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Physician Racial Bias and Word Use during Racially Discordant Medical Interactions

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ABSTRACT
Physician racial bias can negatively affect Black patients' reactions to racially discordant medical interactions, suggesting that racial bias is manifested in physicians' communication with their Black patients. However, little is known about how physician racial bias actually influences their communication during these interactions. This study investigated how non-Black physicians' racial bias is related to their word use during medical interactions with Black patients. One hundred and seventeen video-recorded racially discordant medical interactions from a larger study were transcribed and analyzed using Linguistic Inquiry and Word Count (LIWC) software. Physicians with higher levels of implicit racial bias used first-person plural pronouns and anxiety-related words more frequently than physicians with lower levels of implicit bias. There was also a trend for physicians with higher levels of explicit racial bias to use first-person singular pronouns more frequently than physicians with lower levels of explicit bias. These findings suggest that non-Black physicians with higher levels of implicit racial bias may tend to use more words that reflect social dominance (i.e., first-person plural pronouns) and anxiety when interacting with Black patients.

Physician communication plays a critical role in the outcomes of medical interactions (Epstein & Street, 2007). However, communication during racially discordant medical interactions (e.g., patient is Black and physician is non-Black) is generally less positive than during racially concordant ones (e.g., patient and physician are both White). For example, in racially discordant medical interactions, researchers have found less relationship building (Siminoff, Graham, & Gordon, 2006), less positive patient and physician affect (Johnson, Roter, Powe, & Cooper, 2004), fewer patient questions (Eggly et al., 2011), and less physician information giving (Gordon, Street, Sharf, & Souchek, 2006). This is particularly problematic for Black patients because approximately 80% of them see non-Black physicians when they seek medical help (Chen, Fryer, Phillips, Wilson, & Pathman, 2005) due in large part to the limited number of Black physicians (approximately 5%) currently available in the U.S. (Hamel et al., 2015).

An increasing number of studies provide evidence that these communication difficulties during racially discordant medical interactions are at least in part due to physician racial bias (Penner et al., 2013; Shavers et al., 2012; Smedley, Stith, & Nelson, 2003). Specifically, it has been shown that non-Black physicians' racial bias is associated with Black patients' negative *perceptions* of their physicians and of medical interactions in general (Blair et al., 2013; Cooper et al., 2012; Penner et al., 2010), suggesting that physician bias is manifested in communication with patients. However, there is relatively little research that investigates how non-Black physicians' racial bias influences communication during racially discordant

medical interactions. This study addresses this gap in the literature by investigating how physician racial bias influences non-Black physicians' word use in racially discordant medical interactions with Black patients. We focus on word use because prior research provides strong evidence that word use can reflect a variety of psychological processes, ranging from social relationships (e.g., social status) to emotions (Chung & Pennebaker, 2007; Tausczik & Pennebaker, 2010).

Non-Black Physician Racial Bias and Communication

Although most people do not blatantly express negative feelings toward racial/ethnic minorities, they often harbor racial bias at the automatic, and sometimes non-conscious, level. The former kind of bias is referred to as *explicit* racial bias, which reflects more deliberate attitudes that are relatively easy to monitor and self-regulate; the latter is referred to as *implicit* racial bias, which reflects more spontaneous attitudes that are relatively hard to monitor and self-regulate (Wilson, Lindsey, & Schooler, 2000). National surveys have shown that physicians have a level of implicit racial bias toward Black Americans ($M = 0.39$, SD $= 0.47$, Cohen's $d = 0.89$) that is at least as high as the level of bias found in the general U.S. population ($M = 0.35$, SD $= 0.42$, $d = 0.81$; Sabin, Nosek, Greenwald, & Rivara, 2009). This is despite the fact that expressions of racial bias are strongly condemned among healthcare providers and their professional organizations (Penner, Blair, Albrecht, & Dovidio, 2014).

Social psychology research on implicit bias provides strong evidence that individuals' implicit racial bias influences their nonverbal (e.g., body posture, eye contact, nodding) and paraverbal behaviors (e.g., the amount, speed, and pitch of the speech) during interracial interactions (Dovidio & Gaertner, 2010). Consistent with these findings, studies in the health disparities literature have shown that non-Black physicians' implicit bias is associated with physicians' greater number of utterances, faster speech, and longer talk time (Cooper et al., 2012; Hagiwara et al., 2013). The present study extends this prior work by investigating whether racial bias, particularly implicit bias, is also reflected in another aspect of non-Black physicians' paraverbal behaviors—word use—during racially discordant medical interactions with Black patients. An integration of prior theories and findings from social psychology research on intergroup relations as well as linguistic patterns led us to expect there should be an association between the levels of racial bias and use of first-person pronouns and emotion-related words.

Racial Bias, Social Dominance, and Use of First-Person Pronouns

Research on social dominance orientation provides strong evidence that racial bias is closely related to a sense of social dominance over people who are the target of this bias (Sidanius & Pratto, 1999). For example, it has been shown that White Americans who scored higher on measures of anti-Black racism measures (Pratto, Sidanius, Stallworth, & Malle, 1994) and of ingroup favoritism (Levin, Federico, Sidanius, & Rabinowitz, 2002) were also likely to score higher on a measure of social dominance orientation, the degree to which individuals favor group-based domination and inequality. Turning to social psychology research of linguistic patterns, extensive research has shown that social dominance and/or status is strongly associated with use of first-person pronouns. Specifically, higher status speakers tend to use *more* first-person plural pronouns (e.g., we, us, our) and *less* first-person singular pronouns (e.g., I, me, my; Dino, Reysen, & Branscombe, 2009; Hancock et al., 2010; Scholand, Tausczik, & Pennebaker, 2010). For example, a study of triads during flight simulations showed that as rank went up (i.e., second lieutenant, first lieutenant, and captain), the use of first-person plural pronouns also increased (Sexton & Helmreich, 2000). In a study of e-mail exchanges among undergraduate students, graduate students, and faculty, the higher the status of the sender, the less frequent was the use of first-person singular pronouns (Chung & Pennebaker, 2007). Further, a causal association between hierarchical status and first-person plural pronouns has been demonstrated in studies where status was systematically manipulated (Kacewicz, Pennebaker, Davis, Jeon, & Graesser, 2014). Taken together, the reliable association between racial bias and social dominance and between social dominance/status and the use of first person pronouns led us to expect that non-Black physicians' racial bias would be reflected in more frequent use of first-person plural pronouns and less frequent use of first-person singular pronouns in racially discordant medical interactions.

Racial Bias, Affect, and Use of Emotion-Related Words

Health disparities research has consistently shown that racially discordant medical interactions are less positive in affective tone than racially concordant medical interactions (Cene, Roter, Carson, Miller, & Cooper, 2009; Johnson et al., 2004). Social psychology research on interracial interactions suggests that the particularly relevant emotion during racially discordant medical interactions may be anxiety. According to the intergroup anxiety model (Stephan & Stephan, 1985), people often experience anxiety when interacting with individuals from different social groups because they are concerned that their interactions with individuals from other groups can go wrong, leading to negative evaluations by the others. Research has shown that this is particularly true for people with greater implicit racial bias–they tend to experience more anxiety when they engage in interracial interactions than individuals with lower levels of implicit racial bias (Mendes, Gray, Mendoza-Denton, Major, & Epel, 2007; Page-Gould, Mendoza-Denton, & Tropp, 2008).

Research on linguistic patterns has also shown that people's feelings and thoughts are reliably reflected in frequency of emotion-related words used in interactions (Tausczik & Pennebaker, 2010). For example, the degree of positive emotions experienced by college students during a field practicum was positively associated with the frequency of positive emotion-related words in their written journals (Abe, 2009). In another study, researchers found that the emotion-related words that dating couples used in their instant messages were positively associated with their self-reported relationship satisfaction as well as relationship stability (Slatcher, Vazire, & Pennebaker, 2008). Finally, in a series of experimental studies, participants were induced to either: (1) think about an amusing time or a sad time in their life and then write essays about emotional autobiographical memories (Study 1), or (2) experience either sadness or amusement by watching a film and then deliver an oral presentation describing their current emotion (Studies 2 and 3; Kahn, Tobin, Massey, & Anderson, 2007). In all three studies, feelings of sadness were associated with sadness/depression-related words (e.g., grief; cry, sad), whereas feelings of amusement were associated with positive emotion-related words (e.g., happy, pretty, good). These findings provide strong support for the construct validity of use of emotion-related words as indicators of people's emotions in a given situation. In sum, given the well-documented associations between racial bias and experience of anxiety and between affect and emotion-related word use, there is a likely link between non-Black physicians' racial bias and their use of anxiety-related words during medical interactions with Black patients.

The Present Study

The present study adds to a growing literature on physician bias and its impact on patient-physician communication by investigating how non-Black physicians' racial bias influences their word use when they interact with Black patients. Our first prediction is based on research suggesting that non-Black physicians with higher levels of implicit racial bias are more likely than other physicians to display social dominance

during medical interactions with Black patients (Cooper et al., 2012; Hagiwara et al., 2013) and on research showing that social dominance is associated with greater use of first-person plural pronouns and fewer first-person singular pronouns (Dino et al., 2009; Hancock et al., 2010; Scholand et al., 2010). We predicted that physicians with higher levels of implicit racial bias would use first-person *plural* pronouns (e.g., we, our, us) more frequently and first-person *singular* pronouns (e.g., I, my, me) less frequently than physicians with lower levels of implicit racial bias.

Our second prediction was based on previous research showing that individuals with higher levels of implicit racial bias are more likely than those with lower levels of implicit racial bias to experience intergroup anxiety during interracial interactions (Mendes et al., 2007; Page-Gould et al., 2008) and on research showing that affect is reflected in word use associated with specific types of emotion (Abe, 2011; Kahn et al., 2007; Slatcher et al., 2008). We predicted that physicians with greater implicit racial bias would use more words related to anxiety (e.g., worry, nervous, tense) than physicians with lower implicit bias during racially discordant medical interactions.

Note that the study focuses on implicit racial bias because we believe that the frequency of word use is largely an automatic process and less subjected to conscious monitoring. However, we also included explicit racial bias as another predictor in our analyses in order to control for any unique effects of explicit bias on word use. Likewise, although our focus with emotion was on anxiety, we included other types of negative emotion (i.e., anger and sadness) as well as positive emotion (e.g., great, wonderful, happy) in order to demonstrate the particularly important role anxiety plays in racially discordant medical interactions.

Analysis of the frequency of the use of specific types of words has several strengths and has the potential to complement qualitative analyses of text, which provides important, in-depth information about meaning in context that word count analysis cannot address but has its own limitations (Patton, 2015). First, qualitative analysis of text is generally based on researchers' interpretations of the text, which can be subjected to potential bias. In contrast, word use analysis relies on a count provided by computer software. Thus, it provides an objective, nonintrusive means to study variability in the words people use (Tausczik & Pennebaker, 2010). Second, qualitative analyses of text are labor-intensive; thus, they are usually used to analyze relatively small data sets. On the other hand, word use analysis can analyze a large amount of text in a short amount of time using computer software. This allows researchers to conduct inferential statistics to better understand relations between everyday word use and self-reported emotions, attitudes, and perceptions. Finally, people often show substantial variability in their word use when conveying the same message, reflecting their emotions, attitudes, and perceptions *without their conscious awareness*, and extensive research has shown that such variability can be reliably captured by word use analysis (Chung & Pennebaker, 2007; Tausczik & Pennebaker, 2010). Taken together, the two approaches complement one another, each providing unique information not captured by the other.

Methods

Participants

The present study was a secondary analysis of a study conducted in a primary care clinic in a large Midwestern city. The parent study protocol was approved by the Karmanos Cancer Institute Protocol Review and Monitoring Committee and Wayne State University Institutional Review Board. Participants in the parent study were 18 primary care physicians (15 Asian, 2 White, 1 Black, 55.6% women, M age = 31.00, SD = 3.49) and 153 self-identified Black participants (77.1% women, M age = 43.17, SD = 13.13). It should be noted that the racial/ethnic distribution of these physicians is fairly typical of the staff in primary clinics in low-income, residentially segregated communities in the United States (Hing & Lin, 2009; Mertz, Jain, Breckler, Chen, & Grumbach, 2007).

In the present study, four of those 18 physicians (and their 12 patients) were excluded because they either: did not complete the measures of racial bias (n = 2), did not participate in any video-recorded interactions (n = 1), or were Black (n = 1). Additionally, 24 medical interactions were not video-recorded due to technical problems. Therefore, 14 non-Black physicians (12 Asians, 2 Whites, 50.0% women, M age = 30.09, SD = 2.74) and 117 Black patients (76.9% women, M age = 42.95, SD = 13.66) were included in this secondary analysis.

Procedure

In the parent study, physicians and patients completed baseline assessments and then participated in video-recorded medical interactions. Additionally, both physicians and patients completed post-interaction questionnaires, and patients completed two follow-up questionnaires. More information about these measures can be found elsewhere (e.g., Penner et al., 2010). In the present study, the only measures of interest are the baseline assessments of explicit and implicit racial bias.

We used transcripts of the video-recorded medical interactions to obtain data on word use. Video recording began shortly before a physician entered the room and ended shortly after he/she left the room, thus capturing the entire conversation. Professional transcriptionists transcribed the video recordings verbatim using transcript guidelines specifically developed for text analysis using Linguistic Inquiry and Word Count (LIWC) computer software (Pennebaker, Booth, & Francis, 2007). In order to ensure proper word categorization, the transcription instructions for LIWC analysis specified how to deal with things like filler words (e.g., "you know"), nonfluencies (e.g., "hm"), and stuttering. (Actual instructions can be requested from the corresponding author.) Once transcribed in this manner, any conversations that were not between the patient and the physician (e.g., between patients and nurses) were deleted from all transcripts, and the transcripts were divided by speaker (i.e., physician vs. patient). Thus, the final transcripts that were entered into the LIWC program for analysis included only physicians' language spoken to a patient in a given interaction.

The LIWC program identifies and counts words in more than 70 categories (e.g., pronouns, social words, affect) in a

given transcript. Then, it computes the percentage of use of words in those 70+ categories (the number of times words in a particular category was used divided by the number of words in the entire transcript). It has been widely used since the mid-1990's in a wide range of social psychology studies examining topics ranging from personality traits to physical and mental health (see Chung & Pennebaker, 2007; Tausczik & Pennebaker, 2010).

Measures

Physician Implicit Racial Bias

Implicit racial bias toward Blacks was assessed using the computer-based Race Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). In this computer task, participants are asked to classify items that appear on the computer screen into four categories: two representing social groups (e.g., White vs. Black) and two representing valence (positive vs. negative), which are presented in pairs. The premise is that participants are able to respond faster when social groups and valence are paired together in a way consistent with participant's values (e.g., White/Good or Black/Bad) than when they are paired together in a way inconsistent with their values (e.g., White/Bad or Black/Good). The speed of participant responses to the four combinations of social groups and valence were scored to compute a difference score, represented as D score (Greenwald, Nosek, & Banaji, 2003). Higher D scores indicate more implicit pro-White/anti-Black bias attitudes. Although the internal consistency for the IAT in this study was relatively low compared to previously reported estimates (0.70–0.90; Nosek, Greenwald, & Banaji, 2007), it was still significant (split-half r between even- and odd-numbered D scores = 0.47, p = 0.05).

Physician Explicit Racial Bias

Explicit racial bias toward Black Americans was assessed at baseline with items taken from Brigham's (1993) 20-item Attitudes toward Blacks Scale and McConahay's (1986) 7-item Modern Racism Scale (α = 0.89). Sample items include "I would rather not have Blacks live in the same apartment building I live in," "Some Black people are so touchy about race that it is difficult to get along with them," and "Discrimination against Blacks is no longer a problem in the United States." Participants were asked to indicate the extent to which they agree with each of the 25 statements by using a scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). Higher numbers indicate more explicit racial bias.

Physician Word Use

LIWC was utilized to compute the percentage of words in two broad categories of word types used by the physician in each interaction: first-person pronouns (i.e., the number of first-person pronouns divided by all words in an interaction) and emotion-related words (i.e., the number of emotion-related words divided by all words in an interaction). For first-person pronouns, we further assessed the frequency of both singular

and plural pronouns. For emotion-related words, we assessed both negative emotions and positive emotions (e.g., great, wonderful, happy). Negative emotions are further divided into three subcategories: anxiety (e.g., worried, afraid, nervous), anger (e.g., mad, annoyed, frustrated), and sadness (e.g., sad, unhappy, cry). For the complete list of words included in each of the subcategories, see the LIWC 2007 dictionary (Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007).

Analysis Overview

We conducted initial analyses to determine the distributions of each of the major variables (i.e., means and standard deviations), as well as correlations among them (see Table 1). To test the major hypotheses, we conducted a series of General Estimating Equations (GEE) multiple regressions. GEE regressions were used to correct for bias based on non-independence in data (i.e., many physicians were involved in multiple interactions). GEE is a form of multilevel modeling; it treats group-level variation (in this case, physicians) as a random parameter and provides asymptotically normal estimates even when observations within groups are strongly correlated with one another (Hardin & Hilbe, 2003). Initially, in all GEE regressions, grand-mean-centered implicit racial bias, grand-mean-centered explicit racial bias, and an interaction between the two were entered as predictors. However, the analyses revealed no significant interactions between implicit and explicit racial biases; thus, they were removed from the final model.

Results

Table 1 presents means, standard deviations, and correlations for all major variables. Examination of coefficients suggests that implicit and explicit racial biases are associated with one another.

First-Person Plural Pronouns

The GEE regression revealed a significant positive association between non-Black physicians' implicit racial bias and use of first-person plural pronouns, b = 0.55, SE = 0.25, $Wald\ \chi^2$ (1) = 4.93, p = 0.03. In contrast, an association between explicit racial bias and use of first-person plural pronouns was not significant, b = −0.42, SE = 0.27, $Wald\ \chi^2(1)$ = 2.32, p = 0.13. The finding suggests that, consistent with our prediction, non-Black physicians with higher levels of implicit, but not explicit, racial bias were likely to use first-person plural pronouns more frequently than physicians with lower levels of implicit racial bias.

First-Person Singular Pronouns

There was no association between implicit racial bias and use of first-person singular pronouns, b = −0.21, SE = 0.19, $Wald\ \chi^2(1)$ = 1.21, p = 0.27. However, there was a marginally significant association between explicit racial bias and use of first-person singular pronouns, b = 0.85, SE = 0.45, $Wald\ \chi^2$

Table 1. Means, standard deviations, and correlations among all variables.

	1	2	3	4	5	6	7	8
1. Implicit racial bias	–							
2. Explicit racial bias	0.49**	–						
3. First-person singular pronouns	0.02	0.24**	–					
4. First-person plural pronouns	0.24**	0.01	0.02	–				
5. Anxiety-related words	0.21*	0.08	0.13	0.34**	–			
6. Anger-related words	0.09	0.13	−0.03	−0.03	0.22*	–		
7. Sadness-related words	−0.08	−0.14	0.12	−0.12	−0.07	0.01	–	
8. Positive emotion words	0.02	0.06	−0.14	−0.08	−0.05	−0.20*	−0.18*	–
M	−0.12	2.09	2.36	1.04	0.34	0.12	0.28	5.48
SD	0.35	0.32	0.87	0.65	0.34	0.13	0.22	1.57

Note. All correlations were computed with *N* = 117.

(1) = 3.61, *p* = 0.06. That is, there was a tendency for physicians with higher levels of explicit racial bias to use first-person singular pronouns more frequently than physicians with lower levels of explicit racial bias.

Emotion-Related Words

The GEE regression also revealed that, as expected, there was a significant positive association between implicit racial bias and anxiety-related words, *b* = 0.33, *SE* = 0.01, *Wald χ²* (1) = 571.21, *p* < 0.0001. No association was found between explicit racial bias and anxiety-related words, *b* = −0.04, *SE* = 0.04, *Wald χ²*(1) = .77, *p* = 0.38, supporting our prediction that implicit racial bias has a unique impact on anxiety-related word use, independent of explicit bias. The associations between racial bias (both implicit and explicit) and other types of emotion-related words (i.e., positive emotion, anger, and sadness) were not significant, supporting our prediction that the most relevant emotion for non-Black physicians when interacting with Black patients is anxiety.

Discussion

As far as we are aware, this is the first study to demonstrate that non-Black physicians' racial bias is manifested in physicians' word use, particularly the use of first-person plural pronouns and anxiety-related words, when they interact with Black patients. The finding that implicit bias was associated with the use of first-person plural pronouns ties together prior findings that: (1) physicians with higher levels of implicit racial bias are more likely than physicians with lower levels of implicit racial bias to display social dominance during racially discordant medical interactions (Cooper et al., 2012; Hagiwara et al., 2013), and (2) higher social status is associated with greater use of first-person plural pronouns (Chung & Pennebaker, 2007; Fiedler, Friese, & Wänke, 2011). The present findings suggest that physicians' implicit racial bias is associated with a sense of higher status, which is consistent with social dominance theory positing that individuals with higher levels of racial bias are motivated to maintain group-based dominance and differential status between them and members of other groups (Sidanius & Pratto, 1999). Racially discordant medical interactions are likely to make status differences between physicians and patients salient at multiple levels (i.e., healthcare providers vs. receivers; White/Asian vs. Black). Thus, physicians with higher levels of implicit racial bias may desire to maintain the existing power differentials inherent in many physician-patient relationships in order to promote their distinctiveness and enhance their status.

However, it is possible that greater use of first-person plural pronouns among physicians with higher levels of implicit racial bias could reflect other psychological processes. For example, the association may reflect physicians' endorsement of certain stereotypes about Black patients. Research has shown that non-Black physicians are less likely to associate Black, as opposed to White, patients with being compliant and cooperative (Sabin, Rivara, & Greenwald, 2008). Thus, if physicians in the present study believed, even at an implicit level, that a patient would not be compliant and/or cooperative, they may have seen it necessary to adopt a more authoritative role and exert more control during the medical interaction with that patient. Such an explanation is consistent with Kinsman et al.'s finding (2010) that physicians' statements using first-person plural pronouns are typically authoritative ("*We need to make sure that you take your medicine*"). Alternatively, use of first-person plural pronouns may also simply reflect shared decision-making in medical interactions in some occasions. One important next step is to investigate the underlying mechanisms involved in the use of first-person plural pronouns during racially discordant medical interactions.

Consistent with our prediction, implicit racial bias was also positively associated with the use of anxiety-related words. The association between racial bias and anxiety-related words (but not with other negative emotions, such as anger and sadness) is consistent with predictions derived from the intergroup anxiety model (Stephan & Stephan, 1985). That is, the greater use of anxiety-related words by physicians with higher levels of implicit bias may have been due to intergroup anxiety stemming from their expectations of negative psychological/behavioral consequences and/or negative evaluations by others when they interacted with a Black patient, rather than feelings of acrimony toward the Black patients.

Finally, there was an unexpected trend for higher levels of explicit racial bias to be associated with greater use of first-person singular pronouns. One possible explanation is that physicians with higher level of explicit racial bias were likely to be aware of their negative feelings toward Black patients and of trying to hide such feelings during the racially discordant medical interactions. This conscious effort of self-regulation might have resulted in intensified self-focus and was reflected in greater use of first-person singular pronouns. However, this explanation is speculative, and replications of these findings in other research are required.

Limitations

First, because the study was a secondary analysis, we could not query the physicians about their perceptions of the interactions, their patients, or other factors that might have affected the words they used. This is a problem for almost all research that analyzes physicians' behaviors during real-time medical interactions and then searches for theoretically meaningful patterns in the data. For example, both Cooper et al. (2012) and Hagiwara et al. (2013) found an association between higher levels of non-Black physician implicit bias and social dominance of racial discordant medical interactions. However, because this pattern could not be detected until the study was completed, neither research team could query the physicians as to any perceptions or motives responsible for these behaviors.

The present study, however, does extend and conceptually replicate these earlier findings on social dominance by showing that physicians with higher levels of implicit racial bias also tend to use personal pronouns that prior research (Dino et al., 2009; Hancock et al., 2010; Scholand et al., 2010) has found to be associated with assumed higher status in interpersonal interactions. We believe this conceptual replication is theoretically important and casts more light on what exactly physicians with higher levels of implicit racial bias are doing to make their patients see them as less patient-centered and trustworthy (Blair et al., 2013; Cooper et al., 2012; Haussmann et al., 2015; Penner et al., 2013). However, again, we cannot definitively determine the reasons *why* physicians with higher levels of implicit racial bias do this. Future research that utilizes experimental designs to manipulate the salience of status hierarchy, compliance stereotypes, and/or group identity might be able to directly examine these potential mechanisms. However, it should be noted that such experimental manipulation may not be practical or ethical in studies of real-world medical interactions.

For the same reasons noted above, we were also unable to explain *why* physicians with higher levels of implicit racial bias used more anxiety-related words than physicians with lower levels of implicit racial bias. Without independent self-report or physiological measures of physician anxiety, we are unable to determine whether or not non-Black physicians with higher levels of implicit racial bias actually felt more anxious than physicians with lower levels of implicit racial bias. Convergent evidence using multiple measures of physician anxiety would strengthen the conclusions drawn in the present study.

Another possible limitation of the present study is that the physician sample contained mostly physicians who self-identified as Asian. However, first of all, as mentioned earlier, this is not unusual for primary care clinics serving poor and disadvantaged patients in the United States (Hing & Lin, 2009; Mertz et al., 2007). Second, the results of other studies that have used this sample to study the effects of physician implicit racial bias on racially discordant medical interactions (e.g., Hagiwara et al., 2013; Penner et al., 2010) have been replicated in studies with samples of predominantly White physicians (e.g., Blair et al.,

2013; Cooper et al., 2012; Hausmann et al., 2015). Further, in a study that directly addressed the impact of physician ethnicity on racially discordant medical interactions, Cooper and her colleagues (Cooper et al., 2012) compared the influence of implicit bias on social dominance among White and Asian physicians and reported "the associations of implicit bias or stereotyping with most communication measures were similar regardless of the race of the clinician" (p. 981). Finally, Sabin et al. (2009) report no difference in the level of implicit racial bias displayed by physicians who self-identify as White and Asian. Nonetheless, one might question the generalizability of these findings to racially discordant medical interactions where most physicians self-identify as White. Relatedly, there are many other combinations of physicians' and patients' races that can be racially discordant medical interactions (e.g., between a Black physician and an Asian patient). We would strongly encourage more studies with a variety of diverse samples. However, we believe the kinds of psychological processes identified in this study would cut across specific racial/ethnic categories and can be conceptually replicated in a wide variety of medical interactions if different group memberships between physicians and patients are salient and the physicians hold negative perceptions of the patients.

Finally, the present study was primarily driven by prior research on the role of racial bias in racially discordant medical interactions, and the specific predictions were based on theories of social dominance and intergroup anxiety. Thus, while the study was in some respects relevant to more applied or practical issues, such as the well-documented racial disparities in healthcare, this study primarily focused on a theoretical question—would social dominance and intergroup anxiety be manifested in word use among non-Black physicians interacting with Black patients? We believe this is a great strength of the study, but we acknowledge the current findings do not, as yet, have direct applications for healthcare disparities as use of first-person plural pronouns and anxiety-related words were not associated with patient outcomes (e.g., satisfaction with care, trust in physicians, adherence to treatment recommendations). However, other research has clearly shown that Black patients do react negatively to subtle manifestations of physician implicit racial bias (Blair et al., 2013; Cooper et al., 2012; Penner et al., 2010), although the *specific* behaviors that elicit such effects are yet to be uncovered. This study identifies word use as a possible candidate, but it is likely that Black patients' outcomes are affected by combinations of multiple physician behaviors and that word use is only one of several aspects of communication that interact with one another to predict patient outcomes. The literature on physician bias in racially discordant patient-physician communication is still relatively new. Thus, it is important to conduct theory-driven studies that identify potential correlates of racial bias and then empirically test whether they are manifested in racially discordant medical interactions. However, future studies that take a more inductive approach and attempt to identify subtle physician behaviors that are specifically associated with negative outcomes for patients are also quite important. The findings from the two different research approaches should complement one another and help us to understand both important

theoretical processes and identify practical ways to improve the outcomes of racially discordant medical interactions for Black patients.

Conclusions

An increasing number of studies find that non-Black physicians' racial bias is manifested in their communication during racially discordant medical interactions and can negatively affect *patients'* reactions (Blair et al., 2013; Hausmann et al., 2015; Penner et al., 2010). Understanding the mechanisms underlying disparities in the quality of medical interactions is critical because these disparities have been found to contribute to well-documented racial disparities in treatment outcomes (Penner et al., 2013). The present study suggests that the use of certain types of words may be one important aspect of such communication. The results further our understanding of what physicians with higher levels of implicit bias are *actually doing* that contributes to the negative patient reactions that have been found in multiple studies (Penner et al., 2014). Thus, in our view the present findings represent a significant contribution to the theoretical literature on the way implicit bias is manifested in interracial interactions and may provide important information for future research that is more focused on clinical applications about reducing well-documented racial disparities in the quality of healthcare patients receive.

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