



Healthcare providers' psychological investment in clinical recommendations: Investigating the role of implicit racial attitudes

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ABSTRACT

Racial disparities in clinical recommendations can result in racial disparities in health. While healthcare providers' implicit racial attitudes (affective component of bias) are theorized to be one major factor contributing to racial disparities in clinical recommendations, empirical evidence to support the link is lacking. This study aimed to bridge this gap by moving beyond the standard approach of operationalizing the quality of clinical recommendations as a guideline-consistent vs. -inconsistent dichotomy. The present secondary study examined the role of provider implicit racial attitudes in the quality of clinical recommendations, operationalized as behaviors reflecting providers' psychological investment in patient care (i.e., number of words used to describe clinical recommendations, and number of treatment options recommended). Two-hundred-and-ten White medical trainees reviewed a clinical vignette of either a White or Black male patient and provided clinical recommendations. Their implicit racial attitudes were evaluated using the Implicit Association Test. Participants with more biased implicit racial attitudes (i.e., stronger implicit preference for White vs. Black individuals) used fewer words to describe their clinical recommendations and provided fewer clinical recommendations for the Black (vs. White) patient, while there were no significant differences between Black and White patients among participants with less biased implicit racial attitudes. These results illustrate the insidious impact of implicit racial attitudes in healthcare provision and underscore the need for researchers to consider the complex, nuanced ways in which provider implicit racial attitudes might manifest in clinical decision-making.

1. Introduction

Racial health disparities are widely documented across the globe (Bhala et al., 2020; Small et al., 2017), including the US (Adler and Rehkopf, 2008; National Academies of Sciences, 2017) and many countries in Europe (Bakhtiari, 2022; Meeks et al., 2016). While racial health disparities are complex issues with multiple proximal causes, including access to care (Lasser et al., 2006; Lurie and Dubowitz, 2007), socioeconomic status (Adler and Rehkopf, 2008; Bakhtiari, 2022), and health behaviors (August and Sorkin, 2011; McClendon et al., 2021), one major contributing factor is disparities in the quality of healthcare received by members of racially minoritized groups (Smedley et al.,

2003; Penner et al., 2013; Penner et al., 2023). One form of racial healthcare disparities theorized to have a direct effect on the health of racially minoritized people is inequitable clinical recommendations (McCarthy et al., 2016; Schulman et al., 1999; van Ryn et al., 2006). Prior research provides evidence that healthcare providers are less likely to recommend appropriate treatments (Musey and Kline, 2017; Shah et al., 2015) and diagnostic tests for racially minoritized patients compared to White patients (Elmore et al., 2005; Lansdorp-Vogelaar et al., 2012).

An increasing number of studies have investigated the role of providers' implicit racial bias, particularly attitudes (i.e., spontaneously activated feelings toward a group and its members; Dovidio et al., 2008),

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in such disparities. However, there is little evidence to support the association between providers' implicit racial attitudes and the quality of their clinical recommendations (Dehon et al., 2017; Hagiwara et al., 2020; Maina et al., 2018). One potential explanation for the lack of evidence supporting the role of provider implicit racial attitudes in disparities in clinical recommendations is how the quality of clinical recommendations has been operationalized in prior research. Although there are multiple ways to assess the quality of clinical recommendations, these assessments typically examine whether providers' recommendations align with established guidelines (Green et al., 2007). This approach, however, overshadows the more nuanced ways that implicit racial attitudes may seep into clinical decision-making. The goal of our study was to test whether provider implicit racial attitudes predict the quality of clinical recommendations for Black vs. White patients when it is operationalized in an alternative way—providers' psychological investment (i.e., the effort that they devote to their patients) in clinical recommendations (Do Bú et al., 2023).

1.1. Racial health disparities and inequitable clinical recommendations

An extensive body of literature has documented pervasive health disparities. Evidence from the US suggests that Black individuals, on average, experience worse health outcomes compared to White individuals. For instance, all-cause mortality in the US is 24% higher for Black, compared to White, individuals (Benjamins et al., 2021). Black individuals in the US also experience a lower average life expectancy (74.8 years; Woolf and Schoemaker, 2019) and higher infant mortality rate (12.14 deaths per 1000 live births; Owens-Young and Bell, 2020) than White individuals (78.5 years and 5.02 deaths per 1000 live births, respectively). Similar patterns of racial health disparities exist in Europe. For example, one review found that racially minoritized individuals tend to experience higher rates of type 2 diabetes prevalence across several European countries, including the UK, Netherlands, Sweden, Norway, and Denmark (Meeks et al., 2016).

There are many proximal factors that contribute to these racial health disparities. Race covaries with several socioeconomic factors, such as income, employment status, and educational attainment, due to historical and persistent discrimination (Adler and Rehkopf, 2008; Bakhtiari, 2022). These socioeconomic factors create barriers to accessing and utilizing healthcare services (Caraballo et al., 2022; Dickson and Plauschinat, 2008; Lillie-Blanton et al., 2005; Rosano et al., 2017; Wheeler et al., 2018). Critically, even after accounting for these proximal factors, racially minoritized people continue to experience worse health outcomes than White people (Farmer and Ferraro, 2005; Smedley et al., 2003; Wang and Chen, 2011; Williams et al., 2016). It has been well-documented that racial healthcare disparities are a major factor contributing to racial health disparities (Diette and Rand, 2007; Smedley et al., 2003; Penner et al., 2013; Wheeler and Bryant, 2017). Inequitable clinical recommendations for minoritized patients (vs. White patients) are prime examples of such racial healthcare disparities.

Racial disparities in clinical recommendations that providers *initially* make before engaging in treatment discussions with their patients have been reported across several clinical conditions (Merritt et al., 2021; Meyer et al., 2015; Nocon et al., 2020; van Ryn et al., 2006). For example, van Ryn et al. (2006) found that physicians in the US recommended coronary artery bypass graft surgery to a smaller proportion of Black patients (21%) than White patients (40%) with coronary artery disease. These disparities also exist in the context of diagnostic tests. Research in both the US (Elmore et al., 2005) and Europe (Todorova et al., 2009) suggests that physicians are less likely to recommend cancer screening tests to racially minoritized populations. For example, McCarthy et al. (2016) found that, in the US, 26.7% of Black women received a recommendation for BRCA1/2 testing, compared to 47.5% of White women.

Those disparities in clinical recommendations are likely to manifest in racial disparities in the actual treatment received by patients because

providers' clinical recommendations can set an anchor for subsequent treatment discussions and resulting decisions. Patients often rely on providers' specialized knowledge, advice, and suggestions on how to treat and manage health conditions, although they are also encouraged to participate in treatment decision-making by contributing unique knowledge of their symptoms and goals of treatment (Jayadevappa and Chhatre, 2011; Mead and Bower, 2000; Yelovich, 2016). If providers' initial clinical recommendations are biased, the subsequent treatment decision-making process and actual treatment decisions are also likely to be biased (Epley and Gilovich, 2006; Featherston et al., 2020; Tversky and Kahneman, 1974).

1.2. Provider bias and racial disparities in clinical recommendations

One potential explanation for racial disparities in clinical recommendations is providers' racial bias. Bias can manifest in outgroup derogation (i.e., negative feelings about, perceptions of, and behaviors towards an outgroup and/or its members; Schütte and Kessler, 2007; van Prooijen et al., 2015), ingroup favoritism (i.e., positive feelings about, perceptions of, and behaviors towards one's own group and/or its members; Cameron et al., 2001; Griffiths and Nesdale, 2006; Kowalski, 2003), or both (Allport, 1954; Brewer, 1999). Furthermore, these processes can operate at the implicit and explicit levels (Wilson et al., 2000). The association between provider explicit stereotyping about (i.e., perceptions of) Black individuals and Black-White disparities in clinical recommendations has been well-documented (Calabrese et al., 2014; Madeira et al., 2022, 2023; van Ryn et al., 2006). For instance, Bogart et al. (2001) found that physicians were less likely to recommend highly active antiretroviral therapy to Black (vs. White) men with HIV because they perceived Black patients as less likely to adhere to treatment regimens. Implicit racial attitudes have also been theorized to play a critical role in racial disparities in clinical recommendations; however, there is little evidence to support this association (Dehon et al., 2017; Hagiwara et al., 2020; Maina et al., 2018).

1.3. Limitations in the current operationalization of clinical recommendation quality

One potential reason for the lack of evidence for the association between provider implicit racial attitudes and the quality of clinical recommendations may be due to how researchers have generally operationalized the quality of clinical recommendations. Among 12 clinical vignette studies included in reviews by Dehon et al. (2017) and Maina et al. (2018), 10 studies operationalized the quality of clinical recommendations as either consistency or inconsistency between providers' recommendations and established guidelines (Cassell, 2015; Green et al., 2007; Haider et al., 2014; Haider et al., 2015a; Haider et al., 2015b; Hirsh et al., 2015; Oliver et al., 2014; Puumala et al., 2016; Sabin et al., 2008; Sabin and Greenwald, 2012). For example, in Oliver et al. (2014), participants read a clinical vignette about a patient presenting with symptoms of osteoarthritis for which total knee replacement (TKR) would be an appropriate clinical intervention. Participants then rated the likelihood that the patient's knee pain was due to osteoarthritis, whether they would recommend total knee replacement, and the strength of their recommendation using a 1 (would definitely not recommend TKR) to 5 (would definitely recommend TKR) scale. In this study, high-quality clinical recommendations were operationalized as recommendations of TKR (i.e., guideline-consistent recommendations).

In studies that used clinical vignettes, operationalizing clinical recommendation quality as a guideline-consistent vs. inconsistent dichotomy likely inhibits the manifestation of implicit racial attitudes for several reasons (Hagiwara et al., 2020). First, implicit racial attitudes are more likely to manifest in spontaneous behaviors rather than controlled and deliberative behaviors (Dovidio et al., 1997, 2008). However, participants in those clinical vignette studies were given as much time as they needed to evaluate the patient's information before

making their clinical recommendations. Thus, they likely were engaged in effortful and careful deliberation of potential diagnoses and treatment plans. Second, studies using clinical vignettes inadvertently raise participants' awareness of being evaluated, often resulting in heightened social desirability concerns (Hagiwara et al., 2020). In fact, prior research has shown that more biased implicit racial attitudes (i.e., stronger preferences toward White individuals over Black individuals) were associated with a decreased likelihood of recommending thrombolysis for Black (vs. White) patients among participants who reported no awareness of the research aims (Green et al., 2007). However, a contrasting trend emerged among those with more biased implicit racial attitudes and some awareness of the research goals. This group was more likely to recommend thrombolysis for Black patients, illustrating that participants are more likely to respond in socially desirable ways when they are aware that their racial attitudes and/or quality of clinical recommendations are being evaluated. Finally, according to theories of modern forms of racism, such as Aversive Racism Theory (Dovidio and Gaertner, 1986; Dovidio et al., 2008) and the Justification-Suppression Discrimination Model (Crandall and Eshleman, 2003; Pereira et al., 2010), implicit racial attitudes are more likely to manifest in behavior that does not ostensibly indicate racism and/or when individuals can justify their actions based on factors other than race. When quality of clinical recommendations is operationalized as guideline-consistent vs. -inconsistent treatment, there is one clear correct recommendation. In situations where a clear correct option is salient, expressions of racial bias in clinical recommendations are less likely to occur. This is because such bias could potentially represent inaccurate clinical recommendations, making it more challenging to justify these options.

1.4. An alternative operationalization of clinical recommendation quality

In contrast to the highly controlled clinical cases often employed in vignette studies, many cases in natural clinical settings are characterized with ambiguity, lacking clear 'correct' treatment options (Codish and Shiffman, 2005; Lafitte, 2023). In those ambiguous situations, thorough and careful examinations of relevant clinical and social factors as well as comprehensive reviews of potential treatment options are key to optimizing patient outcomes (Helou et al., 2020; Mamede et al., 2007), but this takes both time and effort (Do Bú et al., 2023). People tend to use their resources (e.g., time, effort, money) for activities and relationships in which they are invested psychologically (Aguar et al., 2008; Vala et al., 2012). In the context of racialized social relations in general, studies have demonstrated that individuals from racially privileged groups with more biased implicit racial attitudes are less willing to invest their time (Vala et al., 2012) and financial resources (Lu, 2021; Stepanikova et al., 2011) in support of minoritized outgroups relative to ingroups.

Consistent with these findings, a recent study has shown that White medical trainees, particularly those who fit the aversive racist profile (those with more biased implicit racial attitudes but less biased explicit racial attitudes) invested less time assessing diagnostic hypotheses, patients' pain levels, and medication options for Black (vs. White) patients (Do Bú et al., 2023). Critically, the study further showed that a greater amount of time spent on assessing diagnostic hypotheses, patient pain levels, and medication options resulted in more accurate diagnosis, pain judgment, and medication recommendation for the White patient. Another study has also found that White medical residents with more biased implicit racial attitudes provided fewer clinical recommendations for Black standardized patients than White standardized patients in simulated clinical cases (Charles, 2009). These findings suggest that operationalizing the quality of clinical recommendations as provider behaviors that reflect their psychological investment in patients may be better able to capture the manifestation of healthcare providers' implicit racial attitudes and its consequences for members of racially/ethnically minoritized groups.

1.5. The present study

The present study examined whether White medical trainees' implicit racial attitudes would contribute to racial disparities in the quality of clinical recommendations when the clinical recommendation quality is operationalized as behaviors that reflect providers' psychological investment in patients. The study involved analysis of secondary data. Specifically, we coded participants' responses to an open-ended question that was included in the parent study (Do Bú, 2023) to obtain: (1) the number of words participants used to describe their recommendations and (2) the number of treatment options participants recommended. We selected these two outcomes because participants were unlikely to expect that the number of words used and recommendations made in their responses to the open-ended question were being evaluated by researchers as reflective of their racial attitudes. To our knowledge, no prior research has directly demonstrated that the number of words used to describe recommendations or the number of treatment options recommended actually represents better clinical recommendation quality. However, the number of words has been used in previous studies as a dimension of psychological investment, specifically as an indicator of the attention one is devoting toward a given task (Boyd and Schwartz, 2021), and is associated with other dimensions of psychological investment, such as time and financial investment (Eskreis-Winkler and Fishbach, 2022). Additionally, the number of clinical recommendations has been investigated as an indicator of the quality of clinical recommendations. For example, the Resource Index is a composite score that operationalizes the quality of clinical recommendations based on the number of several clinical actions (e.g., procedures performed, clinical tests ordered) that have been performed during a patient-provider interaction (Schwab and Singh, 2024).

We hypothesized a linear relationship between implicit racial attitudes and our outcomes, such that participants with more biased implicit racial attitudes (i.e., stronger implicit preference for White over Black individuals) would write fewer words to describe their clinical recommendations for a Black (vs. White) patient. Similarly, we predicted that participants with more biased implicit racial attitudes would make fewer recommendations for a Black (vs. White) patient. Among participants with less biased implicit racial attitudes, we predicted that there would be a reduced disparity in the number of words and clinical recommendations. This latter prediction is based on previous findings demonstrating that individuals with less biased implicit racial attitudes treat Black and White individuals equally (Green et al., 2023; Loeb et al., 2023; Sabin et al., 2009; Sabin and Greenwald, 2012; Snyder et al., 2023). For instance, Sabin and Greenwald (2012) found that physicians with less biased implicit racial attitudes were similarly likely to prescribe narcotic medication for Black and White patients.

Findings from the present study make contributions both in theoretical advancement and clinical application. They shed light on providers' differential psychological investment in Black vs. White patients as one potential mechanism through which implicit racial attitudes influence providers' quality of clinical recommendations. Such findings will build the necessary foundation for future intervention research that aims to raise awareness of the deleterious impacts of implicit racial attitudes in healthcare and to train providers in behavioral skills that mitigate the impacts of implicit racial attitudes on patient care.

2. Method

2.1. Participants

Two-hundred-and-ten White medical trainees in Portugal participated in the parent study (Do Bú, 2023). Most participants (71.4%) identified as women and were in their sixth year of medical training (54.8%), with ages ranging from 21 to 36 ($M = 23.95$; $SD = 2.38$). A sensitivity power analysis conducted in WebPower (Zhang and Yuan, 2018) indicated that this sample had a power of .80 to detect an effect

size of $f = .19$ or higher with $\alpha = .05$. The present secondary analysis included all 210 trainees.

2.2. Procedure

In the parent study, participants were asked to review a clinical vignette about a patient presenting with symptoms of a migraine accompanied by a blurred photograph of either a White or Black man (DeBruine and Jones, 2017). Participants indicated whether or not four diagnostic hypotheses, presented in a random order, applied to the case and then answered an open-ended question assessing clinical recommendations that they thought were essential to the case, such as laboratory exams, medications, clinical exams, and behavioral/lifestyle interventions (supplementary materials for the clinical case and diagnostic hypotheses). After performing the clinical assessment, participants completed a Race Implicit Association Test (IAT) and provided their sociodemographic information. The parent study protocol was approved by the Ethics Committee of the (information omitted for blind review purposes). In the remaining section, we will present only the information relevant to the current study.

The data for the present secondary analysis came from the open-ended question. Participants' responses were coded to assess two outcomes that reflect individuals' psychological investment in patients: the number of words and the number of clinical recommendations. The present study was approved by the Ethics Committee of the (information omitted for blind review purposes) https://osf.io/cwm4y/?view_only=4113623259d9449bb81eda3e9bc5b14e.

2.3. Measures

Number of Words. A team of six psychology master's students independently assessed the total word count in participants' responses using Microsoft Word's word count feature. Discrepancies were discussed and resolved by the team subsequently.

Number of Clinical Recommendations. Two coders (a social psychologist and a general practitioner) independently counted the number of: (1) laboratory exams, (2) medications, (3) clinical exams, and (4) behavioral/lifestyle interventions. These categories were selected due to their relevance in comprehensive migraine management, encompassing both diagnostic and therapeutic approaches as well as lifestyle modifications that are crucial in migraine care (e.g., dietary change, sleep hygiene; Agbetou and Adoukonou, 2022; Evans, 2009; Mayans and Walling, 2018). Interrater reliability was excellent ($Kappa < .83$) across all clinical recommendation categories (see the supplementary material for individual interrater reliabilities). Due to the variability in the number of clinical recommendations across clinical categories, we adjusted the participants' responses by dividing them by the highest number of recommendations in each category and subsequently multiplying by 10 (Cohen, 1988). This approach ensured that the responses across various categories were standardized, ranging from 0 to 10.

Implicit Racial Attitudes. The Race IAT was used to measure implicit preference of White people relative to Black people (Greenwald et al., 2003). Specifically, we utilized iatgen, a survey software IAT developed by Carpenter et al. (2019). Because the participants' native language was Portuguese, the IAT instructions were translated following procedures indicated by Santos et al. (in preparation). The Race IAT consisted of seven blocks. In the compatible categorization block trials, participants categorized White faces with positive words and Black faces with negative words. In the incompatible categorization block trials, participants categorized White faces with negative words and Black faces with positive words. The block order was counterbalanced. IAT D scores were calculated by dividing the difference in reaction time between "compatible" and "incompatible" categorization blocks by the pooled standard deviation of reaction time (Greenwald et al., 2003). The faster associations of photographs of Black faces with negative words and photographs of White faces with positive words indicate greater

implicit preference of White individuals to Black individuals. In other words, D scores reflect relative preference between Black and White individuals, and the combined effects of outgroup derogation and ingroup favoritism.

2.4. Analysis plan

We first examined means, standard deviations, and bivariate correlations among all study variables. To test our first hypothesis, we conducted a moderation analysis with effect-coded patient race as a predictor and grand-mean-centered implicit racial attitudes as a moderator. We used Hayes' (2018) PROCESS macro (Model 1) to generate 5000 bootstrapped confidence intervals of the conditional effect. To test our second hypothesis, we employed a mixed-effects model analysis using Jamovi (2.3.17) software to account for multiple outcome assessments (i.e., laboratory exams, medications, clinical exams, behavioral/lifestyle interventions). The interaction between patient race and student implicit racial attitudes was first probed by examining the simple slope effects of patient race among participants with more biased ($+1 SD$) vs. less biased ($-1 SD$) implicit racial attitudes, as well as the simple slope effects of implicit racial attitudes for the Black vs. White patient. Then, we used the Johnson-Neyman technique to precisely identify significant regions where implicit racial attitudes moderate the relationship between patient race and either the number of words used or the number of clinical recommendations (Amrhein et al., 2019; Finnsaas and Goldstein, 2021; Miller et al., 2013). In our models, we effect-coded (Black = $-.05$; White = $.05$) for patient race to be consistent with the direction of our hypotheses (i.e., participants would use more words and make more clinical recommendations for the White patient compared to the Black patient) as well as to maintain a consistent scale unit of 1 across the analysis (Judd et al., 2017).

3. Results

3.1. Descriptive analyses

Table 1 summarizes means and standard deviations of all variables for the whole sample and by experimental condition. On average, participants in our sample had moderately biased implicit racial attitudes. Implicit racial attitudes did not differ between participants assigned to read a vignette for a Black patient vs. a White patient, $t(206) = .35$, $SE = .05$, $p = .729$, $d = .05$.

Next, we examined bivariate correlations among all study variables in each experimental condition (Table 2)

4. Hypothesis testing

A bootstrapping moderation analysis revealed a significant main effect of patient race ($B = 54.18$, $SE = 20.53$, 95% $CI [13.70, 94.66]$, $p = .009$) but not implicit racial attitudes ($B = 2.64$, $SE = 2.65$, 95% $CI [-2.59, 7.89]$, $p = .320$). The main effect of patient race indicates that

Table 1
Means and standard deviations of variables overall and in each experimental condition.

Study Variables	Overall		White Patient		Black Patient	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
IAT <i>D</i> Score	.45	.39	.44	.40	.46	.38
Number of Words	12.93	15.00	15.44	16.83	10.12	12.11
Total Number of Recommendations	3.11	2.37	3.47	2.57	2.72	2.07
Laboratory Exams	1.73	1.94	2.03	2.18	1.39	1.58
Medications	.87	1.44	1.04	1.61	.68	1.20
Clinical Exams	.77	.96	.82	1.06	.71	.85
Behavioral/lifestyle Interventions	.16	.73	.14	.42	.19	.98

Table 2

Bivariate correlations between study variables in each experimental condition.

Study Variables	1	2	3	4	5	6	7
1. IAT D Score	–	–.05	–.18	–.18	.02	–.01	–.03
2. Number of Words	.17	–	.60**	.20	.67**	.15	.69**
3. Total Number of Recommendations	.01	.65**	–	.77**	.33**	.40**	.27**
4. Laboratory Exams	.13	.44**	.75**	–	.24*	.18	–.01
5. Medications	.10	.67**	.56**	–.14	–	–.06	.52**
6. Clinical Exams	.08	.40**	.32**	.10	.10	–	.08
7. Behavioral/lifestyle Interventions	–.01	.22*	.25**	–.07	.09	–.07	–

Note. ** $p = .001$; * $p < .05$; The upper half of the correlation matrix displays correlation coefficients for the Black patient condition, and the lower section displays correlation coefficients for the White patient condition.

participants used more words to describe their clinical recommendations when the patient was White compared to Black (see Table 1). Although the two-way interaction between patient race and implicit racial attitudes did not reach statistical significance ($B = 85.77$, $SE = 53.20$, 95% $CI [-19.07, 190.62]$, $p = .108$), we proceeded to probing for the exploratory purpose. Consistent with our predictions, simple slope analyses indicated that participants with more biased implicit racial attitudes used significantly fewer words for the Black patient ($M = 9.79$, $SE = 2.06$) than the White patient ($M = 18.55$, $SE = 2.05$), $B = 85.29$, $SE = 28.10$, $p = .002$. In contrast, among participants with less biased implicit racial attitudes, the number of words did not differ significantly between the Black patient ($M = 10.88$, $SE = 2.12$) and the White patient ($M = 12.96$, $SE = 2.00$), $B = 23.73$, $SE = 27.95$, $p = .396$.

The Johnson-Neyman technique revealed a statistically significant region between mean-centered IAT D scores from $-.13$ to 1.04 , where the effect of patient race on the number of words was significant (see Fig. 1). Outside of this region, the conditional effects were not statistically significant (from -1.12 to $-.15$). This indicates that, as the level of bias in participants' implicit racial attitudes increases, there is a significant rise in the number of words used when making clinical recommendations for the White patient compared to the Black patient. Note that these IAT D values are mean-centered and thus a 0 score represents the sample mean of IAT D score ($M = .45$, $SD = .39$) rather than an absence of bias. Please refer to Fig. 1 for the observed values.

In addition to presenting simple slopes of patient race among participants with more (vs. less) biased implicit racial attitudes, we also examined the simple slopes of implicit racial attitudes for the Black patient and the White patient separately. This analysis provides

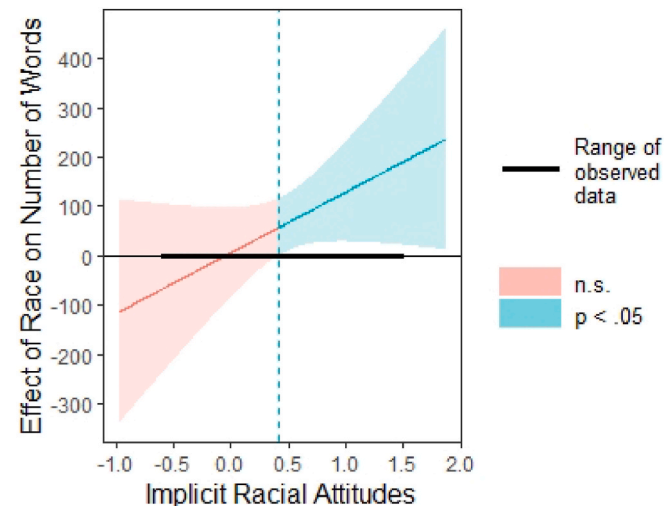


Fig. 1. Moderating effect of implicit racial attitudes on the relationship between patient race and the number of words used in clinical recommendations. Note. The figure shows that the effect of the patient's race on the number of words used in clinical recommendations increases as a function of individuals' implicit attitudes. The values shown are observed data.

additional perspectives on our data for readers interested in exploring our findings further. Simple slope analyses indicated that, when participants were presented with a White patient, more biased implicit racial attitudes were associated with a greater number of words compared to those with less biased implicit racial attitudes, $B = 6.93$, $SE = 3.52$, $p = .050$. In contrast, when participants were presented with a Black patient, implicit racial attitudes were not associated with the number of words, $B = -1.64$, $SE = 3.98$, $p = .398$.

4.1. Clinical recommendations

Table 3 presents the results of the mixed-effects model. The main effects of patient race and clinical recommendation category were significant. Participants made more clinical recommendations for the White patient than the Black patient and recommended more laboratory exams than other types of recommendations (see Table 1). These significant main effects were further qualified by a significant two-way interaction between patient race and implicit racial attitudes. Simple slope analyses showed that participants with more biased implicit racial attitudes made significantly more clinical recommendations for the White patient ($M = 1.15$, $SE = .06$) than for the Black patient ($M = .68$, $SE = .06$), $B = 4.71$, $SE = .86$, $p = .001$. There were no significant differences in the number of recommendations among participants with less biased implicit racial attitudes, $B = .64$, $SE = .87$, $p = .465$. The Johnson-Neyman technique identified a statistically significant range of mean-centered IAT D scores from $-.17$ to 1.04 , within which the effect of patient race on the number of clinical recommendations was significant. Outside this range, specifically from -1.12 to $-.18$, the effects were not statistically significant. Again, note that a score of 0 reflects the mean D score in this sample ($M = .45$, $SD = .39$). Notably, the analysis showed that White (vs. Black) patient race was positively associated with the number of clinical recommendations and that this positive association was intensified as the level of bias in implicit racial attitudes increased (see Fig. 2 for observed values). Finally, the three-way interaction among patient race, implicit racial attitudes, and clinical recommendation category did not reach statistical significance. This indicates that the pattern of the two-way interaction between patient race and implicit racial attitudes is the same across clinical

Table 3

Fixed effects parameter estimates of mixed-effects model examining predictors of the number of clinical recommendations.

Fixed Effect Omnibus Tests	F	ChiSq	Num df	df	p
Patient Race (White – Black)	19.29	19.44	1	816	.001
IAT D Score	.96	.62	1	816	.328
Recommendation Category	112.8	284.1	3	816	.001
Patient Race*IAT D Score	11.07	11.27	1	816	.001
Patient Race*Recommendation Category	2.40	7.31	3	816	.067
IAT D Score*Recommendation Category	.12	.23	3	816	.949
IAT D Score*Patient Race*Recommendation Category	1.38	4.20	3	816	.248

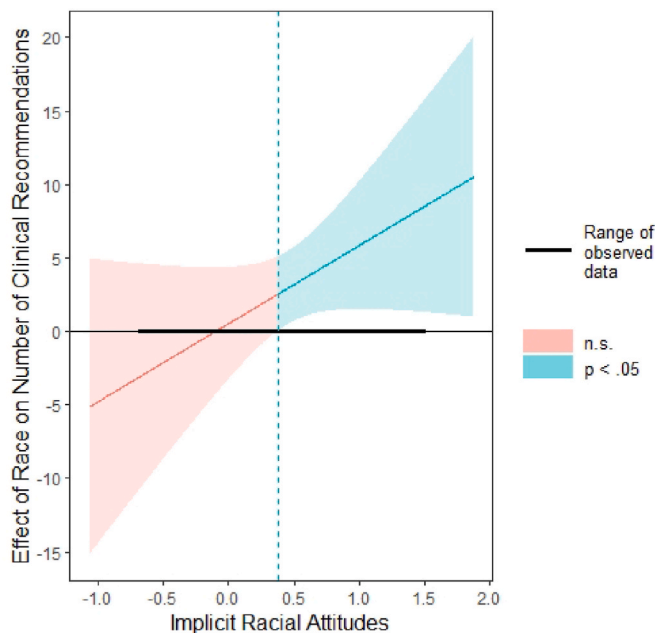


Fig. 2. Moderating effect of implicit racial attitudes on the relationship between patient race and the number of clinical recommendations.

Note. This figure underscores that the effect of the patient's race on the total number of clinical recommendations increases as a function of individuals' implicit racial attitudes. The values shown on the x-axis are observed data.

recommendation categories.

A separate analysis of the simple slopes of implicit racial attitudes for the Black and White patients provided further insight into our findings. For participants presented with a White patient, more biased implicit racial attitudes were associated with more clinical recommendations compared to those with less biased implicit racial attitudes, $B = .34$, $SE = .10$, $p = .002$. Conversely, for participants presented with a Black patient, more biased implicit racial attitudes were associated with slightly fewer recommendations compared to those with less biased implicit racial attitudes, although this difference did not reach statistical significance, $B = -.18$, $SE = .11$, $p = .107$.

5. Discussion

The goal of the present study was to examine the role of medical trainees' implicit racial attitudes in racial disparities in the quality of clinical recommendations, which was operationalized as psychological investment in Black patients relative to White patients. Specifically, we examined the number of words used to describe clinical recommendations and the number of clinical recommendations made. In contrast to findings from prior research operationalizing clinical recommendation quality as a guideline-consistent vs. -inconsistent dichotomy, our study revealed that medical trainees' implicit racial attitudes play a significant role in predicting the quality of clinical recommendations for Black vs. White patients. Participants with more biased implicit racial attitudes used fewer words to describe their clinical recommendations and provided fewer clinical recommendations for the Black patient relative to the White patient. In contrast, among participants with less biased implicit racial attitudes, there were no significant differences in the number of words or clinical recommendations between Black and White patients. This disparity in psychological investment is important because it might, in turn, manifest in poorer quality clinical recommendations for Black patients.

The novel operationalization of the quality of clinical recommendations used in the present research suggests a need for methodological and theoretical advancement in research examining the role of provider

implicit racial bias in clinical decision-making. Our findings suggest that providers' implicit racial attitudes may manifest in the quality of their clinical recommendations in subtle, nuanced ways. This is consistent with prior empirical research demonstrating that implicit racial attitudes are more likely to manifest in spontaneous, automatic behaviors (e.g., the number of words used in an open-ended response) than in thoughtful, deliberative behaviors (e.g., the content of a patient's treatment plan; Dovidio et al., 1997; Dovidio et al., 2008). It has been shown that implicit racial attitudes can also manifest in behaviors that are not typically considered as indicative of bias (Crandall and Eshleman, 2003). Providers are likely to carefully deliberate over a patient's clinical presentation and thoughtfully develop a treatment plan, particularly in clinical vignette studies where they expect that they are being evaluated by researchers on the "accuracy" of their clinical recommendations. However, they are unlikely to expect that researchers are also evaluating how many words they use to describe their clinical recommendations or how many clinical recommendations they make.

5.1. Potential Practical implications

In patient-centered care, which is considered the gold standard of modern medicine (Institute of Medicine, 2001; Kramer et al., 2014), providers are expected to consider multitudes of factors, including, but not limited to, patients' preferences, medical history, availability and cost of treatment, in addition to clinical guidelines when making clinical recommendations (Jayadevappa and Chhatre, 2011; Mead and Bower, 2000; Yelovich, 2016). Our findings suggest that providers with more biased implicit racial attitudes may deviate from patient-centered care for Black patients, as compared to White patients, because they invest less effort in thoroughly evaluating factors relevant to an individual Black patient's healthcare goals. Because clinical recommendations that do not align with a patient's preferences and goals are harder for patients to adhere to (Yelovich, 2016), such recommendations could contribute to subsequent racial disparities in health outcomes.

5.2. Limitations and future directions

While the novel approach and findings of this study make valuable contributions to the field of provider implicit racial attitudes and healthcare disparities, some limitations of this research must be acknowledged. This study examined medical trainees' clinical recommendations after reading a clinical vignette. Providers' decision-making in clinical vignette studies differs from actual clinical decision-making in several notable ways. In clinical practice, healthcare providers must rapidly evaluate cases and formulate clinical recommendations for many patients throughout each day under intense time pressure (Linzer et al., 2000). In vignette studies, on the other hand, providers can take time to read and evaluate a clinical scenario then deliberate about their clinical recommendations, rather than immediately responding to patients' needs and making clinical recommendations spontaneously in the flow of their conversations with patients. We conducted this secondary analysis of data from a clinical vignette study (rather than data that can be gathered in naturalistic clinical settings, such as electronic medical records) because clinical vignettes isolate clinicians' decision-making processes from potential confounding factors (e.g., patient personality, presentation of symptoms; Veloski et al., 2005), better enabling researchers to make causal inferences about clinical decision-making processes. However, future research should examine whether and under what circumstances the current findings can be replicated in naturalistic clinical settings.

Another potential limitation is the presentation order effect. In the parent study, participants were asked to indicate their recommendations for each of the four categories in the following order: laboratory exams, medications, clinical exams, and behavioral/lifestyle interventions. This may potentially explain why the participants in the current study recommended more laboratory exams than medications, which were

recommended more than clinical exams and behavioral interventions. The order in which these categories were listed to patients might have primed participants to recommend more laboratory exams and medications than other types of treatment. Because the current study was a secondary analysis study, we were not able to control the presentation order. However, it should be also noted that the focus of the present study was the association among patient race, implicit racial attitudes, and clinical recommendations, not the overall mean differences across clinical recommendation categories.

Additionally, the present research examined medical trainees, not licensed providers, in only one cultural context. However, prior research suggests that the role of implicit racial attitudes and explicit stereotyping in healthcare disparities is similar between trainees (Bunting et al., 2023; Charles, 2009) and practicing providers (Blair et al., 2013; Penner et al., 2016; Stepanikova, 2012). The general pattern of findings in this study (i.e., White providers' implicit racial attitudes are associated with racial healthcare disparities) is also consistent with prior research across cultural contexts in which Black-White health disparities are present, such as the US and Italy (Charles, 2009; Patel et al., 2019; Penner et al., 2016). Thus, our results suggest that both trainees and practicing healthcare providers with more biased implicit racial attitudes are also likely to invest less psychologically in Black patients than in White patients in various countries. Still, additional research is encouraged to replicate the current findings in additional samples cross culturally.

It is important for future research to validate the number of words used to make clinical recommendations and the number of recommendations made as measures of clinical recommendation quality, though there is some indirect evidence to suggest that they are indicators of providers' psychological investment in delivering patient care. One approach is to assess whether those measures are reliably associated with other established measures of quality of care, such as AGREE-REX (Brouwers et al., 2020) and AGREE Instrument (AGREE Collaboration, 2003). Alternatively, future research may investigate whether greater number of words used to make clinical recommendations and the number of recommendations made would actually result in better clinical outcomes for patients (e.g., improved clinical symptoms, reduced ER utilization, better pain management).

While we theorized that providers' implicit racial attitudes are more likely to manifest in the quality of their clinical recommendations when it is difficult for individuals to recognize what they are being evaluated for or that a given measure is assessing their discriminatory behaviors, findings from the present study do not provide direct evidence. That is, we did not examine whether providers' recognition of how researchers are evaluating the quality of their clinical recommendations would moderate the effects of providers' implicit racial attitudes, which is one important future direction. One potential way to examine the moderating effect is to directly compare measures like number of words used or number of clinical recommendations with measures that are clearer indicators of the quality of providers' recommendations and/or racial disparities in recommendations (e.g., the guideline-consistent vs. -inconsistent dichotomy) in the same study. Another potential way is to experimentally manipulate participants' awareness about what exactly they are being evaluated for. For example, participants may be either informed or not informed that researchers are using measures of psychological investment (e.g., number of words, number of recommendations) to assess their discriminatory behaviors. Being able to demonstrate that the manipulation of providers' awareness about how the quality of their clinical recommendations is being evaluated could either reduce or exacerbate racial disparities in clinical care has significant implications for both provider bias training and efforts to address racial healthcare disparities.

The present secondary study solely focused on implicit racial attitudes because the parent study did not assess explicit racial attitudes. However, prior research demonstrates that physicians who fit the aversive racist profile (i.e., a combination of high implicit racial

attitudes and low explicit racial attitudes) may display lower psychological investment (i.e., write fewer words in their recommendations and make fewer recommendations) in Black patients than providers with other combinations of implicit and explicit racial attitudes. Specifically, one recent study has shown that White medical trainees who fit the aversive racist profile invested less time when forming impressions and formulating treatments for Black patients in comparison to physicians with other combinations of implicit and explicit racial attitudes (Do Bú et al., 2023). They explained these findings by drawing on the research on the time expansion effect in intergroup interactions, which has demonstrated that White individuals with high levels of intergroup anxiety and/or external motivation to appear non-prejudiced often perceive time more slowly when evaluating Black faces (Moskowitz et al., 2015, 2017). Critically, high levels of intergroup anxiety and external motivation to appear non-prejudiced are both important markers of aversive racists (Dovidio and Gaertner, 2004). Do Bú et al. (2023) argued that White medical students with the aversive racist profile might have erroneously perceived that they had spent more time evaluating the Black patient than they had actually spent and consequently cut short their time formulating treatments for Black patients. If providers who fit the aversive racist profile have the tendency to overestimate the amount of time they have spent evaluating a Black patient's case and describing their clinical recommendations, then they may similarly overestimate the number of words they have used and/or recommendations they have made in this time. Future research should directly test these theoretical assumptions by assessing both explicit and implicit racial attitudes.

Finally, our findings also suggest that the associations between IAT D scores and the number of words and clinical recommendations are more pronounced in responses to White (vs. Black) patients. However, it is important to note that the Race IAT used in our study assesses participants' relative preferences of White and Black individuals; therefore, it is not possible to disentangle pro-White attitudes and anti-Black attitudes (Greenwald et al., 2022a, 2022b). This raises the question of whether the observed effects reflect pro-White attitudes, anti-Black attitudes, or a combination of both. Future research should aim to distinguish these components, as this distinction is crucial for understanding the nature of racial biases in clinical decision-making. For example, single-category IATs may provide a more nuanced understanding of implicit attitudes by allowing researchers to measure positive vs. negative attitudes toward a specific group (Axt et al., 2024). This could be a valuable methodological advancement for future studies examining racial disparities in healthcare.

6. Conclusions

This study used a novel approach to investigate the role of healthcare providers' implicit racial attitudes in predicting racial disparities in quality of clinical recommendations. Specifically, quality of clinical recommendations was operationalized as the number of words used to describe recommendations and the number of clinical recommendations, reflecting providers' psychological investment in patients. The findings from this research provide initial evidence that healthcare providers with more biased implicit racial attitudes may invest less effort in formulating clinical recommendations for Black (vs. White) patients. Previous research that operationalizes the clinical recommendation quality as guideline-consistent vs.

-inconsistent has found little evidence supporting the role of providers' implicit racial attitudes in racial disparities in the quality of clinical recommendations. However, this study suggests that providers' implicit racial attitudes manifest in the quality of clinical recommendations in more subtle ways. Future research should consider the complex, nuanced ways in which provider implicit racial attitudes might manifest in providers' clinical recommendation decision-making when selecting research outcomes.

CRediT authorship contribution statement

Conor M.C. Duffy: Writing – review & editing, Writing – original draft, Formal analysis, Conceptualization. **Emerson Do Bú:** Writing – review & editing, Writing – original draft, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Cícero Roberto Pereira:** Writing – review & editing, Formal analysis, Data curation. **Filipa Madeira:** Writing – review & editing. **Nao Hagiwara:** Writing – review & editing, Supervision, Conceptualization.

Competing interest statement

The authors declare no competing interest.

Declaration of interest

The present research and the parent study were approved by the Institutional Review Board of the Faculty of Medicine of the University of Lisbon.

Data availability

Dataset and Supplementary Material used in this research program can be accessed at the OSF repository platform: https://osf.io/cwm4y/?view_only=e92cf8f3a26148a38d67a9b35ee2429ahttps://osf.io/cwm4y/?view_only=4113623259d9449bb81eda3e9bc5b14e.

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Data availability

An Open Science Framework link to the data used in this study is provided in the Method section.

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