UNIVERSITY OF CALIFORNIA, MERCED

Examining Patients' Anti-Hispanic Bias Toward Healthcare Providers

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in

Psychological Sciences

by

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Table of Contents

List of Figures

List of Tables

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PUBLICATIONS

1. **Hinojosa, B. M.**, Meese, W. B., Howell, J. L., Lindgren, K. P, O'Shea, B., Teachman B. A., & Werntz, A. (2023). Implicit and explicit associations between the COVID-19 vaccine and harm predict vaccine beliefs, intentions, and behaviors. *Social and Personality Psychology Compass, 17*(12), e12905.

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5. Hussain, M., Johnson, A. E., Hua, J., **Hinojosa, B. M.**, Zawadzki, M., & Howell, J. L. (2021). When belongingness backfires: Experienced discrimination predicts increased metabolic risk among college students high, but not low in social belonging. *Journal of Behavioral Medicine, 44*(4), 571-578.

Abstract

As the healthcare profession has become more diverse, physicians may encounter patients who discriminate against them based on their group identity. Most past research has focused on addressing healthcare workers' negative bias toward patients, yet incidents of patient bias toward healthcare workers also occur. Patient bias is prejudice, racism, and/or discrimination against healthcare workers by patients experienced during patient-provider interactions and decision-making. Experiencing discrimination due to these biases can negatively influence healthcare workers' health and well-being and reduce their persistence in their careers. Yet, to my knowledge, no studies have measured patients' implicit bias toward healthcare workers. Thus, in two studies, I examined patients' implicit bias toward Hispanic physicians and two important qualities for physician-patient interaction: trustworthiness and competence. I also examined how these biases related to whether people chose a Hispanic physician, their perceptions of care by a Hispanic physician, and their intentions to adhere to medical advice from Hispanic physicians. Across both studies, participants implicitly rated White physicians more favorably (i.e., more implicitly trustworthy and competent) than Hispanic physicians. Results suggested that people were more likely to choose a Hispanic physician to the extent that they implicitly associated Hispanic physicians with competence and more likely to adhere to physicians to the extent that they rated Hispanic physicians as implicitly competent and trustworthy. Additionally, results suggested Hispanic participants were more sensitive to physician ethnicity than were White participants. Specifically, Hispanic participants who were assigned a Hispanic physician were more likely to be confident in the diagnosis to the extent they reported implicit trustworthiness and competence ratings for Hispanic physicians. Additionally, Hispanic participants who were assigned a Hispanic physician were more likely to believe the diagnosis to the extent they reported implicit trustworthiness ratings for Hispanic physicians. Finally, Hispanic participants assigned a White physician were more likely to request a second opinion and less likely to be confident in the physician's diagnosis to the extent they reported implicit trustworthiness ratings for Hispanic physicians.

Introduction

There has been significant attention focused on documenting and addressing healthcare workers' bias and discrimination toward patients. However, incidents of patients' bias toward healthcare workers can also occur and are difficult for healthcare workers to navigate (FitzGerald & Hurst, 2017; Maina et al., 2018; Sabin et al., 2009). For example, a survey of physicians in the U.S. found that 59% reported hearing derogatory remarks from patients about their age, gender, ethnicity, race, weight, or other personal characteristics and 47% of physicians had patients request a different physician on the basis of personal characteristics (Chandrashekar & Jain, 2020). In the present study, we focus on the phenomenon of patient bias toward physicians, with a particular focus on patient bias toward Hispanic/Latino/a/e/x providers (henceforth Hispanic, the most inclusive term).

Ethnicity and Medical Interactions

Past research on the influence of Hispanic ethnicity in medical interactions has primarily focused on the influence of patient race on medical interactions. For instance, one study found that Hispanic patients were more likely than White patients to report that they would have received superior medical care if they belonged to a different racial/ethnic group and to suggest that medical staff judged them unfairly or treated them with disrespect based on their race/ethnicity (Johnson et al., 2004). Another study showed that, compared to White parents, Mexican-American parents regularly reported experiencing discrimination by healthcare workers as their child was treated for a serious illness (Davies et al., 2011). Instances of discrimination included observing priority space given in the hospital to White patients over Mexican-American patients, seeing healthcare workers attend more frequently to the needs of White patients than Mexican-American patients, feeling like healthcare workers stereotyped them as poor and uneducated, feelings of being avoided, and feeling generally unsupported and unheard by healthcare workers. Additionally, findings from one study suggest that Hispanic children treated in emergency departments waited for healthcare nearly 25% longer than did White children (James et al., 2005). These disparities in care have led some to suggest racially concordant patient-provider interactions should result in better healthcare.

Previous research supports racially concordant patient-provider pairings resulting in better healthcare outcomes for patients: patients whose provider shares their racial/ethnic background are more likely to use healthcare services (LaVeist et al., 2003), have longer visits (Cooper et al., 2003), and are more satisfied with their visits (Cooper et al., 2003). However, a recent review on patient-provider concordance found mixed and inconclusive results on better patient experience and improved health outcomes (Otte, 2022). Results indicated that four studies suggested patient-provider racial concordance led to positive patient outcomes. However, most studies on patient-provider racial concordance found no significant improved patient outcomes such as quality of surgical care and patient trust (Otte, 2022).

Looking specifically at Hispanic patients, research on patient-provider concordance are, like the broader literature, mixed. Ma and colleagues (2019) found that

Hispanic patients in racially concordant patient-provider pairings were more likely to seek preventive care and visit a healthcare provider for new and ongoing medical concerns. Additionally, research suggests Hispanic participants who perceive racism in healthcare are more likely to prefer a Hispanic physician (Chen et al., 2005). By contrast, Malhotra and colleagues (2017) found that Hispanic patients had improved patient outcomes (e.g., higher cancer screening rates) with racially discordant patient-provider pairings. Further, Hispanic men in racially concordant patient-provider pairings reported less satisfaction with their medical care, specifically in their provider's ability to communicate and listen effectively (Oguz, 2018).

Regardless of whether there is utility in promoting racially concordant provider-patient pairings, there is a need to broaden the healthcare system to better reflect the increasing diversity of the United States (Jensen et al., 2021). Despite accounting for 19% of the U.S. population, and being the nation's largest racial/ethnic minority, in 2019 Hispanic people comprised only 6.2% of medical school graduates, 5.8% of active physicians, and 5.4% of registered nurses (Association of American Medical Colleges, 2019; Cheshire et al., 2020). While there has been a great deal of effort to increase diversity, equity, and inclusion in medical education Hispanic physicians are still severely underrepresented (Stanford, 2020). Thus, to increase the number of Hispanic physicians, it is important to understand the barriers to job satisfaction and well-being in the healthcare domain. Importantly, one barrier may be healthcare workers' experiences of bias directed at them by patients.

Patient Bias

Bias against healthcare workers is observable at both a macro (e.g., institutional) level and a micro (e.g. patient – healthcare worker interaction) level. Examples of bias at a macro level include fewer opportunities and worse training offered to members of racial/ethnic minority groups, and greater physician job turnover (Nunez-Smith et al., 2009). Bias experienced by healthcare workers at the micro level includes patient bias—that is, forms of prejudice, racism, and discrimination against healthcare workers, by patients, experienced during decision-making (e.g., choosing a physician) and patient-provider interactions (Chandrashekar & Jain, 2020). One study on patient bias in the U.S. found that healthcare workers and medical students experienced biased and discriminatory treatment from patients including, biased remarks, racist jokes, being the target of negative stereotypes, patients questioning whether non-White physicians were a nurse (rather than a physician), and explicit refusal of care (Wheeler et al., 2019). In a study with in-depth qualitative interviews with Hispanic medical residents, residents reported that they routinely experienced racial/ethnic bias from patients, such as patients saying to a resident, "Oh you don't really look like a doctor" (Osseo-Asare et al., 2018, pp.5).

Experiencing bias from patients can negatively influence healthcare workers' health and well-being. For example, one study found that healthcare workers who experienced racial bias by patients experienced greater levels of perceived stress and poorer mental well-being (Kaltiso et al., 2021). Healthcare workers who experienced bias from patients also reported feelings of degradation, powerlessness, and emotional burden (Chandrashekar & Jain, 2020; Espaillat et al., 2019; Wheeler et al., 2019). Additionally, healthcare workers and medical residents who experienced bias from patients reported

decreased practice and learning and withdrawal from roles and rotation (Wheeler et al., 2019).

In sum, research suggests patient bias against healthcare workers can influence healthcare workers' health, well-being, job satisfaction, and job performance. Nevertheless, the majority of past research has focused on the impact of healthcare workers' bias toward patients. In addition, the research on patient bias has not included implicit measures of associations, a point we turn to next (Bhat et al., 2021; Champagne-Langabeer & Hedges, 2021; Chandrashekar & Jain, 2020; Greene et al., 2018; Popper-Giveon, 2021; Solnick et al., 2020; Wheeler et al., 2019).

Implicit Bias

There has been vigorous debate about how to define and operationalize implicit bias (Cesario, 2022; Corneille & Béna, 2022; Cyrus-Lai et al., 2022; De Houwer & Boddez, 2022; Dovidio & Kunst, 2022; Gawronski et al., 2022; Krajbich, 2022; Melnikoff & Kurdi, 2022; Norman & Chen, 2022; Olson & Gill, 2022; Ratliff & Smith, 2022; Schmader et al., 2022). Here, we adopt the definition that implicit biases are automatic behavioral responses to "social category cues" (e.g., cues related to ethnicity, sexuality, gender, Ratliff & Smith, 2022). Implicit bias thus differs from explicit bias in that people's explicit bias is reflected in behaviors that are controlled, intentional, and consciously influenced by social category cues (Gawronski et al., 2022).

Most White Americans' implicit biases favor the dominant groups such as (in the United States) White people and those of high socioeconomic status (Axt et al., 2014; Mattan et al., 2019). Importantly, people often self-report explicit egalitarian attitudes but show evidence of implicit bias in favor of dominant groups (Baron & Banaji, 2006; Greenwald & Lai, 2019; O'Brien et al., 2010). Important to the present work, implicit bias relates to discrimination in various contexts. Research suggests implicit biases are linked to poorer quality interactions between groups (Greenwald & Lai, 2019; Hall et al., 2015; O'Brien et al., 2010). These poorer quality interactions may be more harmful in certain contexts such as, healthcare.

Implicit Bias in Healthcare

Past research on implicit bias in healthcare has focused exclusively on implicit bias among healthcare workers. These findings consistently suggest healthcare workers' implicit biases on multiple implicit measures are similar to the population broadly, showing pro-dominant group bias (FitzGerald & Hurst, 2017; W. J. Hall et al., 2015). For example, multiple studies have found that healthcare workers report anti-Hispanic implicit biases including implicit stereotypes connecting Hispanic patients with unpleasant, reluctant, and risky (Bean et al., 2013; Blair et al., 2014; Blair, Havranek, et al., 2013; Blair, Steiner, et al., 2013; Chapman et al., 2018; Stone et al., 2020; Wolsiefer et al., 2021). One study found that healthcare workers' anti-Hispanic implicit biases predicted language use in medical encounters suggesting they relayed less complex information and offered less focus on future appointments (Chapman et al., 2018). Past research also offers correlational evidence that implicit bias relates to healthcare providers' medical decision-making, diagnoses, and patient-provider interactions (Chapman et al., 2013; FitzGerald & Hurst, 2017; Maina et al., 2018).

While it is still imperative to address healthcare workers' implicit biases, an increasing number of researchers call for more research on the opposite phenomenon,

patient bias against healthcare workers (Chandrashekar & Jain, 2020; Jain, 2020; Wheeler et al., 2019). Past research has measured explicit patient bias, but not implicit patient bias (Bhat et al., 2021; Greene et al., 2018; Solnick et al., 2020). Bhat and colleagues (2021) were interested in how the ethnicity associated with surgeons' names may influence patients' perceptions of surgeon competence and how likely they would be to become a patient of the surgeon. Results suggested White and Hispanic respondents reported higher competence and recruitment likelihood for surgeons of their own respective ethnicities, but there was no significant difference in competence and recruitment scores among the surgeons generally. Green and colleagues (2018) were interested in investigating participants' preference for physicians based on gender and the race/ethnicity of a physician's name. Results suggest participants were more likely to select a physician with a White male name compared to other groups including a physician with a White female name, African American name of either gender, or Middle Eastern name of either gender.

Both Bhat and colleagues (2021) and Green and colleagues (2018) claim a strength of their study is that they detect implicit bias. Nevertheless, they do not measure participants' implicit bias, they simply assume it from participants' biased behavior. Based on clear evidence that implicit bias might (a) diverge from explicit bias and (b) relate independently to behavior in the healthcare context, it is important to include such measures in any study of patient bias toward healthcare workers. Given the evidence of patient bias toward healthcare workers, it is imperative we investigate how patient bias relates to patient-provider outcomes. In particular, it is important to examine how implicit patient bias may relate to physician selection and perceptions of providers.

The Current Study

The majority of past research has focused on healthcare workers' implicit biases towards patients to understand health disparities, yet to our knowledge, no studies have measured patients' implicit biases towards healthcare workers. Thus, the present study aims to examine: (1) patients' implicit biases regarding Hispanic healthcare providers, (2) whether those biases influence provider selection, and (3) whether those biases influence patients' perceptions of providers.

Indicators of Patient Bias

In this study, I measure patients' perceptions of competence and trustworthiness of physicians. Competence and trustworthiness map onto two domains (competence and warmth) that are core to human perception of others, and, in particular, of social groups (Abele et al., 2008; Cuddy et al., 2011; Fiske et al., 2007; Judd et al., 2005; Roussos & Dunham, 2016). I chose the specific domain of trustworthiness to represent the warmth domain because trust in a physician is essential for good physician-patient relationships and bolsters patient outcomes (Gong et al., 2021). For example, past research suggests that patients who self-report more trust in their physician are more likely to adhere to medication and recommended care, less likely to delay care, and more likely to keep their appointments (Gong et al., 2021). I chose competence to represent the competence domain, because patients' faith in the competence of their physician is also essential to the provider-patient relationship (Chipidza et al., 2015). For instance, if patients do not feel their physician is competent, they are less likely to follow their physicians' advice and to adhere to medical treatment (Kraft-Todd et al., 2017).

The Present Research & Hypotheses

In two studies, I examined perceptions of Hispanic and White physicians by Hispanic and non-Hispanic participants. In Study 1, I examined the role of implicit bias, physician ethnicity, and patient (participant) ethnicity on physician selection and medication-adherence intentions. I hypothesized that people, and in particular non-Hispanic White participants, would hold Hispanic-untrustworthy and Hispanic-incompetent implicit biases. To the extent that people hold implicit Hispanic untrustworthy and incompetent biases, I expected that they would be less likely to choose a Hispanic physician and less likely to intend to adhere to medical advice from a Hispanic physician.

In Study 2, I examined the role of implicit bias, physician ethnicity, and patient (participant) ethnicity on responses to a medical scenario where an online symptom checker undermines a physician's diagnosis. As in Study 1, I hypothesized that people, and in particular non-Hispanic White participants, would hold Hispanic untrustworthy and Hispanic incompetent implicit biases. Further, to the extent that people hold implicit Hispanic untrustworthy and incompetent biases, I expected that when presented with a Hispanic physician they would be less confident in the physician's diagnosis, less likely to believe the physician's diagnosis, more likely to intend to request additional diagnostic tests, more likely to intend to request a second opinion, and more likely to intend to mention a Symptom Checker diagnosis.

Study 1

Study 1 examined the relationship between participants' implicit biases and physician selection. Past research has examined the influence of physician race on patients' physician selection, finding that patients are less likely to select people of color as their physicians (Green et al., 2018). The present study expands this earlier work by looking specifically at the role of Hispanic ethnicity and examining patients' implicit biases. Thus, the current study will expand previous work by examining participants' implicit trustworthiness and competence ratings of Hispanic physicians and examine the extent to which those biases regarding Hispanic physicians relate to physician selection and medical-adherence intentions. I chose White physicians as a contrast group because they comprise the largest racial group in healthcare in the United States – 56.2% of all active physicians (Association of American Medical Colleges, 2018) – and are the dominant majority group in the country, as well (Menchaca, 2023). Thus, if patients have anti-Hispanic bias, they should rate Hispanic physicians as less trustworthy and competent than White physicians and should also be less likely to select a Hispanic physician when given the chance.

Method

Participants and Procedure

Participants were 228 U.S. volunteers (57% male, 40.3% female, and 2.7% nonbinary; M_{age} = 40.23 years, SD_{age} = 12.41 years) from Prolific.co, an online participant recruitment platform, compensated $1.20 for their time. Participants were restricted to those who identified as Hispanic (49.1%) or White (50.9%) on a prescreening conducted by Prolific.co, with a quota of ½ of the sample coming from each group. All procedures were approved by the university's Institutional Review Board. All participants consented, completed all measures in a counterbalanced order, and were

debriefed.

Measures

Hispanic Ethnicity. Participants were coded as Hispanic if they chose "Latino/Hispanic" in the demographic ethnicity question on the Prolific.co pre-screener. I code Hispanic this way following other government agencies in the United States such as, the United States Census Bureau who identifies people who are Hispanic as people who identify as Hispanic, Latino, or Spanish and may be of any race (U.S. Census Bureau, n.d.-a).

Implicit Bias: Speeded Self-Report. Speeded self-reports are quick, direct, self-report measures of perceptions that occur rapidly to reduce people's ability to thoughtfully control their responses (Ranganath et al., 2008). A strength of the speeded self-report is that it allows the ability to capture biases toward multiple groups simultaneously and does not require comparison between groups to be meaningful (as do other implicit measures, such as the Implicit Association Test). In comparative analyses of direct and indirect measures, speeded self-reports have compared favorably to other implicit measures, with moderate to high correlations, across many constructs including politics, self-esteem, and race (Bar-Anan & Nosek, 2014; Nosek et al., 2014; Sriram & Greenwald, 2009).

In the present study, participants completed two speeded self-reports: one where they rated the competence of targets that appeared on the screen and one where they rated the trustworthiness of targets that appeared on the screen (Ranganath et al., 2008). Specifically, they were presented with a series of stimuli including pictures of 10 Hispanic (5 female and 5 male) and 10 White (5 female and 5 male) faces from the Chicago Face Database (Ma et al., 2015) digitally altered to be dressed as a physician and wearing lab coats. The task also included filler stimuli, which were pictures of Asian and Black faces from the Chicago Face Database that were digitally altered to be dressed as chefs, pilots, military personnel, and police officers (see Appendix A for all stimuli). Images were selected from the Chicago Face Database if they were between the ages of 27 and 39 (physicians who are younger are more likely to experience discrimination, Hall et al., 1994), average ratings of attractiveness on a scale of 1-5 (i.e., around 3.0), and the highest likelihood that they were coded as their self-reported race and gender by untrained coders guessing at these factors based on their appearance. Of the faces selected, the original raters from stimuli development categorized the faces correctly 90% of the time or more for the White faces, 81% or more for Hispanic male faces, and 70% or more for Hispanic female faces. Unlike the White racial category, there were no Hispanic faces with a race probability score higher than 0.93—thus the Hispanic faces are somewhat more racially ambiguous than the White faces. To address the racial ambiguity, I included Hispanic (e.g., "Dr. Martinez") and White (e.g., "Dr. Smith") last names along with the photos. Last names were selected from the most common surnames based on the 2010 United States census (Comenetz, 2016).

As a measure of implicit competence, participants were asked to rate each picture on a Likert scale using the 1, 3, 7, and 9 keys on their keyboard as response keys which specifically corresponded to: 1 =Very Incompetent; 3 = Slightly Incompetent; 7 = Slightly Competent; 9 = Very Competent ($M_{Hispanic}$ = 6.93, $SD_{Hispanic}$ = 1.79; M_{White} = 7.09, SD_{White} = 1.61). The instructions on the screen told them to "rate how

competent/incompetent you find the person in this picture." Pictures would appear on screen for up to 1200ms. If participants did not rate the picture within that window, a warning that they "missed one" and should "try to respond a little faster" would appear. They could then press the space bar to continue with the task. This quick response window ensured that participants had time to respond, but could not exert thoughtful control over their reaction (Ratliff & Smith, 2022).

The measure of implicit trustworthiness was identical to that for competence except that the keys were: 1 =Very Untrustworthy; 3 = Slightly Untrustworthy; 7 = Slightly Trustworthy; 9 = Very Trustworthy ($M_{Hispanic}$ = 6.75, $SD_{Hispanic}$ = 1.86; M_{White} = 6.92, SD_{White} = 1.70). See Appendix B for full instructions for both tasks.[1]

Physician Selection. Participants were asked to imagine they were looking for a physician and had to select from a list of four physicians (adapted from Greene et al., 2018). They saw a matrix of "star" ratings where each physician received from 0 (worst) to 3 (best) stars on eight metrics (e.g., "Treats illness using best practices, "Screens for diseases using best practices", "Uses systems to prevent medication errors", "Uses systems to track all lab results", "How well doctor communicates", "Getting care when needed", "Patient rating of doctor, "Courteous and helpful office staff"). Two of the physicians—one with a Hispanic name (Hernandez) and one with a White name (Campbell)—had top, 3-star performance on seven of the eight metrics and a 2-star performance on an eighth metric. The other two physicians had Asian last names (Xiong and Zhang) but had markedly lower ratings (e.g., 1 or 2 stars in multiple domains). Surnames were selected from a list of the most common and unique-to-their-ethnicity surnames based on the 2010 United States census (Comenetz, 2016). First names were selected from multiple lists of popular baby names from an online website (Pampers, n.d.). See Appendix C for stimuli used in this measure.

Participants were presented with either all male names or all female names to eliminate gender bias in decision making. The male names were José Hernandez, Matthew Campbell, Eric Xiong, and Michael Zhang; The female names were Maria Hernandez, Jessica Campbell, Amy Xiong, and Naomi Zhang. Overall, 57.7% of participants chose a Hispanic physician.

Intentions to Adhere. Participants were presented with a single picture of either a Hispanic or White doctor (from the pool of stimuli for the implicit measures) and asked to respond to the question, "Imagine this doctor told you to take a medication daily, how likely would you be to take that medication daily?" on a scale ranging from 1 = Definitely Unlikely; 2 = Moderately Unlikely; 3 = Slightly Unlikely; 4 = Neither Unlikely nor Likely; 5 = Slightly Likely; 6 = Moderately Likely; 7 = Definitely Likely (M = 5.74, SD = 1.46).

Study 1 Results

All analyses were conducted using SPSS 29.0.

Trust and Competence Perceptions

First, I compared people's implicit ratings of the trustworthiness and competence of Hispanic and White physicians as a function of participant ethnicity using a 2 (Within-

[1] I included an explicit measure in the two studies, but (1) my focus was primarily on implicit bias and (2) there were large correlations between the two, thus, I only report implicit in this paper. I address this issue further in the discussion.

Subjects, Implicit Outcome: Competence, Trustworthiness) x 2 (Within-Subjects, Physician Ethnicity: Hispanic, White) x 2 (Between-Subjects, Participant Ethnicity: Hispanic, White) mixed-subjects ANOVA.

Results suggested there was a main effect of physician ethnicity—participants rated White physicians more favorably (M = 7.00, SE = 0.11) than they rated Hispanic physicians (M = 6.84, SE = 0.12), $F(1, 219) = 5.24$, $p = .02$, $\eta_p^2 = .02$. There was also a main effect of implicit outcome—people found physicians more competent (M = 7.01, SE = 0.11) than trustworthy (M = 6.83, SE = 0.11), $F(1, 219) = 7.28$, $p = .008$, $\eta_p^2 = .03$.

There was neither a main effect of participant ethnicity, $F(1, 219) = 0.01$, $p = .91$, $\eta_p 2 < .001$, nor interactions between participant ethnicity and physician ethnicity, $F(1, 219) = 0.31$, $p = .59$, $\eta_p^2 = .001$, participant ethnicity and implicit outcome, $F(1, 219) = 0.03$, $p = .86$, $\eta_p^2 < .001$, nor a three-way interaction between participant ethnicity, physician ethnicity, and implicit outcome, $F(1, 219) = 0.82$, $p = .37$, $\eta_p^2 < .004$.

Adherence Intentions

Next, using linear regression, I examined the role of participants' implicit competence and, separately, trust biases toward Hispanic physicians, physician ethnicity, and participant ethnicity in whether people intended to adhere to physician advice. Results from the full models appear in Table 1.

As hypothesized, people were more likely to intend to adhere to physician-prescribed medication regimens to the extent that they rated Hispanic physicians competent (b = .28, SE = .05, $CI_{95\%}$ [.17, .38]) and trustworthy (b = .27, SE = .05, $CI_{95\%}$ [.17, .37]). No other effects were statistically significant.

Table 1.
Results from linear regressions predicting adherence intentions.

Predictor	b (SE)	t	p
Model 1: Competence			
Participant Ethnicity	-.03 (.19)	-0.15	0.89
Implicit Competence	**.28 (.05)**	**5.18**	**<.001**
Physician Ethnicity	-.20 (.19)	-1.09	0.28
Participant Eth. x Physician Eth.	-.10 (.38)	-0.27	0.79
Participant Eth. x Implicit Comp.	.01 (.11)	0.05	0.96
Physician Eth. x Implicit Comp.	.02 (.11)	0.16	0.87
3-way interaction	-.14 (.21)	-0.66	0.51
Model 2: Trustworthiness			
Participant Ethnicity	-.06 (.19)	-0.31	0.76
Implicit Trustworthiness	**.27 (.05)**	**5.31**	**<.001**
Physician Ethnicity	-.17 (.19)	-0.88	0.38
Participant Eth. x Physician Eth.	-.12 (.38)	-0.31	0.76
Participant Eth. x Implicit Trust	.07 (.10)	0.72	0.47
Physician Eth. x Implicit Trust	-.03 (.10)	-0.26	0.80
3-way interaction	.004 (.20)	-0.02	0.99

Notes: **Bold** indicates p < .05.

Physician Selection

Next, using logistic regression, I examined the role of participants' implicit competence and trust biases toward Hispanic physicians and participant ethnicity in whether people selected a Hispanic physician.

In the model using competence, people were more likely to choose a Hispanic physician to the extent that they rated Hispanic physicians as competent, OR = 1.28, $CI_{95\%}$ [1.10, 1.50], p = .002. Hispanic participants were marginally more likely to choose a Hispanic physician, OR = 1.64, $CI_{95\%}$ [0.94, 2.85], p = .08, and the main effect of implicit competence was not moderated by participant ethnicity, OR = 0.88, $CI_{95\%}$ [0.64, 1.21], p = .44.

By contrast, in the model using trustworthiness there were no significant effects: People were only marginally more likely to choose a Hispanic physician to the extent that they rated Hispanic physicians as trustworthy, OR = 1.15, SE = .08, $CI_{95\%}$ [0.99, 1.33], p = .07, Hispanic participants were only marginally more likely to choose a Hispanic physician, OR = 1.63, SE = .28, $CI_{95\%}$ [0.95, 2.81], p = .08, and the main effect of implicit trustworthiness ratings was not moderated by participant ethnicity, OR = 1.02, SE = .15, $CI_{95\%}$ [0.76, 1.37], p = .89.

Study 1 Discussion

In sum, people rated White physicians more favorably than Hispanic physicians. People were also more likely to intend to adhere to medication regimens when they rated Hispanic physicians as competent and trustworthy. Additionally, people were more likely to select a Hispanic physician as their new physician if they rated Hispanic physicians as competent.

Study 2

The purpose of Study 2 was to extend Study 1. Specifically, Study 2 examined the relationship between participants' implicit biases towards Hispanic and White physicians and their confidence in a Hispanic or White physician's diagnosis versus a contradictory online symptom checker.

Previous work by Solnick and colleagues (2020) examined the influence of physicians' race on patients' ratings of their physicians versus an online symptom checker. However, this work did not measure participants' implicit biases and examined patients' biases towards White versus Black physicians. Thus, the current study expands on previous work by measuring participants' implicit biases to examine patients' biases toward Hispanic physicians' diagnostic abilities.

Method

Participants and Procedure

Participants were 238 U.S. volunteers (41.7% male, 33.2% female, and 1.2% nonbinary; M_{age} = 42.33 years, SD_{age}= 13.05 years) from Prolific.co, an online participant recruitment platform and compensated $1.20 for their time. Participants were restricted to those who identified as Hispanic (49.8%) or White (50.2%) on a prescreening conducted by Prolific.co, with a quota of ½ of the sample coming from each group.

All procedures were approved by the university's Institutional Review Board. All participants consented, completed all measures in a counterbalanced order, and were debriefed.

Measures

Hispanic Ethnicity. Hispanic ethnicity was coded the same as in Study 1.

Associations. Participants completed the same speeded self-report measures as in Study 1; implicit competence, ($M_{Hispanic}$ = 7.06, $SD_{Hispanic}$ = 1.83), (M_{White} = 7.22, SD_{White} = 1.71); implicit trustworthiness, ($M_{Hispanic}$ = 6.85, $SD_{Hispanic}$ = 1.93), (M_{White} = 6.95, SD_{White} = 1.84).

Clinical Vignette. Participants were presented with the following scenario and were prescribed a diagnosis by either a Hispanic or White physician (Solnick et al., 2020). To begin participants were asked if they have an appendix and if they answered no (n = 35) they were presented with the statement, "For the following scenario imagine you have an appendix." All other participants read this scenario without the prior instruction:

> In this part, imagine you are a patient in an interaction with an emergency medicine doctor at a hospital. Please carefully read the scenario below, as you will be asked to enter your symptoms on the interface at the next page.
>
> You have been experiencing abdominal pain since yesterday. The pain has been slowly getting worse over the last 24 hours. It is a cramping pain that feels the worst around your belly button area. You haven't felt hungry since the pain started. You have experienced nausea and vomiting. Although you weren't able to keep down your last meal, you tried drinking some water and were able to keep that down. Most recently, you vomited clear liquid. You have also had three episodes of watery diarrhea in the last 24 hours. There was no blood in the diarrhea. You do not have a fever, and haven't been camping or traveling recently you decide to seek medical attention in the emergency department of a hospital.

After reading that scenario, participants completed an attention check and were asked to select the symptoms that they have been experiencing and if they were correct they moved on with the study, but if they were incorrect they were redirected back to the clinical vignette then presented with the attention check a second time. Participants selected from the following symptoms, "Abdominal pain"; "Cough"; "Throat irritation"; "Chest pain"; "Headache".

After passing the attention check, participants read the following scenario:

> While waiting to see the doctor you research your symptoms on the internet by entering them into an online "Symptom Checker" (for example WebMD or Mayo Clinic). The Symptom Checker provides you with a list of diseases and conditions that match what you reported. We have entered these symptoms into a real symptom checker and received a diagnosis. We have also asked real emergency medicine doctors to make a diagnosis based on these symptoms. You will see the diagnosis from one of these doctors on the next page, along with the diagnosis provided by the Symptom Checker. Please carefully read both diagnoses and answer the questions that follow.

The participants then read the following about a diagnosis from the physician:

> Dr. [Hispanic or White surname] would ask for your symptoms, then perform a physical exam and check your blood work and urine. Imagine that you have no abdominal tenderness during the physical exam and the diagnostic tests come back normal.
>
> Dr. [Hispanic or White surname] would make the following diagnosis: "I took a

> look over your results and based on what you're telling me I think you have viral gastroenteritis, or a stomach virus. Your symptoms should resolve in a couple of days. My advice is that you continue to take in fluids with electrolytes such as Gatorade. I will also write you a prescription for a medication to help with your vomiting. Come back to the emergency department if your pain becomes worse, you see blood in your stool or vomit, or have any other symptoms that worry you."

Participants were also presented with the following diagnosis from the Symptom Checker:

> The Symptom Checker will take the symptoms you provide and return the most likely cause based on what you entered. Imagine that you enter the same symptoms you described to the doctor. The Symptom Checker made the following diagnosis: "Your symptoms could be caused by appendicitis, a serious infection of your appendix. Your appendix is a small tube that projects from your intestine. If left untreated, your appendix can burst, spreading infection in your abdomen. Treatment usually involves surgery to remove the appendix and antibiotics. To help diagnose appendicitis your doctor may order diagnostic tests such as a blood or urine sample, and recommend an abdominal X-ray, an abdominal ultrasound or a computerized tomography (CT) scan to help confirm appendicitis or find other causes of your pain.

Confidence in Diagnosis. Participants responded to the question, "How confident are you that the doctor made the correct diagnosis?" and "How confident are you that the doctor recommended the correct treatment plan?" on a scale ranging from 1 = Very Unconfident; 2 = Moderately Unconfident; 3 = Slightly Unconfident; 4 = neither Unconfident nor Confident; 5 = Slightly Confident; 6 = Moderately Confident; 7 = Very Confident (Solnick et al., 2020) ($r_{\text{between-items}}(226) = .89$, $p < .001$, $M = 4.18$, SD = 1.43).

Believing the Physician. Participants responded to the question, "Which diagnosis do you think is more likely to be correct?" on a scale ranging from 1 = Definitely the Symptom Checker; 2 = Probably the Symptom Checker; 3 = Maybe the Symptom Checker; 4 = Neither the Doctor nor the Symptom Checker; 5 = Maybe the Doctor; 6 = Probably the Doctor; 7 = Definitely the Doctor (Solnick et al., 2020) (M = 5.01, SD = 1.57).

Requests More Tests. Participants responded to the question, "How likely are you to ask the doctor to perform additional diagnostic tests?" on a scale ranging from 1 = Definitely Unlikely; 2 = Moderately Unlikely; 3 = Slightly Unlikely; 4 = Neither Unlikely nor Likely; 5 = Slightly Likely; 6 = Moderately Likely; 7 = Definitely Likely. (Solnick et al., 2020) (M = 5.23, SD = 1.61).

Intentions to Get a Second Opinion. Participants responded to the question, "How likely are you to get a second opinion of the diagnosis?" on a scale ranging from 1 = Definitely Unlikely; 2 = Moderately Unlikely; 3 = Slightly Unlikely; 4 = Neither Unlikely nor Likely; 5 = Slightly Likely; 6 = Moderately Likely; 7 = Definitely Likely (M = 4.88, SD = 1.75).

Mention the Symptom Checker. Participants responded to the question, "How likely are you to mention the Symptom Checker diagnosis to the doctor?" on a scale ranging from 1 = Definitely Unlikely; 2 = Moderately Unlikely; 3 = Slightly Unlikely; 4

= Neither Unlikely nor Likely; 5 = Slightly Likely; 6 = Moderately Likely; 7 = Definitely Likely (M = 5.07, SD = 1.78).

Study 2 Results

All analyses were conducted using SPSS 29.0.

Trust and Competence Perceptions

First, I compared people's implicit ratings of the trustworthiness and competence of Hispanic and White physicians as a function of participant ethnicity using a 2 (Within-Implicit Outcome: Competence, Trustworthiness) x 2 (Within-Subjects Physician Ethnicity: Hispanic, White) x 2 (Between-Subjects Participant Ethnicity: Hispanic, White) mixed-subjects ANOVA.

As in Study 1, there was a main effect of implicit outcome type: participants rated physicians as more competent (M = 7.16, SE = 0.12) than trustworthy (M = 6.93, SE = 0.12), $F(1, 214) = 10.04$, $p = .002$, $\eta_p^2 = .05$. This effect was significantly moderated by participant ethnicity, $F(1, 214) = 4.87$, $p = .03$, $\eta_p^2 = .02$, such that, as in Study 1, White participants reported physicians as more competent (M = 7.16, SE = .16) than trustworthy (M = 6.77, SE = .17), but, unlike Study 1, there was no difference for Hispanic participants ratings of physicians trustworthiness (M = 7.09, SE = .17) or competence (M = 7.17, SE = .16).

There was not a main effect of physician ethnicity, $F(1, 214) = 3.04$, $p = .08$, $\eta_p^2 = .01$, though it was marginal and in the same direction as in Study 1. There was also not evidence for a main effect of participant ethnicity, $F(1, 214) = 0.56$, $p = .46$, $\eta_p^2 = .003$, nor interactions between participant ethnicity and physician ethnicity, $F(1, 214) = 1.22$, $p = .27$, $\eta_p^2 = .01$, nor a three-way interaction between participant ethnicity, physician ethnicity, and measure type, $F(1, 214) = 0.001$, $p = .98$, $\eta_p^2 < .001$.

Patient Intentions

I ran multiple linear regressions examining implicit trust and competence bias on intentions to request additional diagnostic tests, intentions to request a second opinion, intentions to mention the Symptom Checker diagnosis to the physician, belief in the physician's diagnosis, and confidence in the diagnosis and treatment plan.

Competence. All results for competence appear in Table 2.

Confidence in Diagnosis. There was a significant three-way interaction between implicit competence, physician ethnicity, and patient ethnicity, qualifying all other effects. As such, I examined the two-way interaction between physician ethnicity and implicit competence ratings among Hispanic and White participants separately. Among White participants, there was no significant two-way interaction between implicit competence ratings and physician ethnicity, nor a main effect of either variable on whether they had confidence in the physician diagnosis.

Among Hispanic participants, there was a significant two-way interaction between implicit competence ratings and physician ethnicity. Examining the simple main effect of implicit competence ratings among those assigned Hispanic and White physicians showed that Hispanic participants who were assigned a Hispanic physician were more likely to be confident in the physician's diagnosis to the extent they reported implicit competence ratings for Hispanic physicians (see Figure 1). However, implicit competence ratings did not relate to Hispanic participants' confidence in White physicians.

Request More Tests. There were no significant main effects nor interactions for intentions to request more diagnostic tests.

Second Opinion. There was a significant two-way interaction between implicit competence and physician ethnicity, but when examined further, the main effect of implicit competence was not significant for either physician, though the effect was in opposite directions for White (positive: more likely to intend to ask for a second opinion) and Hispanic (negative: less likely to intend to ask for a second opinion) physicians.

Mention Symptom Checker. There was a significant two-way interaction between physician ethnicity by participant ethnicity, but when examined further the main effect of physician ethnicity was not significant, though the effect of physician ethnicity was in opposite directions for White (positive: more likely to intend to mention the symptom checker to the physician) and Hispanic (negative: less likely to intend to mention the symptom checker to the physicians) participants.

Believing the Physician. There was a significant 3-way interaction between implicit competence, physician ethnicity, and participant ethnicity, but when examined among White and Hispanic participants, the 2-way interaction between implicit competence ratings and physician ethnicity was not significant for either—though it was in opposite directions between White (negative: less likely to believe the physician) and Hispanic (positive: more likely to believe the physician) participants. The main effect of implicit competence ratings was significant for Hispanic participants who were assigned Hispanic physicians—they were more likely to believe the physician to the extent that they rated Hispanic physicians as competent implicitly. The main effect of implicit competence ratings for Hispanic physicians on participants' belief in the physician diagnosis was not significant for Hispanic participants with White physicians nor White participants with either physician ethnicity.

Trustworthiness. All results for trustworthiness appear in Table 2.

Confidence in Diagnosis. As with competence, there was a significant three-way interaction between implicit trustworthiness, physician ethnicity, and patient ethnicity, qualifying all other effects. As such, I examined the two-way interaction between physician ethnicity and implicit trustworthiness ratings among Hispanic and White participants separately. Among White participants, there was no significant two-way interaction between implicit trustworthiness ratings and physician ethnicity, nor a main effect of either variable on whether they had confidence in the physician's diagnosis.

Among Hispanic participants, there was a significant two-way interaction between implicit trustworthiness ratings and physician ethnicity. Examining the simple main effect of implicit trustworthiness ratings among those assigned Hispanic and White physicians showed that Hispanic participants who were assigned a Hispanic physician were more likely to be confident in the physician's diagnosis to the extent they reported implicit trustworthiness ratings for Hispanic physicians (see Figure 2). Additionally, Hispanic participants who were assigned a White physician were less likely to be confident in the physician's diagnosis to the extent they reported implicit trustworthiness ratings for Hispanic physicians (see Figure 2).

Request More Tests. Unlike with competence, where there were no significant effects, there was a significant two-way interaction between implicit trustworthiness by physician ethnicity such that, participants assigned a White physician were more likely to

intend to request additional diagnostic tests to the extent they reported implicit trustworthiness ratings for Hispanic physicians. However, implicit trustworthiness ratings for Hispanic physicians did not relate to intentions to request additional diagnostic tests to those assigned a Hispanic physician.

Second Opinion. There was a significant three-way interaction between implicit trustworthiness, physician ethnicity, and patient ethnicity, qualifying all other effects. As such, I examined the two-way interaction between physician ethnicity and implicit trustworthiness ratings among Hispanic and White participants separately. Among White participants, there was no significant two-way interaction between implicit trustworthiness ratings and physician ethnicity, nor a main effect of either variable on whether they wanted a second opinion.

Among Hispanic participants, there was a significant two-way interaction between implicit trustworthiness ratings and physician ethnicity. Examining the simple main effect of implicit trustworthiness ratings among those assigned Hispanic and White physicians showed that Hispanic participants who were assigned a White physician were more likely to request a second opinion of the diagnosis to the extent they reported implicit trustworthiness ratings for Hispanic physicians (see Figure 3). However, implicit trustworthiness ratings did not relate to Hispanic participants' desire to seek a second opinion from Hispanic physicians (see Figure 3).

Mention Symptom Checker. There was a significant two-way interaction between physician ethnicity by participant ethnicity, but when examined further the main effects were not significant, though it was in opposite directions for White (positive: more likely to mention the symptom checker to the physician) and Hispanic (negative: less likely to mention the symptom checker to the physician) participants.

Believing the Physician. There was a significant three-way interaction between implicit trustworthiness, physician ethnicity, and patient ethnicity, qualifying all other effects. As such, I examined the two-way interaction between physician ethnicity and implicit trustworthiness ratings among Hispanic and White participants separately. Among White participants, there was no significant two-way interaction between implicit trustworthiness ratings and physician ethnicity, nor a main effect of either variable on whether they believed the physician's diagnosis.

Among Hispanic participants, there was a significant two-way interaction between implicit trustworthiness ratings and physician ethnicity. Examining the simple main effect of implicit trustworthiness ratings among those assigned Hispanic and White physicians showed that Hispanic participants who were assigned a Hispanic physician were more likely to believe the physician's diagnosis to the extent they reported implicit trustworthiness ratings for Hispanic physicians (see Figure 4). However, implicit trustworthiness ratings did not relate to Hispanic participant's belief in White physicians' diagnosis (see Figure 4).

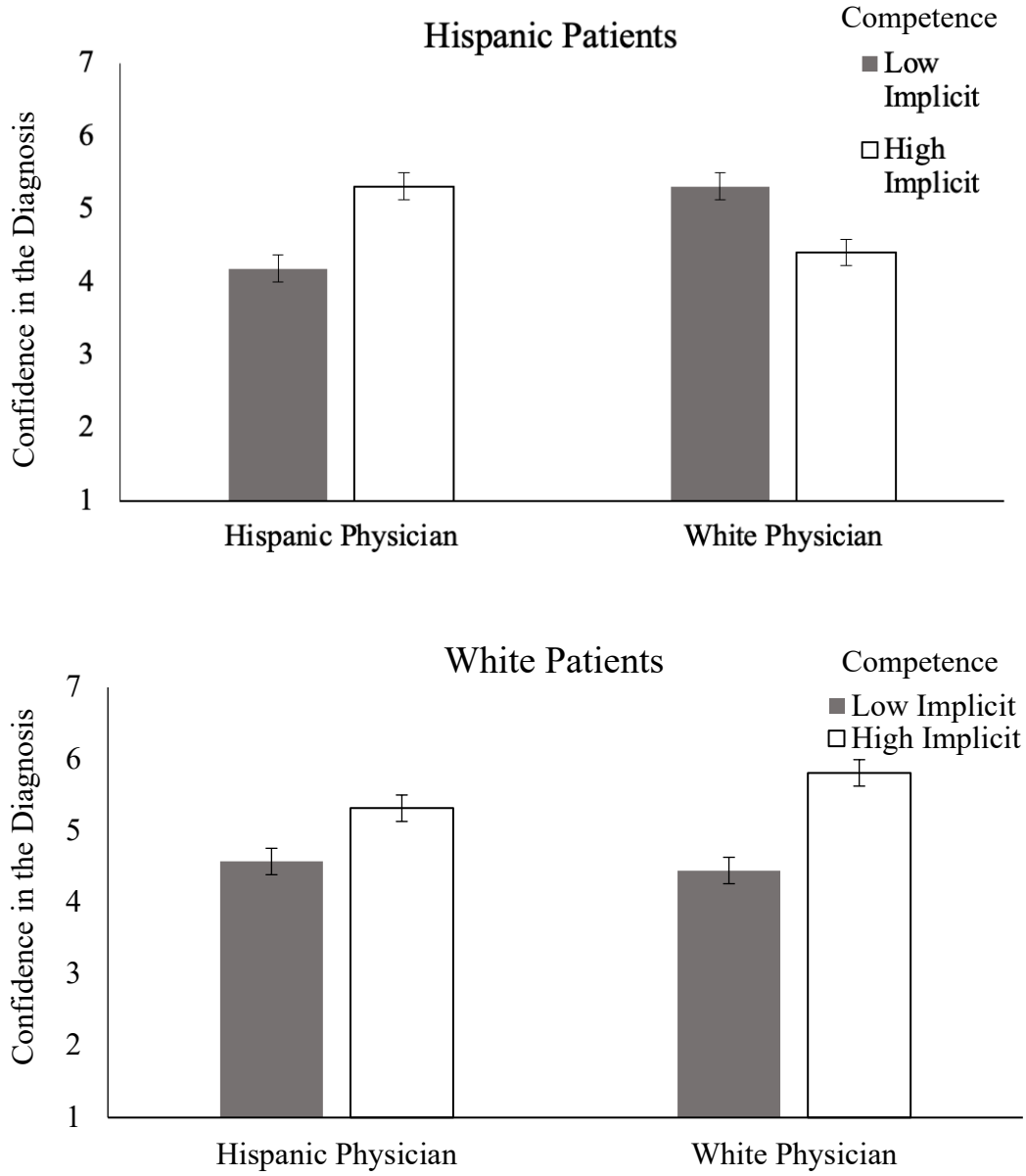

Figure 1.

Results of linear regression showing Hispanic patients (top panel) and White patients (bottom panel) assigned Hispanic and White physicians at high and low implicit competence of Hispanic physicians on confidence in the diagnosis.

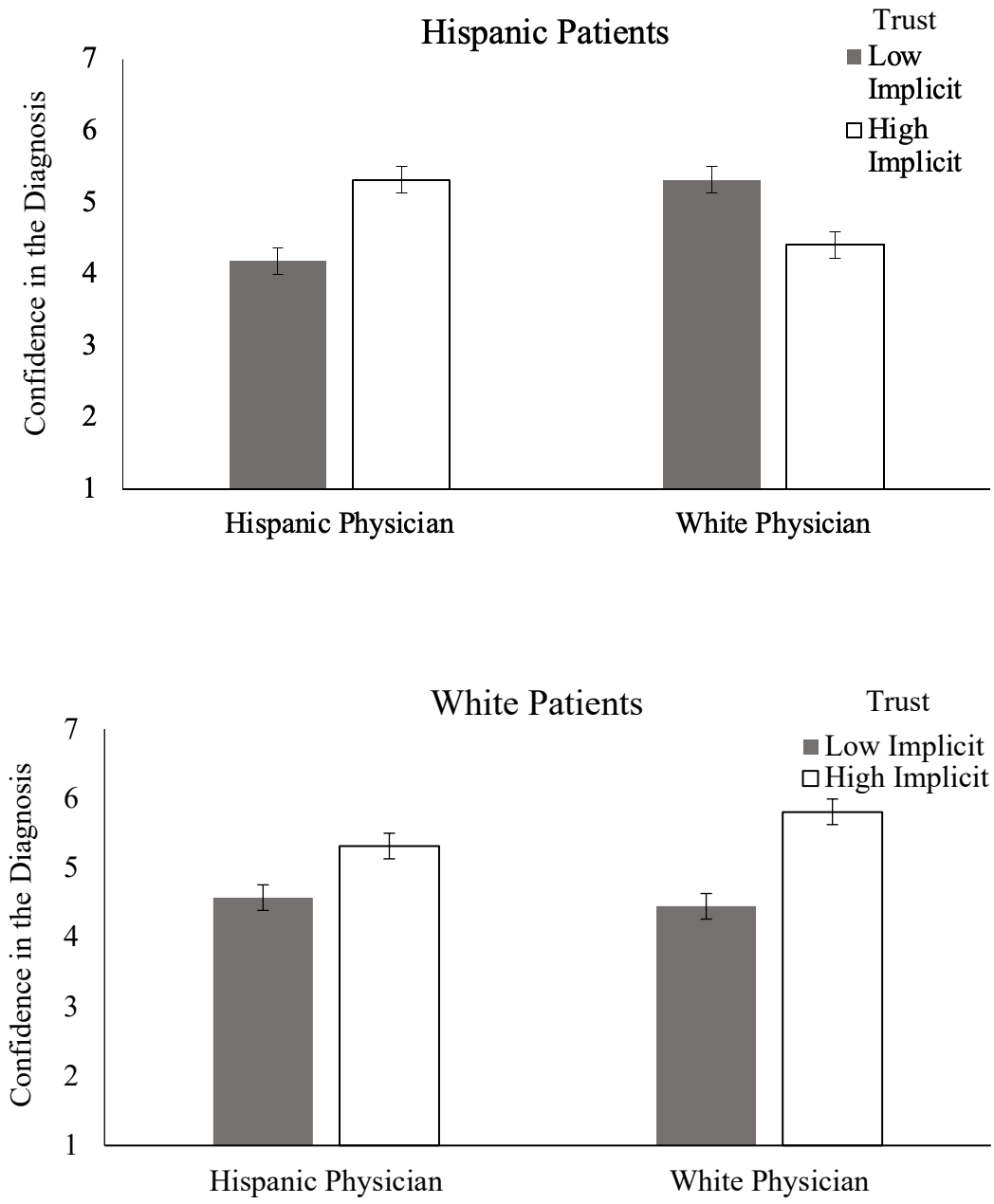

Figure 2.

Results of linear regression showing Hispanic patients (top panel) and White patients (bottom panel) assigned Hispanic and White physicians at high and low implicit trust of Hispanic physicians on confidence in the diagnosis.

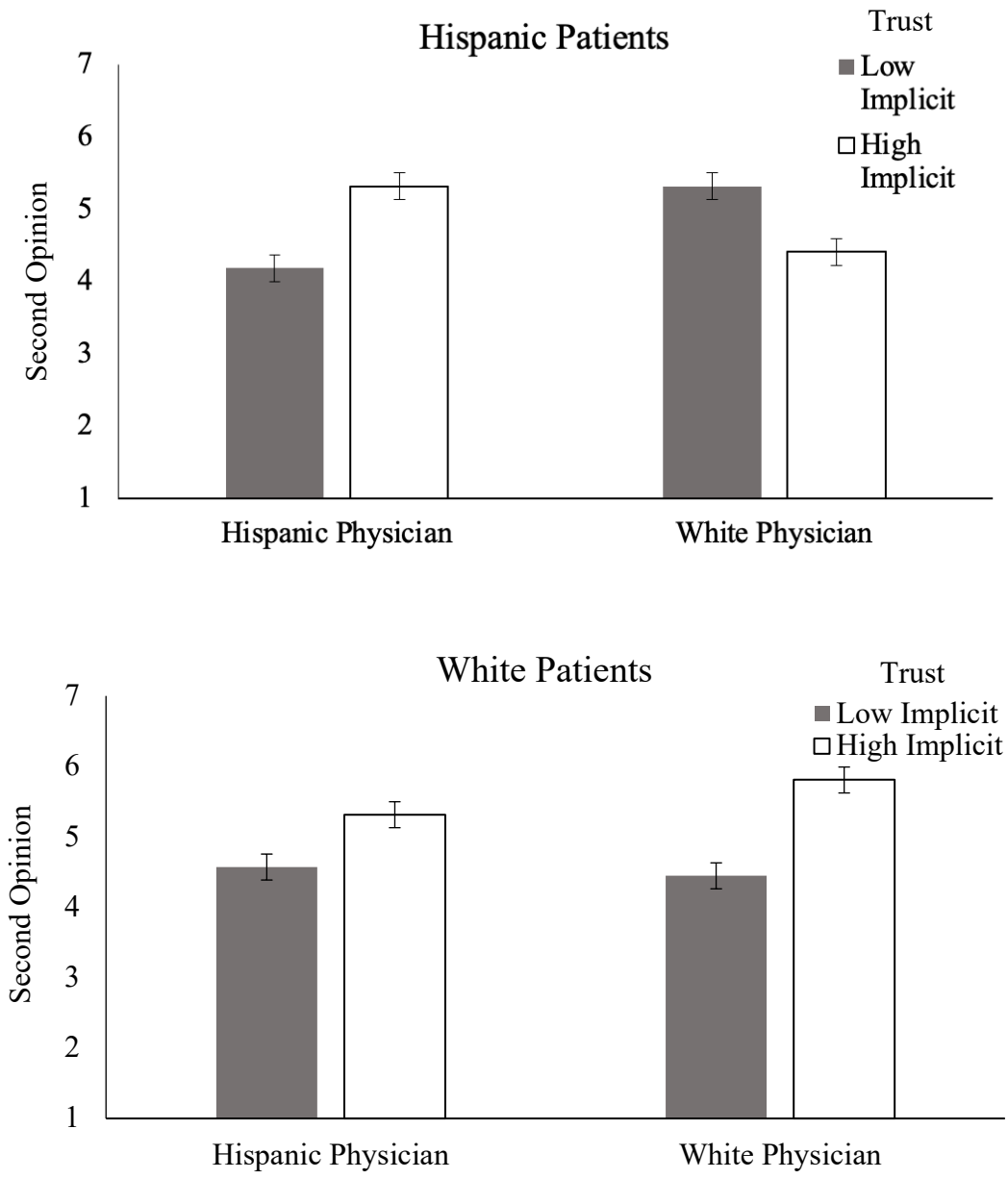

Figure 3.

Results of linear regression showing Hispanic patients (top panel) and White patients (bottom panel) assigned Hispanic and White physicians at high and low implicit trust of Hispanic physicians on requesting a second opinion.

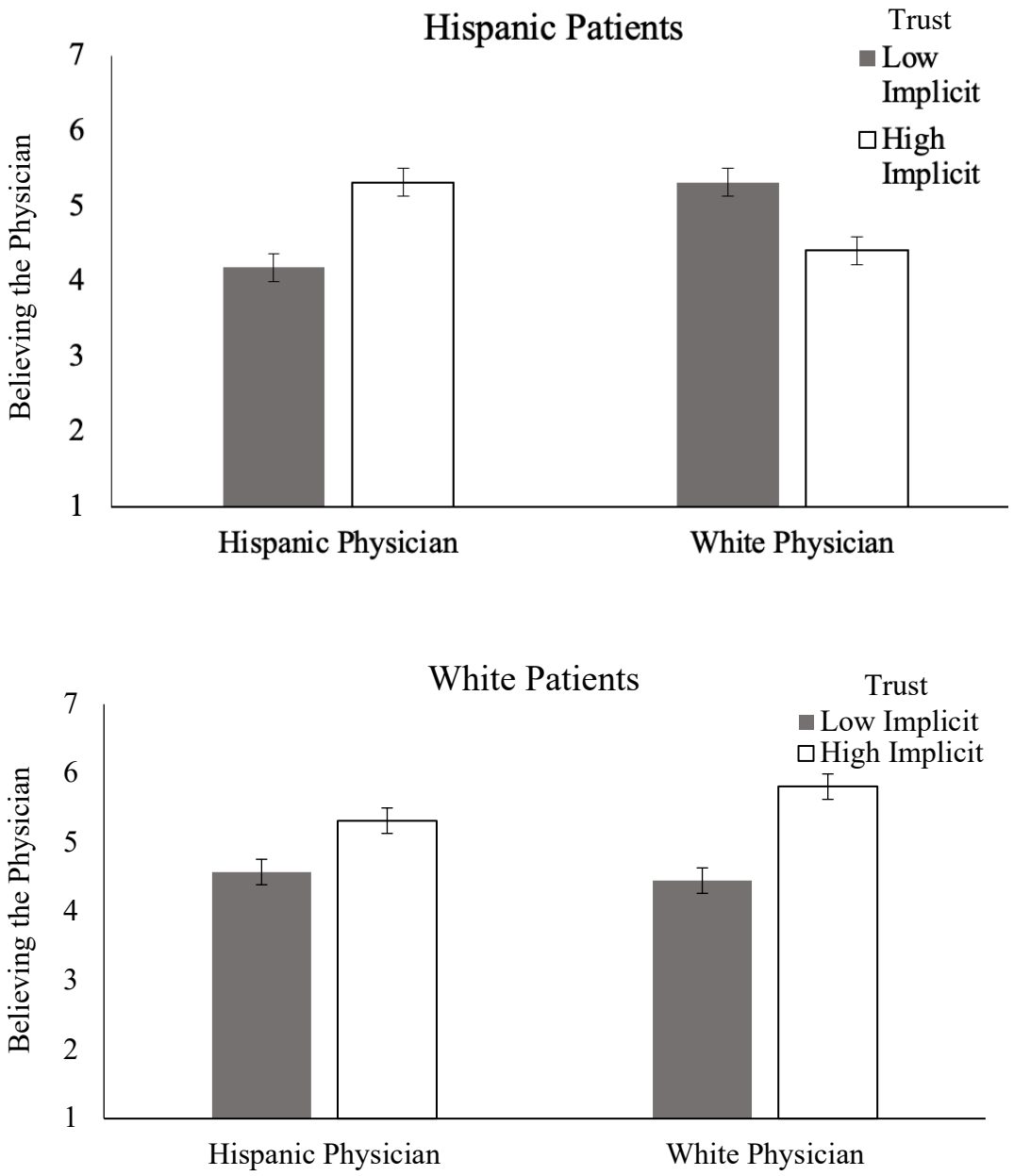

Figure 4.

Results of linear regression showing Hispanic patients (top panel) and White patients (bottom panel) assigned Hispanic and White physicians at high and low implicit trust of Hispanic physicians on believing the physician.

Table 2.
Results from linear regressions of more tests, second opinion, mention checker, believe checker, and confidence in the physician's diagnosis.

	More Tests	Second Opinion	Mention Checker	Believe Doctor	Confidence
Model 1: Competence			b [$CI_{95\%}$]		
Participant Eth.	.28 [-.15, .70]	.24 [-.23, .71]	-.31 [-.78, .16]	-.26 [-.67, .16]	-.23 [-.61, .15]
Physician	.31 [-.12, .73]	.32 [-.15, .79]	-.17 [-.63, .30]	.08 [-.33, .50]	-.13 [-.51, .26]
Implicit Comp.	.12 [.00, .23]	.02 [-.11, .15]	.13 [.01, .26]	.08 [-.03, .20]	**.12 [.02, .23]***
Implicit Comp. x Part. Eth.	.01 [-.22, .24]	.19 [-.06, .45]	.16 [-.10, .41]	.12 [-.10, .35]	-.06 [-.27, .15]
Implicit Comp. x Physician	-.14 [-.37, .09]	**-.26 [-.52, -.01]***	.06 [-.19, .32]	.04 [-.18, .27]	.06 [-.15, .27]
Physician x Part. Eth.	-.80 [-1.65, .05]	.13 [-.81, 1.06]	**-.94 [-1.88, -.001]***	.48 [-.35, 1.31]	.26 [-.51, 1.02]
3-way interaction	-.06 [-.52, .40]	-.33 [-.84, .18]	-.39 [-.90, .12]	**.48 [.02, .93]***	**.49 [.07, .91]***
			Effect of Implicit at …		
Hispanic Physician	—	-.11 [-.29, .07]	—	—	—
White Physician	—	.15 [-.03, .33]	—	—	—
Hispanic Participant	—	—	—	.14 [-.11, .30]	—
White Participant	—	—	—	.02 [-.14, .18]	**.15 [.01, .30]***
			Effect of Physician at …		
Hispanic Participant	—	—	-.64 [-1.29, .02]	.32 [-.30, .90]	—
White Participant	—	—	.31 [-.36, .97]	-.16 [-.75, .43]	-.25 [-.80, .30]
			Effect of Implicit x Physician at …		
Hispanic Participant	—	—	—	.28 [-.04, .60]	**.30 [.01, .60]***
White Participant	—	—	—	-.19 [-.51, .13]	-.19 [-.48, .11]
			Effect of Implicit at …		
Hispanic Participant Hispanic Physician	—	—	—	—	**.24 [.03, .45]***
Hispanic Participant White Physician	—	—	—	—	-.06 [-.27, .15]

Model 2: Trustworthiness					
Participant Ethnicity	.26 [-.17, .68]	.24 [-.23, .70]	-.36 [-.84, .12]	-.31 [-.71, .10]	-.23 [-.60, .14]
Physician	.37 [-.05, .80]	.39 [-.07, .86]	-.17 [-.64, .31]	.00 [-.40, .41]	-.15 [-.52, .22]
Implicit Trust.	.11 [-.00, .22]	.04 [-.08, .16]	.13 [-.00, .25]	**.13 [.03, .24]***	**.15 [.05, .25]***
Implicit Trust. x Part. Eth.	.08 [-.14, .31]	.17 [-.08, .41]	.04 [-.21, .29]	-.10 [-.32, .11]	**-.24 [-.44, -.05]***
Implicit Trust. x Physician	**-.26 [-.49, -.04]***	**-.32 [-.56, -.07]***	.08 [-.18, .33]	.11 [-.11, .32]	.18 [-.01, .38]
Physician x Part. Eth.	-.75 [-1.60, .10]	.23 [-.70, 1.16]	**-.99 [-1.94, -.03]***	.47 [-.34, 1.28]	.07 [-.67, .82]
3-way interaction	-.20 [-.65, .24]	**-.59 [-1.08, -.10]***	-.07 [-.57, .43]	**.61 [.19, 1.04]***	**.69 [.30, 1.08]***
			Effect of Implicit at …		
Hispanic Physician	-.02 [-.17, .13]	—	—	—	—
White Physician	**.24 [.08, .41]***	—	—	—	—
Hispanic Participant	—	—	—	—	—
White Participant	—	-.04 [-.21, .12]	—	**.19 [.04, .33]***	**.27 [.14, .40]***
			Effect of Physician at …		
Hispanic Participant	—	—	-.66 [-1.33, .01]	—	—
White Participant	—	.28 [-.39, .94]	.33 [-.35, 1.01]	-.23 [-.81, .35]	-.18 [-.71, .35]
			Effect of Implicit x Physician at …		
Hispanic Participant	—	**-.61 [-.98, -.25]***	—	**.41 [.09, .73]***	**.53 [.24, .82]***
White Participant	—	-.02 [-.35, .31]	—	-.20 [-.49, .08]	-.16 [-.42, .10]
			Effect of Implicit at …		
Hispanic Participant Hispanic Physician	—	-.18 [-.44, .07]	—	**.29 [.07, .51]***	**.29 [.09, .50]***
Hispanic Participant White Physician	—	**.43 [.17, .69]***	—	-.13 [-.35, .10]	**-.24 [-.45, -.03]***

Notes: **Bold *** indicates $p < .05$.

Study 2 Discussion

In sum, as in Study 1, participants rated White physicians more favorably than Hispanic physicians. When it came to participants' evaluations of the scenario, participants who reported higher implicit trustworthiness and competence ratings for Hispanic physicians were more likely to be confident in the physician's diagnosis. Additionally, participants who reported implicit trustworthiness ratings for Hispanic physicians were more likely to believe the physician's diagnosis.

Participants presented with a White physician were more likely to intend to request a second opinion and additional diagnostic tests to the extent they reported implicit trustworthiness ratings for Hispanic physicians. Additionally, White participants were more likely to be confident in the physician's diagnosis to the extent they reported implicit trustworthiness ratings for Hispanic physicians.

Next, Hispanic participants who were assigned a Hispanic physician were more likely to be confident in the diagnosis to the extent they reported implicit trustworthiness and competence ratings for Hispanic physicians. Additionally, Hispanic participants who were assigned a Hispanic physician were more likely to believe the diagnosis to the extent they reported implicit trustworthiness ratings for Hispanic physicians. Finally, Hispanic participants assigned a White physician were more likely to request a second opinion and less likely to be confident in the physician's diagnosis to the extent they reported implicit trustworthiness ratings for Hispanic physicians.

General Discussion

The present studies examined implicit patient bias toward Hispanic physicians. Overall, across both studies, participants implicitly rated White physicians more favorably (i.e., as more trustworthy and competent) than Hispanic physicians. This is consistent with prior research that shows dominant racial groups receive more positive evaluations, both explicitly and implicitly, than other racial groups (Forscher et al., 2015; Mattan et al., 2019). Additionally, this supports previous research that showed, in comparison to White people, Hispanic people received lower implicit evaluations and stereotype ratings, although these findings are implicit biases from healthcare providers directed towards patients (Bean et al., 2013; Blair et al., 2014; Blair, Havranek, et al., 2013; Blair, Steiner, et al., 2013; Chapman et al., 2018; Stone et al., 2020; Wolsiefer et al., 2021). Previous research also suggests participants hold implicit stereotypes of Hispanic people as less intelligent than White people (Weyant, 2005). While intelligence does not fully encompass competence, competence in the medical context includes both technical competence (i.e., intelligence of biological knowledge and medical procedures) and interpersonal competence (i.e. social interactions with patients), it may help to explain the lower implicit competence ratings of Hispanic physicians.

Study 1 examined implicit patient bias, intentions to adhere to physician-prescribed medication regimens, and physician selection. People found physicians as more competent than trustworthy, which is consistent with a variety of prior work suggesting that people tend to rate physicians as high in competence but middling to low in interpersonal warmth (which includes traits like trustworthiness) (Strinić et al., 2021). Participants were more likely to adhere to physician-prescribed medication regimens to the extent that they rated Hispanic physicians as implicitly competent and trustworthy. Consistent with hypotheses, participants were more likely to choose a Hispanic

physician, than a similarly rated White physician or lower rated Asian physicians, to the extent that they rated Hispanic physicians as competent. This suggests patients' implicit biases surrounding physician competence may influence whether they select physicians of specific ethnicities. There was not a significant influence of ratings of implicit trustworthiness of Hispanic physicians on physician selection (though there was a marginal trend in the same direction) suggesting perhaps implicit competence is more important in physician selection.

Study 2 was designed to expand Study 1. As in Study 1, participants rated White physicians more favorably than Hispanic physicians, but an interaction showed this effect was driven primarily by White patients.

Study 2 expanded Study 1 by examining how implicit ratings of trustworthiness and competence of Hispanic physicians related to participant perceptions of intentions for interactions with a hypothetical physician. Overall, it seemed that Hispanic participants were more sensitive to physician ethnicity than were White participants. Indeed, White participants' intentions and perceptions did not relate to physician ethnicity in any way. By contrast, to the extent that Hispanic participants found Hispanic physicians trustworthy and competent they were more likely to believe Hispanic physicians and be confident in the diagnosis received by Hispanic physicians. Additionally, to the extent that they found Hispanic physicians trustworthy, they were less likely to feel confident in diagnoses by White physicians and more likely to want a second opinion and to want to request more tests from a White physician. This latter finding suggests that trust in Hispanic physicians might, unexpectedly, undermine patient care of Hispanic patients by a White physician.

These findings that Hispanic patients' trust in Hispanic physicians relate to poorer outcomes when they are matched with White physicians may occur because Hispanic participants experience medical mistrust when interacting with a physician from the majority racial group in the United States. Indeed, previous research suggests those from marginalized racial or ethnic groups often report medical mistrust due to historical experiences of discrimination in the healthcare domain (Benkert et al., 2019). Medical mistrust has been negatively associated with utilization of healthcare services, cancer screenings, and organ donation (Williamson & Bigman, 2018). As a result, these findings might suggest that racially concordant pairings might be best for patients who have positive implicit perceptions of Hispanic physicians. Moving forward, researchers may examine the role of implicit bias in racially discordant patient-provider pairings and health outcomes.

Limitations and Future Directions

Although the present work represents an initial step to understanding patients' implicit bias toward Hispanic physicians, there were some limitations that suggest the need for future research.

First, the purpose of the present study was to examine patients' implicit biases towards physicians and how those biases relate to physician selection and patient intentions. Along with measures of implicit bias I did originally include matched explicit. Upon examining the correlations between the implicit and explicit measures, it was discovered the correlations were very high suggesting they were multicollinear and could not be examined together in linear models. As such, I chose to only report the results of

implicit patient bias in this paper, as it was the primary focus of the paper. See Appendix D for results of explicit patient bias. Looking further at the correlation of implicit and explicit bias, one reason may be that in the healthcare domain when making judgments about a physician, people may not care to hide judgments that may be perceived as biased. Indeed, the healthcare domain is a place where bias toward physicians, such as choosing a physician based on their gender or race, is deemed acceptable, especially for those from minority groups (Chen, 2005; Somnath et al., 2000). Therefore, people may not have a social pressure to appear as non-biased—leading to congruent implicit and explicit biases. Nevertheless, the measure used in the present study—the Speeded Self-Report—is a direct implicit measure (i.e., people are aware of what they are reporting, even if they cannot control it) and generally correlates more highly with explicit attitudes than other, indirect implicit measures (i.e., where people are not necessarily aware of what they are reporting and cannot control it, such as the Implicit Association Test; Ranganath et al., 2008). Future studies can thus employ indirect implicit measures to examine this question more thoroughly.

Next, we focused primarily on comparing Hispanic and non-Hispanic ethnic identities in these studies. Nevertheless, people with Hispanic ethnicities often comprise multiple racial groups (e.g., Black-Hispanic, White-Hispanic, Asian/White-Hispanic). Consistently, when completing the demographic question within the studies multiple participants selected biracial or multiracial Hispanic identities (Study 1: 11.8% biracial White-Hispanic, 24.6% multiracial; Study 2: 11.8% biracial White-Hispanic, 20.6% multiracial). Future research may investigate how biracial Hispanic and White or multiracial Hispanic people specifically respond to implicit Hispanic physician trust and competence and whether race and ethnicity interact to influence patient outcomes.

Another limitation of the present work is that the studies were conducted online with samples from participant recruitment platforms. Future research can examine patients' implicit biases in real-life scenarios and different healthcare contexts (e.g., with their primary care physicians, in hospitals). Additionally, the present work examines patient responses to hypothetical scenarios, but does not examine healthcare outcomes for patients or the influence of implicit patient bias on physician-patient interactions. Future research can investigate the extent to which implicit biases toward Hispanic physicians relate to long-term health outcomes and physician-patient interactions with Hispanic physicians.

Conclusion

This is the first study to measure patients' implicit bias toward Hispanic physicians. Overall, the present study suggests that people generally rated White physicians as more trustworthy and competent than Hispanic physicians. People were also more likely to intend to adhere to medication regimens when they rated Hispanic physicians as competent and trustworthy, and people were more likely to select a Hispanic physician as their new physician if they rated Hispanic physicians as competent. Physician ethnicity appears to be important for Hispanic patients, but not White patients. Racially concordant interactions might be preferable for Hispanic patients who rate Hispanic physicians as trustworthy implicitly. Nevertheless, more research is needed to understand patients' implicit bias toward Hispanic physicians and the influence of patient bias on the physician-patient relationship.

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Appendix A

Speeded Self-Report Stimuli

Hispanic Physicians

Dr. Sanchez

Dr. Ramirez

Dr. Hernandez

Dr. Gonzales

Dr. Martinez

Dr. Martinez

Dr. Sanchez

Dr. Ramirez

Dr. Hernandez

Dr. Gonzales

White Physicians (developed by Solnick et al., 2020)

Dr. Smith

Dr. Miller

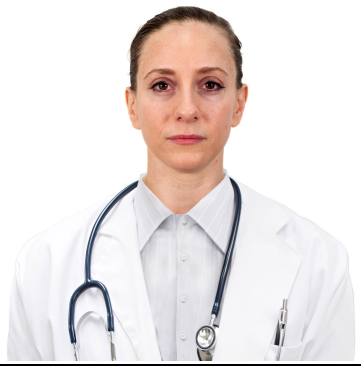
Dr. Hall

Dr. Anderson

Dr. Murphy

Dr. Smith

Dr. Miller



Dr. Hall

Dr. Anderson

Dr. Murphy

Filler Stimuli

Chef Zhang

Sergeant Truing

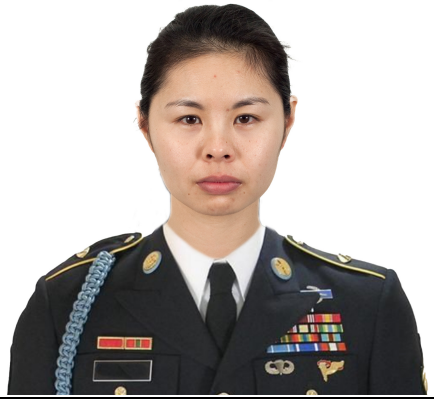
Police Yang

Mr. Huang

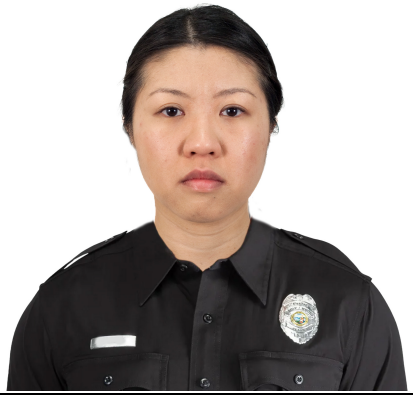
Pilot Xiong

Chef Xiong

Sergeant Huang



Officer Zhang



Ms. Truing

Pilot Yang

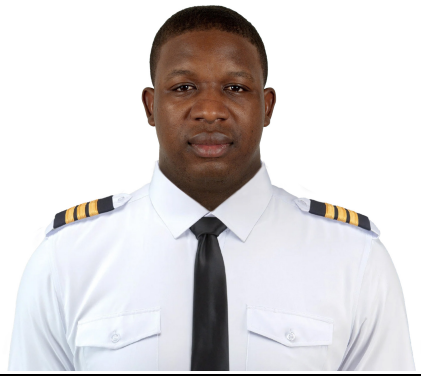
Chef Jefferson

Sergeant Banks

Officer Williams

Mr. Booker

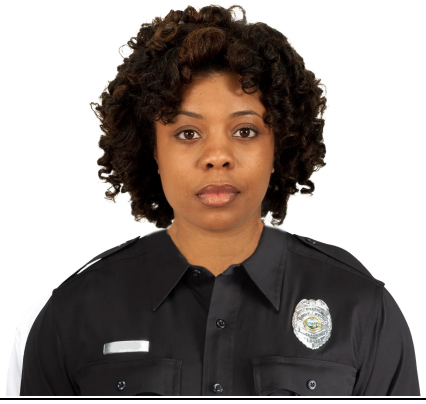
Pilot Washington



Chef Washington

Sergeant Booker

Police Banks



Ms. Williams

Pilot Jefferson

Appendix B

Instructions for Speeded Self-Report: Trustworthy

Instructions

You will now complete two tasks where you will judge a number of pictures very quickly.
For this task you will first see a **"+"** in the middle of the screen. Next, you will see a picture of a face. **Your task is to indicate how UNTRUSTWORTHY or TRUSTWORTHY you find the picture** using the 1, 3, 7, and 9 keys on your keyboard, as shown below:

1	3	7	9
Very Untrustworthy	Slightly Untrustworthy	Slightly Trustworthy	Very Trustworthy

You simply press the key that corresponds to how untrustworthy or trustworthy you find that image. As soon as you respond to an item, the **"+"** will appear again, followed by the next picture.
You will have **ONLY ONE SECOND** to respond to each item, so just go with your gut reaction - there are no right or wrong answers in this task!

If it takes you longer than 1 second to respond, a prompt will indicate that you need to go faster.

Remember, this task goes very fast, so stay alert. We recommend you use your left-hand fingers to press the "1" and "3" keys, while you use your right-hand fingers for the "7" and "9" keys (take a second to try it now). Please press the button below to begin.

Continue

Instructions for Speeded Self-Report: Competence

Instructions

You will now complete two tasks where you will judge a number of pictures very quickly.
For this task you will first see a **"+"** in the middle of the screen. Next, you will see a picture of a face. **Your task is to indicate how INCOMPETENT or COMPETENT you find the picture** using the 1, 3, 7, and 9 keys on your keyboard, as shown below:

1	3	7	9
Very Incompetent	Slightly Incompetent	Slightly Competent	Very Competent

You simply press the key that corresponds to how incompetent or competent you find that image. As soon as you respond to an item, the **"+"** will appear again, followed by the next picture.
You will have **ONLY ONE SECOND** to respond to each item, so just go with your gut reaction - there are no right or wrong answers in this task!

If it takes you longer than 1 second to respond, a prompt will indicate that you need to go faster.

Remember, this task goes very fast, so stay alert. We recommend you use your left-hand fingers to press the "1" and "3" keys, while you use your right-hand fingers for the "7" and "9" keys (take a second to try it now). Please press the button below to begin.

Continue

Appendix C

Physician Selection

Male Physician Selection

	Dr. Eric Xiong	Dr. José Hernandez	Dr. Michael Zang	Dr. Matthew Campbell
Effective & Safe Care Patients receive recommended care and practice has safeguards to protect patients from medical errors				
Treats illness using best practices	★★☆	★★★	★★★	★★★
Screens for diseases using best practices	★☆☆	★★★	★★★	★★★
Uses systems to prevent medication errors	★★★	★★★	★★☆	★★☆
Uses systems to track all lab results	★☆☆	★★☆	★★★	★★★
Patient Survey Results What patients say about the doctor				
How well doctor communicates	★★☆	★★★	★☆☆	★★★
Getting care when needed	★★★	★★★	★★★	★★★
Patients rating of doctor	★★★	★★★	★★★	★★★
Courteous and helpful office staff	★★☆	★★★	★★☆	★★★

Female Physician Selection

	Dr. Amy Xiong	Dr. Maria Hernandez	Dr. Naomi Zang	Dr. Jessica Campbell
Effective & Safe Care Patients receive recommended care and practice has safeguards to protect patients from medical errors				
Treats illness using best practices				
Screens for diseases using best practices				
Uses systems to prevent medication errors				
Uses systems to track all lab results				
Patient Survey Results What patients say about the doctor				
How well doctor communicates				
Getting care when needed				
Patients rating of doctor				
Courteous and helpful office staff				

Appendix D

Study 1
Results from linear regressions predicting adherence intentions.

Predictor	b (SE)	t	p
Model 1: Competence			
Participant Ethnicity	-.04 (.19)	-.19	.85
Explicit Competence	**.30 (.06)**	**5.20**	**<.001**
Physician Ethnicity	-.24 (.19)	-1.29	.20
Participant Eth. x Physician Eth.	-.08 (.38)	-.21	.83
Participant Eth. x Explicit Comp.	-.05 (.12)	-.40	.69
Physician Eth. x Explicit Comp.	.10 (.12)	.83	.41
3-way interaction	-.02 (.23)	-.11	.92
Model 2: Trustworthiness			
Participant Ethnicity	-.05 (.19)	-.29	.77
Explicit Trustworthiness	**.31 (.05)**	**5.94**	**<.001**
Physician Ethnicity	-.16 (.19)	-.85	.40
Participant Eth. x Physician Eth.	-.00 (.37)	-.01	.99
Participant Eth. x Explicit Trust.	.08 (.10)	.75	.45
Physician Eth. x Explicit Trust.	.03 (.10)	.33	.74
3-way interaction	.06 (.21)	.27	.79

Notes: **Bold *** indicates $p < .05$.

Study 1
Results from logistic regressions predicting selecting a Hispanic physician.

Predictor	OR [$CI_{95\%}$]	p
Model 1: Competence		
Participant Ethnicity	1.62 [.93, 2.81]	.09
Explicit Competence	**1.29 [1.09, 1.53]**	**.00**
Participant Eth. x Explicit Comp.	.86 [.61, 1.21]	.37
Model 2: Trustworthiness		
Participant Ethnicity	1.64 [.95, 2.84]	.08
Explicit Trustworthiness	**1.26 [1.07, 1.47]**	**.00**
Participant Eth. x Explicit Trust	.97 [.71, 1.32]	.84

Notes: **Bold *** indicates $p < .05$.

Study 2
Results from linear regressions of more tests, second opinion, mention checker, believe checker, and confidence in the physician's diagnosis.

	More Tests	Second Opinion	Mention Checker	Believe Doctor	Confidence
Model 1: Competence			b [$CI_{95\%}$]		
Participant Ethnicity	.28 [-.15, .72]	.28 [-.19, .75]	-.24 [-.71, .23]	-.23 [-.68, .15]	-.26 [-.65, .13]
Physician	.37 [-.06, .80]	.39 [-.09, .86]	-.14 [-.61, .33]	.01 [-.41, .43]	-.17 [-.56, .22]
Explicit Comp.	.11 [-.01, .23]	-.03 [-.17, .10]	.13 [-.01, .26]	.06 [-.06, .18]	.11 [-.00, .22]
Explicit Comp. x Part. Eth.	.07 [-.17, .32]	.20 [-.07, .47]	.14 [-.13, .40]	-.07 [-.30, .17]	-.15 [-.37, .07]
Explicit Comp. x Physician	-.12 [-.37, .12]	-.21 [-.48, .06]	**.31 [.04, .58]**	.06 [-.18, .29]	.06 [-.16, .28]
Physician x Part. Eth.	-.82 [-1.68, .04]	.08 [-.87, 1.03]	**-1.09 [-2.03, -.15]**	.49 [-.34, 1.32]	.28 [-.49, 1.05]
3-way interaction	-.09 [-.58, .41]	-.44 [-.98, .10]	.30 [-.23, .84]	**.55 [.07, 1.02]**	.34 [-.10, .78]
			Effect of Explicit at …		
Hispanic Physician	—	—	**.28 [.11, .46]**	—	—
White Physician	—	—	-.03 [-.23, .17]	—	—
			Effect of Physician at …		
Hispanic Participant	—	—	**-.69 [-1.35, -.03]**	—	—
White Participant	—	—	.40 [-.26, 1.07]	—	—
			Effect of Explicit x Physician at …		
Hispanic Participant	—	—	—	.33 [-.03, .69]	—
White Participant	—	—	—	-.22 [-.53, .09]	—
			Effect of Explicit at …		
Hispanic Participant Hispanic Physician	—	—	—	.19 [-.04, .42]	—
Hispanic Participant White Physician	—	—	—	-.14 [-.42, .14]	—

Model 2: Trustworthiness					
Participant Ethnicity	.21 [-.22, .64]	.13 [-.34, .60]	-.34 [-.81, .14]	-.22 [-.63, .19]	-.19 [-.57, .19]
Physician	.40 [-.03, .83]	.41 [-.06, .88]	-.13 [-.61, .35]	.08 [-.33, .49]	-.11 [-.49, .27]
Explicit Trust.	**.12 [.01, .24]**	.05 [-.07, .18]	.12 [-.01, .25]	**.17 [.06, .28]**	**.15 [.05, .25]**
Explicit Trust. x Part. Eth.	.09 [-.14, .33]	.20 [-.06, .46]	.20 [-.06, .46]	-.11 [-.33, .11]	-.19 [-.39, .02]
Explicit Trust. x Physician	**-.26 [-.49, -.03]**	**-.28 [-.53, -.02]**	.14 [-.12, .40]	.14 [-.09, .36]	.11 [-.10, .31]
Physician x Part. Eth.	-.67 [-1.53, .18]	.34 [-.60, 1.28]	-.92 [-.12, .40]	.37 [-.44, 1.18]	.11 [-.65, .86]
3-way interaction	-.19 [-.65, .28]	**-.83 [-1.34, -.31]**	.04 [-.49, .55]	**.66 [.22, 1.10]**	**.56 [.16, .99]**
			Effect of Explicit at …		
Hispanic Physician	-.01 [-.15, .14]	—	—	—	—
White Physician	**.25 [.07, .43]**	—	—	—	—
			Effect of Physician at …		
Hispanic Participant	—	—	—	—	—
White Participant	—	—	—	—	—
			Effect of Explicit x Physician at …		
Hispanic Participant	—	**-.69 [-1.08, -.29]**	—	**.46 [.12, .81]**	**.39 [.07, .71]**
White Participant	—	.14 [-.19, .46]	—	-.20 [-.48, .09]	-.18 [-.45, .08]
			Effect of Explicit at …		
Hispanic Participant Hispanic Physician	—	-.19 [-.43, .05]	—	**.35 [.14, .56]**	**.25 [.06, .45]**
Hispanic Participant White Physician	—	**.50 [.19, .81]**	—	-.12 [-.39, .15]	-.14[-.39, .11]

Notes: **Bold *** indicates $p < .05$.