lighter candidate a job offer and considered the lighter more qualified to a nearly significant degree. Therefore, although the data did not clearly confirm my predictions, there was some evidence suggesting the presence of skin-tone bias.

There are several limitations to this study, including the situational context of the study. A hiring decision might be too emotionally indifferent to evoke skin-tone-related stereotypes; instead, it might require a more negatively valanced context (e.g., criminal charges) to reveal significant levels of skin-tone bias (Maddox, 2004). Another limitation might relate to the number of candidates participants were asked to rate. Before rating the target (skin-tone manipulated) candidate, participants were asked to rate two other candidates, as well as another afterward. It is possible that the processing of each target decreased as the study progressed, which could be a reason results were minimal.

Another potential limitation could result from introducing the manipulated targets alongside Black individuals of the opposing skin-tone. Though this was intended to increase the salience of the targets' skin-tone, it might have made group-level (racial) categorizations more salient than within-group (skin-tone) categorizations. Additionally, the other groups of candidates shown included a combination of White, Black, Latino and Asian images, which could have contributed to racial categorizations being more salient than skin-tone categorizations.

Lastly, social desirability might have interfered with the theories of bias measure, making them ineffective. Given the socio-political climate of 2020, particularly with advances of the Black Lives Matter movement, people may feel especially motivated to control their biases in attempts to appear unbiased — especially those related to race. If so, people might not be willing to report that any aspect of a Black target affected their perceptions of that person. The measures used in this study might not have been subtle enough to avoid the influence of social desirability. Related to social desirability influencing reports of theories of bias, participants may have already been correcting for biases within their initial ratings, thereby making any additional correction difficult to find.

In future research, it would be interesting to study skin-tone bias and bias correction processes within a more negative context. To address the issue of group-level versus within-race categorizations, I would include manipulations of skin-tone salience. This could involve introducing targets with Black individuals of the same skin-tone range (e.g., lighter-skinned target with lighter individuals) in addition to the groups of opposing skin-tones utilized in this study to test whether participants are conceptualizing targets on a racial level or a skin-tone level. It is also important to address the issue of social desirability. For example, regarding the theory

of bias measures, one might ask participants to rate how they believe people society-wide would be biased on a list of factors to shift responsibility away from the self. Whether such theories would relate to individuals' corrections might then depend on whether participants' theory reports actually reflect perceptions of their own tendencies.

Finally, an important addition to future research would include a more racially diverse sample. As most of the sample (74%) was White, I was incapable of examining any impact of the perceivers' race as it relates to skin-tone bias and bias correction. It would be interesting to examine the results of participants from groups more likely to be aware of or impacted by skin-tone bias (e.g., Black and Indian individuals). The Bleaching Syndrome (Hall, 1995) might suggest that these groups would rate darker-skinned targets more harshly than lighter targets. If so, they might also be more aware of such tendencies than my White participants and might be more likely to correct when warned of such biases.

In conclusion, no effects clearly emerged indicating skin-tone bias (though some individual measures were suggestive), and ratings of candidates shifted positively regardless of skin-tone or the specificity of the warning against biased judgments. This could reflect the classification of the target individuals by race rather than skin-tone. However, theories of bias related to race did no better than skin-tone-related theories of bias. I remain interested in skin-tone bias, and research should be continued to further examine these effects.

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