False beliefs are associated with racial bias in pain assessment and treatment recommendations only among White (not among non-White) medical students and residents

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WORKING PAPER

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Beliefs that Blacks and Whites are fundamentally—biologically and innately—different have been prevalent for centuries. These beliefs were championed by White slave owners and scientists to justify slavery and inhumane experimentation on Black people (e.g., Guillory, 1968; Washington, 2006). Today, these beliefs remain relatively common. Many believe, for instance, that Black athletes are fundamentally—biologically and innately—better than White athletes (e.g., Hoberman, 1997; Hughey & Doss 2015; Sailes, 1998). Modern biological conceptions of race are notable in that they appear complementary ("Black people are so strong!"). Indeed, some research suggests that biological conceptions of race are no longer related to racial prejudice (e.g., Williams & Eberhardt, 2008); prejudiced and non-prejudiced people alike believe that race is a biological construct. Yet, biological conceptions of race remain problematic (Roberts, 1995; 2013).

In a recently published article, we examined whether biological conceptions of race are associated with racial bias in pain treatment (Hoffman, Trawalter, Axt, & Oliver, 2016, Study 2), a well-known, well-documented healthcare disparity with wide-ranging consequences (Anderson, Green, & Payne, 2009). We found that a substantial number of White medical students and residents hold false beliefs about biological differences between Blacks and Whites, and these beliefs predict racial bias in pain perception and treatment recommendation accuracy. This work then provides evidence that biological conceptions of race—operationalized as false beliefs about biological differences between Blacks and Whites—continue to shape the way Black people are treated. They are associated with racial disparities in pain assessment and treatment recommendations.

In that article, we focused on White participants. We did so given the historical context of Black–White relations, particularly in the medical context. We provided analyses for non-White participants in the supporting information. Here, we focus on non-White participants. Focusing on non-White

participants is potentially important because it can clarify the nature of biological conceptions and their impact. If biological conceptions operate like (explicit) racial attitudes, we might expect non-White participants not to endorse biological conceptions and, consequently, show no racial bias in pain assessment or treatment. If biological conceptions operate more like (implicit) cultural beliefs, we might expect non-White participants to endorse biological conceptions and, consequently, show racial bias in pain assessment and treatment.

Original Study Method

We briefly describe the original study method here, but the interested reader can find the detailed method in the original article (Hoffman et al., 2016). We collected data from 418 medical students and residents. Participants read two mock medical cases, one involving a Black patient and one involving a White patient. After reading each case, participants rated the patient's pain (0=no pain, 10=worst possible pain) and made a treatment recommendation (dummy coded for accuracy, 0=inaccurate, 1=accurate). Then, participants completed a measure of beliefs about biological differences between Blacks and Whites. Specifically, participants rated the extent to which 15 items (11 false items) were true or untrue (1=definitely untrue to 6=definitely true; e.g., Black people's blood coagulates more quickly, Black people have thicker skin than White people, Black people age more slowly than White people, Black people's nerve-endings are less sensitive than White people's nerve-endings).

Analytic Strategy

We first compared White and non-White participants' endorsement of false beliefs. We looked only at US-born, native-English speakers, consistent with previous work and given that conceptions of race are culturally specific, but results hold when including non-US born and non-native English speakers.

We next used the analytic strategy for modeling pain assessment and treatment recommendations detailed in the original paper. Instead of modeling pain assessment and treatment recommendations of the White participants in our sample, however, we modeled pain assessment and treatment recommendations of the non-White participants in the sample. As in the original paper, we controlled for participant gender, participant age, and participant medical cohort (first-year, second-year, third-year, or resident) in all of our analyses. Results hold without covariates, however.

Results

On average, White and non-White participants endorsed false beliefs to a similar extent, F (319) = .13, p = .722. See Table 1 for White and non-White participants' endorsement of false (and true) items. However, as reported in the original paper, non-White participants' false beliefs did not predict racial bias in pain assessment, F (1, 103) = .55, p = .459, or treatment recommendation accuracy, F (90) = .65, p = .421. One caveat, of course, is that we have fewer non-White participants than White participants so our analyses for non-White participants are lower-powered. Even still, the patterns of results are quite different. In fact, modeling racial bias in pain assessment and treatment recommendation accuracy as a function of false beliefs, participant race, and their interaction, controlling for covariates, revealed a significant interaction between false beliefs and participant race, F (1, 317) = 6.00, p = .015, η_p^2= .019 and F (1, 285) = 4.92, p = .027, η_p^2= .017, suggesting that false beliefs indeed operate differently for White and non-White medical students and residents. See also Figure 1A and 1B vs Figure 2A and 2B[1].

Discussion

The analyses above reveal that both White and non-White medical students and residents hold false beliefs about biological differences between Blacks and Whites; they both subscribe to biological

[1] It is interesting to note that, on average, non-White participants' treatment recommendations were less accurate than White participants' recommendations. This perhaps reflects the known fact that racial/ethnic minorities are often more cautious/concerned about opioid use than are Whites (see Anderson, Green, & Payne, 2009).

conceptions of race. However, analyses also reveal that false beliefs are not associated with racial bias in pain assessment and treatment recommendation among non-White participants. These beliefs are associated with racial bias in pain assessment and treatment only among White medical students and residents. This pattern of results suggests that non-White students and residents either (1) do not use these beliefs to inform their medical judgments or (2) use these beliefs to inform their medical judgments but then "debias" their judgments.

The present findings are consistent with historical analyses suggesting that Whites' biological conceptions of race serve to justify and maintain the racial status quo, to advantage Whites and/or disadvantage Blacks. What is notable here is that White medical students and residents may be maintaining the status quo—they may be contributing to racial disparities in pain treatment—without any racial animus. Indeed, previous work has found that racial attitudes do not predict racial bias in pain assessment (Mathur, Richeson, Paice, Muzyka, & Chiao, 2012; Trawalter, Hoffman, & Waytz, 2012). This, then, may be yet another example of "racism without racists" (Bonilla-Silva, 2006). The present findings are also consistent with evidence that Whites are more likely to engage in behaviors that justify and maintain the status quo whereas non-Whites are more likely to engage in behaviors that challenge and change the status quo (e.g., Bonilla-Silva, 2006; Chow, 2014; Eisinger, 1974; Feagin & O'Brien, 2004; McAdam, 2010; Sidanius, Liu, Shaw, & Pratto, 1994; cf., Jost, Banaji, & Nosek, 2004). Indeed, research has shown that minority medical students, nurses, and physicians are more sensitive to racial bias in healthcare and therefore may be more motivated to prevent it (Roberts-Dobie et al., 2013; Wilson et al., 2004). Such motivations and norms can override attitudes and beliefs in determining racially biased behavior (Crandall, Eshleman, & O'Brien, 2002; Fazio, 1990; Schuette & Fazio, 1995; Ziegert & Hanges, 2005).

Limitations of the present work offer avenues for future work. First, future work will need to examine the extent to which these findings extend to other samples and real-world contexts (i.e.,

doctor-patient interactions and actual treatment plans). Second, future work will need to develop interventions to challenge biological conceptions of race and test whether such interventions can reduce racial bias in pain assessment and treatment recommendations. Such work will not only be important for practical reasons but for establishing the causal relationship between biological conceptions of race and racial bias in pain assessment and treatment. Related to this, future work could also examine why and how non-White students' and residents' conceptions of race do not shape their medical judgments. This work could also inform intervention efforts.

Concluding Remarks

Biological conceptions of race have been prevalent for centuries. They have been used to justify, among other things, mistreatment of Black people by the scientific community. Today, biological conceptions remain common. That White and non-White medical students and residents hold false beliefs about biological differences between Blacks and Whites is perhaps not surprising then, especially in light of the fact that medical students and residents are trained to think about the body in biological terms. The present analyses, however, suggest that non-White medical students and residents do not use or else they compensate for their false beliefs when making medical judgments. This finding may be heartening to some but it has a disheartening corollary: White medical students and residents do seem to use their false beliefs when making medical judgments (Hoffman et al., 2016). Therein lies the problem.

Table 1. *Percent of non-White participants endorsing false (and true) items.*

Item	% non-White (*N* = 111)	% White (*N* = 222)
Blacks age more slowly	29	20
Blacks' nerve-endings are less sensitive	12	7
Blacks' blood coagulates more quickly	22	15
Whites have larger brains	0	1
Whites are less susceptible to heart disease*	68	69
Blacks are less likely to have MS*	49	57
Whites have a better sense of hearing	3	3
Blacks' skin is thicker	42	34
Blacks' bones are denser*	42	47
Blacks have a more sensitive sense of smell	13	10
Whites have a more efficient respiratory system	6	4
Black couples are more fertile	18	9
Whites are less likely to have strokes*	47	52
Blacks are better at detecting movement	17	12
Blacks have a stronger immune system	11	12

Note. For ease of presentation, we shortened the items; see SI Text in Hoffman et al (2016) for full items and additional information. As in Hoffman et al (2016), for ease of interpretation and ease of presentation, we collapsed the scale and coded responses marked as possibly, probably, or definitely untrue as 0 and possibly, probably, or definitely true, as 1, resulting in percentages of individuals who endorsed each item. All analyses, however, use the continuous scale and not this dichotomized variable. Bold items represent the items included in the false beliefs about biological differences between blacks and whites composite. *Items are factual or true.

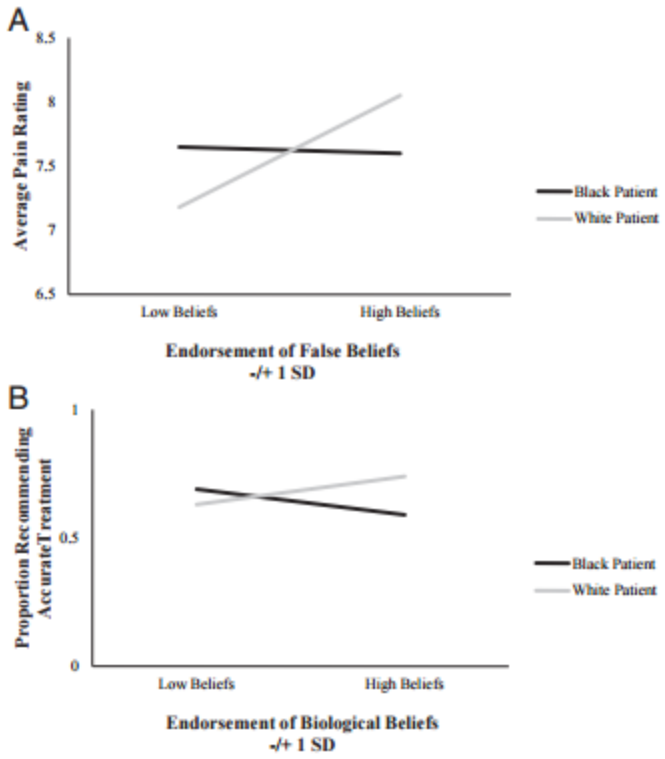

Figure 1. Graphs of results for White participants (Hoffman et al., 2016). Pain assessment as a function of false beliefs (Panel A) and treatment recommendation accuracy as a function of false beliefs (Panel B).

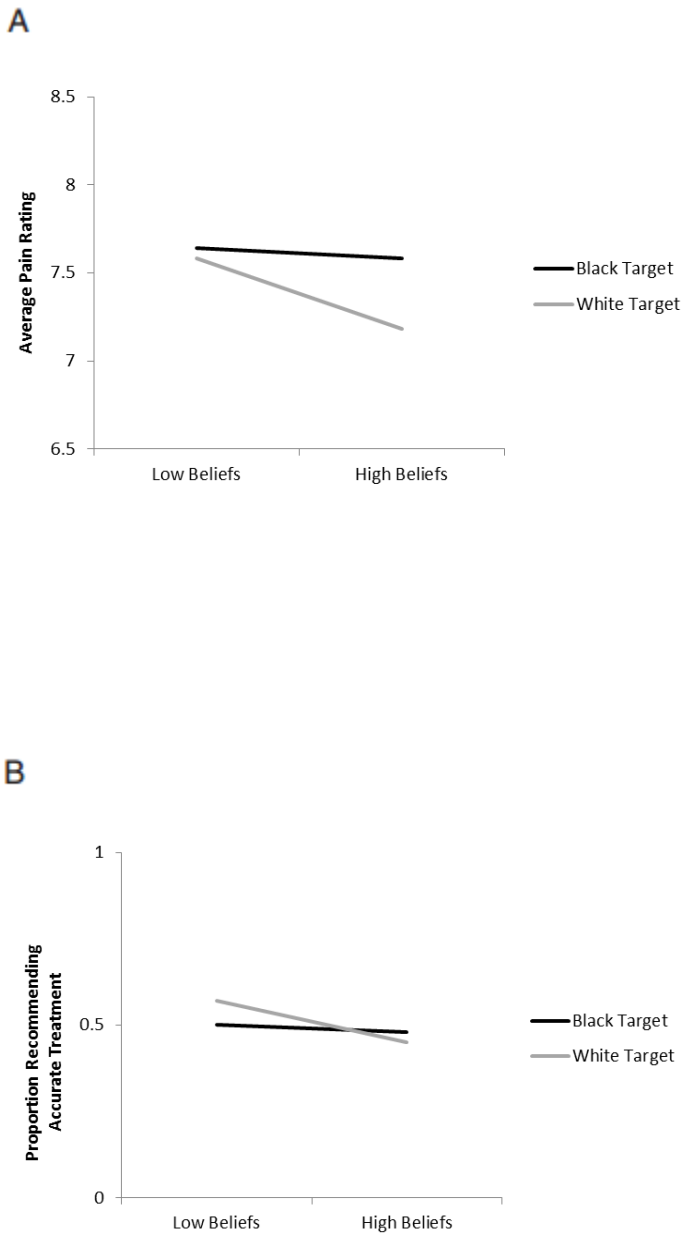

Figure 2. Graphs of results for non-White participants. Pain assessment as a function of false beliefs (Panel A) and treatment recommendation accuracy as a function of false beliefs (Panel B).

References

Anderson KO, Green CR, Payne R (2009) Racial and ethnic disparities in pain: Causes and consequences of unequal care. J Pain 10(12):1187–1204.

Bonilla-Silva E (2006) Racism without Racists: Color-blind Racism and the Persistence of Racial Inequality in the United States (Rowman & Littlefield Publishers).

Chow K (2014). A brief history of racial protest in sports. Retrieved at http://www.npr.org/sections/codeswitch/2014/12/02/367766230/a-brief-history-of-racial-protest-in-sports

Crandall CS, Eshleman A, O'Brien L (2002) Social norms and the expression and suppression of prejudice: the struggle for internalization. J Person & Psychol, 82(3): 359.

Eisinger PK (1974) Racial differences in protest participation. Am Pol Sci Rev 68(02): 592-606.

Fazio RH (1990) Multiple processes by which attitudes guide behavior: The MODE model as an integrative framework. Adv in Exp Soc Psychol 23:75-109.

Feagin JR, O'brien E (2004) White men on race: Power, privilege, and the shaping of cultural consciousness. Beacon Press.

Guillory JD (1968) The pro-slavery arguments of Dr. Samuel A. Cartwright. La Hist 9:209–227.

Hoberman JM (1997) Darwin's Athletes: How Sport Has Damaged Black America and Preserved the Myth of Race (Houghton Mifflin Company, New York).

Hoffman KA, Trawalter S, Axt J, Oliver MN (2016) Racial bias in pain assessment and treatment recommendations, and false beliefs about biological differences between blacks and whites. In press at Proc Nat Acad Sci.

Hughey M, Goss DR (2015) A level playing field? Media constructions of athletics, genetics, and race. Ann Am Acad Pol Soc Sci 661(1):182–211.

Jost JT, Banaji MR, Nosek BA (2004) A decade of system justification theory: Accumulated evidence of conscious and unconscious bolstering of the status quo. Pol Psychol 25(6): 881-919.

Mathur VA, Richeson JA, Paice JA, Muzyka M, Chiao JY (2014) Racial bias in pain perception and response: Experimental examination of automatic and deliberate processes. J Pain 15(5):476–484.

McAdam, D (2010) Political process and the development of black insurgency, 1930-1970 (University of Chicago Press).

Roberts, D (2013) Fatal Invention: How Science, Politics, and Big Business Re-create Race in the Twenty-first Century (The New Press).

Sailes GA (1998) The African American Athlete: Social Myths and Stereotypes. African Americans in Sports: Contemporary Themes, ed Sailes GA (Transaction Publishers, New Brunswick, NJ), pp 183–198.

Schuette RA, Fazio RH (1995) Attitude accessibility and motivation as determinants of biased processing: A test of the MODE model. Person & Soc Psychol Bull 21:704-710.

Sidanius J, Liu JH, Shaw JS, Pratto F (1994) Social dominance orientation, hierarchy attenuators and hierarchy enhancers: Social dominance theory and the criminal justice system. J App Soc Psychol 24(4): 338-366.

Staton LJ, et al. (2007) When race matters: Disagreement in pain perception between patients and their physicians in primary care. J Natl Med Assoc 99(5):532–538.

Trawalter S, Hoffman KM, Waytz A (2012) Racial bias in perceptions of others' pain. PLoS One 7(11):e48546.

Washington HA (2006) Medical Apartheid: The Dark History of Medical Experimentation on Black Americans from Colonial Times to the Present (Doubleday, New York).

Williams MJ, Eberhardt JL (2008) Biological conceptions of race and the motivation to cross racial boundaries. J Pers Soc Psychol 94(6):1033–1047.

Ziegert JC, Hanges, PJ (2005) Employment discrimination: the role of implicit attitudes, motivation, and a climate for racial bias. J of App Psychol 90(3): 553.