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Intergroup Time Bias and Aversive Racism in the Medical Context

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Time is fundamental to organizing all aspects of human life. When invested in relationships, it has a psychological meaning as it indicates how much individuals value others and their interest in maintaining social relationships. Previous research has identified an intergroup time bias (ITB) in racialized social relations, defined as a discriminatory behavior in which White individuals invest more time in evaluating White than Black individuals. This research proposes an aversive racism explanation for the ITB effect and examines its consequences in the medical context. In four experimental studies ($N = 434$), we found that White medical trainees invested more time in forming impressions of White (vs. Black) male patients. Study 5 ($N = 193$) further revealed more time investment in diagnosing, assessing pain, and prescribing opioids for White than Black male patients. This biased time effect mediated the impact of patients' skin color on health care outcomes, leading to greater diagnostic accuracy and pain perception, and lower opioid prescriptions. A meta-analytical integration of the results (Study 6) confirmed the ITB effect reliability across experiments and that it is stronger in participants with an aversive racist profile (vs. consistently prejudiced or nonprejudiced). These findings provide the first evidence that bias in time investment favoring White (vs. Black) patients is associated with aversive racism and impacts medical health care outcomes. Furthermore, these results offer insights into the sociopsychological meaning of time investment in health care and provide a theoretical explanation for an understudied insidious form of discrimination that is critical to comprehending the persistency of racial health care disparities.

Keywords: racial discrimination, aversive racism, intergroup time bias, impression formation, health care disparities

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Time is one of the most valuable resources in human life, and it is a fundamental dimension of social interaction (McGrath, 1988). Indeed, time is ubiquitous in how we socially organize ourselves, including our work lives, leisure activities, educational experiences, or relationships with our families and friends (Hamermesh, 2019). It is central to understanding how people function in society because it is a social value, as expressed by the popular saying, "time is money" (Leclerc et al., 1995). In recent decades, the way people use and perceive time

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has become the object of research in various fields of knowledge (Hamermesh, 2019; Youngreen & Silcox, 2020). Recent studies have shown, for example, that time is considered even more important than money in framing individuals' general well-being (see Dunn et al., 2020; A. V. Whillans et al., 2016, 2019, for a review). In general, a social and psychological consequence of time as a valuable resource is that the quantity of time individuals invest in an activity reflects the extent to which that activity is important to them (Hamermesh, 2019). Within this assumption, when invested in relationships, time has a psychological meaning as it indicates how much individuals value other people and are interested in continuing a social relationship with them (Hall, 2019; Reutner & Greifeneder, 2018; Woolley & Fishbach, 2018).

In a more recent research line, time has also been investigated as the social value individuals give to different social groups (Vala et al., 2012). Specifically, within the context of racialized social relations, the time invested by individuals to members of their own group (ingroup), in comparison to that allocated to members of another group (outgroup), has been studied as a discriminatory behavior against socially devalued groups (Aguiar et al., 2008; Vala et al., 2012). For example, Vala et al. (2012) found that when evaluating ingroup and outgroup members, individuals bias their time by investing more of it when forming impressions of White than Black targets, which is referred to as the intergroup time bias (ITB) effect. The current research program extends the scope of the ITB effect in three critical ways. First, the study seeks to demonstrate the pervasive nature of the ITB across various social spheres, with a particular focus on its implications for socially devalued groups in high-stress contexts, such as the medical field. Second, by delving into the underlying racial attitudes that contribute to the ITB prevalence, we further present an aversive racist explanation for this phenomenon and discuss the social and psychological implications of time investment. Finally, our study is the first to comprehensively investigate the downstream consequences of the ITB on health care outcomes for patients, providing insights into the impact of this bias in medical decision making.

Intergroup Time Bias in Clinical Interactions

Time has been studied by numerous research lines in social psychology, and its meaning varies depending on the characteristics of the object of study, the context, and the main theoretical framework used by researchers (see Youngreen & Silcox, 2020, for a review). For example, within the impression formation literature, time has been studied as the amount of attention individuals give to processing information about a target-person's attributes (Neuberg & Fiske, 1987). The time spent forming an impression of a person has also been analyzed as an indicator of the perceiver's motivation and interest in forming an accurate impression of a target-person (Brewer, 1988). Moreover, within the implicit attitudes' literature, time reaction to evaluative and conceptual stimuli has been the cornerstone of well-known measurement paradigms of implicit stereotyping (e.g., Wittenbrink et al., 2001), implicit prejudice (e.g., J. Dovidio et al., 1986; Fazio et al., 1995); and the more general implicit bias in social categorization (Greenwald et al., 1998, 2003).

Despite the centrality of time as a methodological tool for assessing a person's information processing and for measuring implicit attitudes, only recently have the sociopsychological meaning and consequences of time investment become the focus of interest in intergroup relations. Specifically, since time is a valuable and scarce resource, time investment in social interactions can be motivated by individuals' general tendency to favor ingroup over outgroup members (Tajfel & Turner, 1979; Vala et al., 2012). Accordingly, the time individuals devote to interacting with ingroup and outgroup members can reveal a form of intergroup discrimination. This possibility is consistent with the notion that time investment might be related to psychological forces operating in racialized social relations. Previous research by Vala et al. (2012) on the ITB effect in interracial relations has suggested that the time individuals invest in intergroup relations can reveal a discriminatory behavior characterized by individuals' motivation to invest more time in interacting with members of the ingroup than the outgroup. In several experimental studies, Vala et al. (2012) found that White participants consistently invested more time forming impressions of White than Black targets. Moreover, the ITB effect was predicted by participants' implicit prejudice and explicit racism.

In the medical context, previous observational research has indirectly alluded to a similar phenomenon in doctor–patient communication. Specifically, non-Black physicians typically spent less time providing treatment planning, health education, answering questions, and assessing Black (vs. White) patients' knowledge about health (Gross et al., 1998; Oliver et al., 2001; Waitzkin, 1985). Additionally, Hirsh et al. (2015) found that non-Black physicians spent more time rating the pain of White than Black fictitious patients. In terms of time waiting for medical care, the opposite effect is found, as previous research has shown that Black patients wait longer than White ones for clinical appointments (Qiao et al., 2016; Ray et al., 2015). To our knowledge, however, no research to date has examined whether there is a time bias while providers form first impressions of patients, even though previous studies have pointed to its importance (e.g., clinical first impressions of patients formed by physicians within the first seconds of contact can be linked to subsequent diagnosis; Balla et al., 2012; Beglinger et al., 2015; Bösner et al., 2014; Breytspraak et al., 1977; Kostopoulou et al., 2016). Furthermore, despite observational evidence pointing to more time invested in White than Black patients in communication processes, no study to date has systematically investigated whether time investment bias in the clinical decision-making process can affect the actual health care outcomes for patients. Also, it is critical to analyze whether this bias in time investment is related to one of the expressions of racism in egalitarian and democratic western societies. Specifically, since the ITB effect can reveal an unobtrusive form of discrimination, it might be specially expressed by individuals who define themselves as egalitarian and nonprejudiced, but who nonetheless harbor nonconscious implicit bias against Black individuals (J. F. Dovidio & Gaertner, 2004). With this in mind, we examined the role of providers' explicit and implicit racial biases and egalitarian beliefs in the ITB effect within the aversive racism framework.

Intergroup Time Bias and Aversive Racism in Clinical Interactions

Health care disparities between Black and White individuals are the most well-documented in the literature (Penner et al., 2019, 2023). Such inequalities have been attributed to unjust economic, political, and social factors (Braveman, 2006) but are also rooted in basic psychological mechanisms which foster providers and patients' racial bias (J. F. Dovidio et al., 2017). The aversive

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racism framework has been one of the proposed theoretical explanations addressing such bias in the medical context (see J. F. Dovidio et al., 2017; Penner et al., 2019, for review). It is a specific type of contemporary racial bias held by people who endorse egalitarian values, believe themselves to be unprejudiced, but nonconsciously hold negative attitudes and feelings toward Black individuals (J. F. Dovidio & Gaertner, 2004). The theory assumes that most people in the contemporary United States have internalized the justice principle that all people are equal and deserve the same rights and opportunities, and for this reason, they sustain nonprejudiced beliefs (J. F. Dovidio & Gaertner, 2004). However, such individuals still harbor nonconscious negative attitudes they have learned in their socialization process, in which a hierarchical social structure that disadvantages Black people is still maintained (J. F. Dovidio et al., 2017).

To capture aversive racists, a combined pattern of explicit (conscious, deliberate) and implicit (nonconscious, spontaneous) racial bias towards Black people has been used (J. F. Dovidio, 2001; J. F. Dovidio & Gaertner, 2004; Hagiwara et al., 2016; Murrell, 2020). Predominantly, previous research has shown that aversive racists discriminate against Black individuals in different situations. For example, when they find a justification other than the target's skin color (e.g., aversive racists defend their refusal to help Black people by emphasizing the duration of a task, implying that they are lengthy; see Saucier et al., 2005, for a review); but also through subtle behaviors toward Black people (e.g., distancing nonverbal behavior; J. F. Dovidio et al., 2002). In the medical context, previous studies have found that non-Black physicians with low explicit but high implicit racial biases elicit fewer positive responses and less trust from Black patients when compared to providers with other racial attitudes profiles (Penner et al., 2010, 2013). More recently, Hagiwara et al. (2016) further showed that when physicians with an aversive racist profile (relative to other profiles) interacted with patients who reported prior discrimination incidents in their lives, they were rated as having a greater negative affect and, more importantly, as being less engaged during clinical appointments with Black patients. Indeed, it is well-documented that Black individuals respond quite negatively to aversive racists. This is probably because aversive racists often convey mixed messages toward Black people, such as positive verbal behaviors that do not match with their negative nonverbal behaviors (J. F. Dovidio et al., 2002; Hagiwara et al., 2016). We argue that less time invested by aversive racists in Black patients represents an understudied insidious form of discriminatory behavior.

In fact, there is no direct experimental evidence that aversive racism affects the time physicians invest in patients, specifically at the beginning of consultations, where doctors form their first impressions of patients, or when they diagnose and make clinical decisions for patients (e.g., recommend medication dosage). However, findings on time expansion effects (Kenrick et al., 2016; Moskowitz et al., 2015, 2017) might provide insight into why aversive racists are more likely to invest less time in the clinical assessment of Black (vs. White) patients. Specifically, time expansion effect research has shown that individuals with higher levels of intergroup anxiety (Moskowitz et al., 2015) and strong external motivation to appear nonprejudiced are particularly likely to perceive time slowing when evaluating Black faces (Kenrick et al., 2016; Moskowitz et al., 2017). Critically, aversive racists are more likely than any other individuals to experience intergroup anxiety in interracial situations (J. F. Dovidio & Gaertner, 2004; Levine & Hogg, 2010; Mendes et al., 2007; Page-Gould et al., 2008). This suggests that health care providers with an aversive racist profile are likely to experience the time expansion effect when interacting with Black patients. If they perceive that they spend longer time with Black patients than with White patients, then they are also likely to conclude that they have invested a significant amount of time in Black patients. Subsequently, this may lead these providers to end their interactions with Black patients early (Moskowitz et al., 2015).

Furthermore, despite the significance of previous findings on aversive racism in medical care (Hagiwara et al., 2016; Penner et al., 2010, 2013), studies developed in this realm have not considered racially concordant interactions between doctors and patients. In other words, they only considered the interaction of non-Black physicians and Black patients and did not account for the effect of patients' skin color (e.g., Black vs. White). Therefore, given that (a) values such as equality and fairness are central to the medical context, (b) health care providers have nonconscious racial biases against Black individuals (Penner et al., 2019), and considering (c) time as a valuable and scarce resource that is used to favor ingroup over outgroup members (Vala et al., 2012), we hypothesize that aversive racist medical trainees may be unintentionally more prone to disengage from interactions with Black patients and to invest more of their time assessing White patients.

The Present Research

We analyzed time investment in the medical context, as time is considered a valuable and scarce resource for treating patients (Yahanda & Mozersky, 2020) with consequences in physician–patient communication (Choy & Ismail, 2017; Hagiwara et al., 2013; Hashim, 2017); trust in the physician–patient relationship (Skirbekk et al., 2011); patients and physicians' satisfaction with the assistance provided (Dugdale et al., 1999; Lin et al., 2001; Linzer et al., 2009, 2015; Mawardi, 1979); and physicians' malpractice risk (Hickson et al., 2002; Levinson, 1994; Levinson et al., 1997). Furthermore, the amount of time invested by a physician in clinical consultations might vary according to the patient's group membership. In fact, research shows that Black patients speak less, have lower quality and briefer face-to-face interactions with White providers when compared to White patients (see Cooper & Roter, 2003; Penner et al., 2019; Shen et al., 2018. for review). Yet, scholars have given little attention to systematically examining potential time biases in the assessment of White and Black patients and have devoted even less attention to the elaboration of theoretical explanatory models to comprehend clinicians' discrimination in time investment, despite its importance in patient evaluation and clinical practice (Senft et al., 2018). Given this framework, and in the light of the theoretical underpinnings of the ITB effect, we examine critical aspects of the clinical consultation: When a physician forms the first impressions of a patient (Balla et al., 2012; Bösner et al., 2014; Kostopoulou et al., 2016), and when they diagnose and make decisions on the pain and medication dosage for patients (Hirsh et al., 2015). Specifically, we test the hypothesis that White medical trainees bias their time by investing it more in White than Black patients. Moreover, we have explored whether this time bias is associated with different forms of racism expressed in

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western societies (J. F. Dovidio & Gaertner, 2004; Freng et al., 2022; Murrell, 2020).

First, building on the impression formation paradigm from Vala et al. (2012), we conducted four studies aiming to analyze whether there is an ITB effect in the time White medical trainees invest forming first impressions of White and Black patients. We also examined the relationship between this effect and aversive racism. Specifically, in Study 1, we tested the hypothesis that participants invest more time forming first impressions of White than Black patients (i.e., the ITB effect). Moreover, we hypothesize that the ITB effect would be stronger in those with an aversive racist profile. In Study 2, we aimed to replicate the ITB effect using a diverse set of stimuli in a different cultural context, also testing the role of aversive racism. In Study 3, we went further by improving the experimental paradigm and measuring egalitarian values to examine whether individuals who consciously describe themselves as egalitarian, nonracists but also exhibit high implicit racial bias express a stronger ITB. In Study 4, we aimed to replicate the ITB effect using an eye-tracking procedure. We also explored whether eye fixation on specific areas of patients' faces (e.g., whole face, eyes, mouth, and nose), as well as on positive and negative attributes associated with them influenced the time participants invested in forming impressions of patients. Based on the previous studies on racial stereotypical features perception (e.g., Burgund, 2021; Cassidy et al., 2019; Friesen et al., 2019; Kawakami et al., 2014), we specifically explored whether participants would invest more time looking at the faces of White (vs. Black) patients and would invest more time looking at the eyes of White compared to those of Black patients. Additionally, we explored whether participants would look more at the nose and mouth of Black (vs. White) patients (Bean et al., 2012; Friesen et al., 2019).

In Study 5, we expanded our investigation of the ITB effect beyond patient impression formation and examined the consequences of this bias in other clinical dimensions (i.e., diagnostic accuracy, pain assessment, and medication prescription). We further explored whether this effect is stronger in participants with an aversive racist profile. Moreover, we examined the downstream consequences of the ITB on diagnostic accuracy, pain perception, and medication prescription, hypothesizing that investing more time in the patient would lead to better diagnosis and treatment recommendations.

Finally, in Study 6, we employed a meta-analytical approach to examine the consistency of the ITB effect across studies and explore its potential moderators. We investigated whether the valence of information associated with patients, paradigm used in studies, cultural context, participants' avoidance of forming prejudiced impressions, and racial attitudes profiles of participants moderate the ITB effect. Specifically, we investigated whether participants invested less time while assessing patients when negative (vs. positive or clinical) information was associated with them (Baumeister et al., 2001), particularly when considering Black (vs. White) patients. This hypothesis is in line with the notion that, when judging Black patients with negative traits, participants may become aware of the possibility of being racist, which, according to the aversive racism theory (J. F. Dovidio & Gaertner, 2004), could elicit an aversive response and lead to even faster disengagement while forming impressions. Additionally, we examined whether the ITB varies based on the type of paradigm used in studies (impression formation vs. clinical tasks) and the context in which data were collected (Brazil vs. Portugal). We also tested whether the avoidance of forming prejudiced impressions of patients predicts the ITB effect across studies. Finally, we investigated whether the ITB effect was stronger among those who exhibited an aversive racist profile compared to consistently prejudiced or nonprejudiced participants across the five studies (see Table 1).

This research program received ethical approval from the ethics review boards of the Faculty of Medicine and the Institute of Social Sciences of the University of Lisbon. Data and materials from the studies can be found online (https://osf.io/7jf8z/).

Study 1

We asked White medical trainees to form first impressions of Black and White male individuals by evaluating whether a set of positive and negative traits characterized them. We also measured both explicit and implicit bias by asking participants to perform the Implicit Association Test (IAT; Greenwald et al., 2003) and fill in a

Table 1
Systematization of the Studies' Hypotheses

Hypotheses	Studies
H1. White medical trainees invest more time forming impressions of White (vs. Black) individuals, which we termed the ITB effect.	Studies 1–4
H2. The ITB effect is stronger among medical trainees with an aversive racism profile compared with those who are consistently prejudiced and nonprejudiced.	Studies 1–6
H3. White medical trainees invest more time when diagnosing, assessing pain, and prescribing opioids to White (vs. Black) patients.	Study 5
H4. The time investment mediates the relationship between patients' skin color and diagnostic accuracy, pain assessment, and opioid prescriptions.	Study 5
H5. Medical trainees' racist profiles moderate the mediations proposed in H4.	Study 5
H6. Participants invest less time while assessing patients when negative (vs. positive or clinical) information is associated with them, particularly when considering Black (vs. White) patients.	Study 6
H7. Explore whether the ITB effect varies based on the paradigm employed in studies (impression formation *vs.* clinical tasks) and investigate if the context of data collection (Brazil vs. Portugal) has an influence on the ITB effect.	Study 6
H8. Explore whether the avoidance of forming prejudiced impressions of patients predicts the ITB effect across studies.	Study 6

Note. H = hypothesis; ITB = intergroup time bias.

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self-reported racism scale (Vala et al., 2012). Based on the previous studies on the ITB effect (Vala et al., 2012), we predicted that participants would invest more time forming first impressions of White than Black people. Additionally, we analyzed the associations between participants' avoidance of forming prejudiced impressions and both explicit racism and implicit racial bias with the ITB effect. Finally, we explored whether the ITB effect is related to aversive racism. Specifically, we operationalized aversive racists as those individuals who scored lowest on the explicit racism scale, but expressed higher implicit racial bias (J. F. Dovidio, 2001; Penner et al., 2010), and then examined if the ITB effect was stronger in participants who exhibited such a profile.

Method

Participants and Experimental Design

One hundred twenty-eight Brazilian medical trainees were invited to participate in this study. Thirty-four did not complete the study and nine self-declared as Black, therefore, the final sample included 85 White medical trainees (50.6% female), aged 18–43 years ($M = 23.12$; $SD = 5.20$). Participants were in their first (37.6%), second (41.2%), and fourth (21.2%) year of training. A sensitive power analysis conducted in WebPower (Zhang & Yuan, 2018) indicated that this sample had a power of .80 to detect an effect size of $f = .30$ or higher with $\alpha = .05$. We used a within-subjects unifactorial experimental design in which the independent variable was the targets' skin color (Black vs. White), and the main dependent variable was the time participants invested in forming impressions of the targets.

Procedure and Measures

We collected data online using the E-prime Go software. To recruit participants, we contacted two Brazilian universities and asked professors to share a link to the online experiment with their medical students. First, self-enrolled participants performed an impression formation task in which we measured the ITB and trait judgments. Then, they performed the IAT (Greenwald et al., 2003), with which we measured the participants' implicit racial bias. Thereon, we assessed their explicit racism by using a self-reported Racial Beliefs Scale (Vala et al., 2012). Finally, they indicated demographical information (i.e., gender, skin color, nationality, and year of medical training) and were fully debriefed. Participants received course credits in exchange for their time participating in the study.

In the impression formation task, we used a paradigm developed by Vala et al. (2012), which starts by asking participants to form impressions of some people as fast and precisely as possible. We used eight pretested digital color photos of males with neutral facial expressions (four of Black and four of White men; DeBruine & Jones, 2017). These photos were pretested using self-report measures of racial prototypicality, attractiveness, age, and photo quality. Further details on the pretest results can be found on the open science framework platform at https://osf.io/7jf8z/. In addition to the photos, we also used eight nonstereotypical traits of Black and White people, four of which were positive; that is, honest, sincere, wise, and hard-working; $M_B = 3.02$ and $M_W = 3.06$, $t(28) = 0.66$, $SE = .199$, $p = .509$, $d = 0.07$, and four were negative; that is, dishonest, ignorant, liar, and lazy; $M_B = 3.31$ and $M_W = 3.10$, $t(28) = 0.88$, $SE = .244$, $p = .383$, $d = 0.31$, that served as stimuli.[1] Detailed analyses on the stereotypicality (https://osf.io/kwq4x) and perceptual valence (https://osf.io/m42az) of these traits can be accessed through open science framework Platform. The procedures of the impression formation task involved two phases. The first was a categorization task in which participants were asked to focus on a fixation point (+) for 1,000 ms in the screen center, which was automatically replaced by one random photo of the targets. The participants' task was to indicate whether the targets were Black or White by pressing a key on the keyboard. The second phase was constituted by the impression formation task in that each trial started by asking participants to focus on a fixation point (+) for 1,000 ms in the screen center. The fixation point was immediately substituted by a photo accompanied by one of the eight nonstereotypical traits (presented below the picture). In this phase, we instructed participants that "As a medical trainee, your task is to select "yes" or "no" to indicate whether the trait characterizes the person in the photograph or not." Participants were asked to rest their fingers on the "s" (for "yes") and "n" (for "no") keys of the keyboard. We imposed no time constraint, so the system was paused until the participant had responded. The first eight trials served as practice, with no interval separating these eight practice trials from the 64 experimental trials. Response latencies were measured during the second phase of the task, comprising the experimental trials. We did not exclude any trials based on erroneous categorization during the first phase of the impression formation task.

Intergroup Time Bias (ITB) Measurement. We used response latency to measure the time participants invested in forming impressions of the targets. We conducted outlier analyses and excluded trials that deviated beyond 2.0*SDs* from each variable's mean (Ratcliff, 1993; Tabachnick & Fidell, 2001). The intergroup time bias (ITB) represented the difference in latencies for Black and White individuals (i.e., White latencies minus Black latencies). Accordingly, higher scores represented a greater investment of time in forming first impressions of White people (Vala et al., 2012).

Trait Judgments. The impression formation task enabled us to evaluate the extent to which participants identified positive and negative traits as characteristic of each target. Participants' responses were assigned a code of 0 if the trait did not characterize, or 1 if the trait characterized the target.

Implicit Racial Bias. We used the IAT to measure implicit bias toward Black people (Greenwald et al., 2003). This task was performed in five trial blocks. Blocks one, two, and four corresponded to practical trials, whereas blocks three and five corresponded to the critical blocks. The presentation of the critical blocks was counterbalanced. In the compatible categorization block trials, the participants categorized White targets and positive words by pressing a specific key (i.e., White + Good) and categorized Black targets and negative words by pressing another specific key (i.e., Black + Bad). In the incompatible categorization block trials, they categorized White targets and negative words with a single key (i.e., White + Bad) and categorized Black targets and positive words with another single key (i.e., Black + Good). We followed the procedures indicated by

[1] In this study, we used only nonstereotypical pretested traits for the social groups studied in the impression formation task, since previous experimental research has shown that the ITB effect occurs regardless of the stereotypicality of the traits associated with the targets (Vala et al., 2012). In the trait pretest, we randomly presented 162 traits to White Portuguese individuals and asked them to rate on a scale from 1 to 5 the extent to which they believed the Portuguese society considers each trait characteristic of White or Black individuals.

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Greenwald et al. (2003) to compute the D-IAT scores after defining reaction times less than 300 ms and greater than 10,000 ms as incorrect responses. Comparing response time among compatible *versus* incompatible categorization blocks (i.e., incompatible *minus* compatible blocks) and dividing it by the pooled standard deviation, we obtained the D-IAT scores that provided us with the measure of implicit racial bias. The faster associations of Black targets with negative attributes and quicker associations of White targets with positive attributes indicate a stronger implicit bias toward Black people. In this study, D-IAT scores varied from −.87 to .88 ($M = 0.162$; $SD = 0.407$). Such scores were significantly higher than zero, indicating an implicit pro-White racial bias, $t(84) = 3.66$, $p = .001$, $d = .41$).

Explicit Racism. We measured explicit racism using the Racial Beliefs Scale (Vala et al., 2012). This instrument assesses beliefs about the biological nature of differences between groups ($\alpha = .59$; $\omega = .63$). The seven-item version (1 = *totally disagree*; 7 = *totally agree*) includes items such as "The mixture of different human groups may weaken the biological evolution of the human species" and "The human species is divided into racial groups that are very different from each other." Higher scores on this scale indicate stronger explicit racism.

Results

Intergroup Time Bias

ANOVA results showed a reliable targets' skin color effect, $F(1, 84) = 22.775$, mean squared error (MSE) = .136, $p = .001$, $\eta_p^2 = .213$. As predicted, participants invested more time in forming impressions of White than Black people. The main effect of the traits' valence was nonsignificant, $F(1, 84) = 1.157$, $MSE = .095$, $p = .285$, $\eta_p^2 = .014$. In addition, results show that participants invested more time in forming impressions of White (vs. Black) individuals, regardless of whether the traits were positive ($b = .133$, $SE = .050$, $p = .009$, $d = .582$) or negative ($b = .248$, $SE = .049$, $p = .001$, $d = 1.08$). This provides evidence for an ITB effect on both positive and negative traits. The interaction effect between the targets' skin color and valence did not reach the threshold of statistical significance, $F(1, 84) = 3.896$, $MSE = .283$, $p = .052$, $\eta_p^2 = .044$, suggesting a trend of a stronger ITB effect when participants judged targets with negative traits. The means of the response latencies are presented in Table 2.

Trait Judgments

The second panel of Table 2 shows the means of trait judgments. We did not find a significant main effect of the target's skin color, $F(1, 84) = .063$, $MSE = .124$, $p = .803$, $\eta_p^2 = .001$. However, we found a significant main effect of the valence of the traits, $F(1, 84) = 80.721$, $MSE = 2.172$, $p = .001$, $\eta_p^2 = .490$, indicating that participants judged the targets, regardless of skin color, as being characterized by more positive than negative traits. We also found a significant interaction between the targets' skin color and the trait valence, $F(1, 84) = 72.901$, $MSE = .686$, $p = .001$, $\eta_p^2 = .465$. Participants judged Black targets as being characterized by positive traits to a greater degree than White targets ($b = .757$, $SE = .098$, $p = .001$, $d = 1.69$). Additionally, participants judged White targets as being characterized by more negative traits than Black targets ($b = .776$; $SE = .097$, $p = .001$, $d = 1.74$). This pattern of results suggests that participants tended to form more positive and less negative impressions of Black targets compared to White targets, which is in line with previous research showing the effects of the antiprejudice norm (see Pettigrew & Meertens, 1995). To explore the association between this avoidance to form prejudiced impressions and the ITB effect in later analyses, we computed an index (Vala et al., 2012) that quantifies the extent to which participants were more likely to endorse positive traits for Black targets and negative traits for White targets. We computed this index using the equation: (Black positive−Black negative) − (White positive−White negative). In this formula, a higher value for (Black positive−Black negative) and a value approaching zero for (White positive−White negative) indicate a stronger aversion to forming prejudiced impressions of Black individuals.

Correlates of the ITB

We regressed the ITB scores on the study's measured variables and explored the interaction between implicit racial bias and explicit racism (see Table 3). The main effects of capturing these variables' association with ITB were not significant. In Figure S1 in the Supplemental Material, we better explored the pattern of effects by showing a positive association between implicit racial bias and ITB among participants with low explicit racism but not among those with high explicit racism. However, Table 3 shows that the interaction effect between explicit and implicit racial bias was not strong enough to reach statistical significance.

The ITB in Racism Profiles

We analyzed the predicted value of ITB in the three racial attitudes profiles of participants (see Penner et al., 2010).[2] Because both the explicit racism and implicit racial bias are continuous variables, we defined the aversive profile to correspond to those participants with low explicit (i.e., those scoring $-1SD$ from the mean) and high implicit racial bias (i.e., those with $+1SD$ from the IAT mean). We then compared the ITB effect of these participants with two other profiles (see Figure 1): consistently prejudiced participants (high in both implicit and explicit racial bias), and nonprejudiced participants (low in both implicit and explicit racial bias). Using maximum likelihood regression-based estimates, we obtained the ITB effect in participants' racist profiles. Results showed that the ITB effect was significantly different from zero in participants with an aversive racist profile ($b = .331$, $SE = .080$, $p = .001$, $d = .900$), and not significant among those who express a nonprejudiced profile ($b = .136$, $SE = .073$, $p = .062$, $d = .405$), and consistently prejudiced profile ($b = .119$, $SE = .081$, $p = .143$, $d = .317$). Further contrast-based comparisons showed that the ITB in aversive racist participants significantly differs from the other two profiles pooled ($b = .203$, $SE = .096$, $p = .034$, $d = .458$). While the ITB effect was slightly more pronounced among aversive racists compared to consistently prejudiced ($b = .212$, $SE = .118$, $p = .072$, $d = .309$) and nonprejudiced groups ($b = .195$, $SE = .105$, $p = .064$, $d = .401$), these variations did not reach statistical significance.

[2] In the present and forthcoming studies, we estimated these analysis parameters while controlling for participants' avoidance of forming prejudiced impressions. The analysis was conducted using MPlus software (8th version; Muthén & Muthén, 2017).

Table 2
Means (and Standard Deviations) of the Latencies (in Seconds) and Trait Judgment (Studies 1–4)

	Study 1		Study 2		Study 3		Study 4	
Valence	White	Black	White	Black	White	Black	White	Black
Latencies								
Positive	1.91 (.824)	1.77 (.709)	1.57 (.527)	1.57 (.506)	1.53 (.701)	1.46 (.737)	1.12 (.382)	1.10 (.315)
Negative	2.00 (.805)	1.75 (.740)	1.34 (.410)	1.21 (.384)	1.31 (.745)	1.16 (.576)	1.00 (.340)	.942 (.315)
Trait judgments								
Positive	1.92 (1.21)	2.69 (1.17)	1.64 (1.08)	1.79 (1.09)	1.93 (1.14)	2.03 (1.18)	2.46 (1.22)	2.23 (1.24)
Negative	1.25 (1.11)	.494 (.756)	.254 (.378)	.096 (.245)	.177 (.362)	.120 (.380)	.112 (.408)	.077 (.400)

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Discussion

White medical trainees invested more time in forming first impressions of White than Black men. They also judged Black men more positively than White men, whereas they judged White men more negatively than Black men. Furthermore, results showed that the ITB effect was related to aversive racism. In other words, participants with low explicit racism but high implicit bias toward Black individuals showed greater ITB than the other racial attitude profiles pooled (i.e., consistently prejudiced and nonprejudiced). These results provided preliminary evidence of an ITB effect in the medical context, suggesting the existence of an implicit intergroup bias in the behavior of White medical trainees, which holds potential for observing discriminatory behaviors in patient assessment.

Notably, the pattern of results was consistent with the prediction that aversive racism is related to how future providers invest their time in interracial relations. However, an alternative explanation could be that the time bias observed in the formation of first impressions of Black and White individuals merely reflected that participants acted stereotypically, not based on attributes, as we used pretested nonstereotypical traits in the impression formation task, but on the basis of the stereotypicality of the targets of impression formation. Given that Black individuals constitute the majority of the Brazilian population (Instituto Brasileiro de Geografia e Estatística, 2010) and are targets of racial discrimination in all sectors of Brazilian society (dos Santos & Pereira, 2021; Silva & Lima, 2016), cultural representations of the Black social category and its characteristics may have been more accessible to participants when asked to form impressions of Black versus White individuals. For this reason, it is critical to determine whether the ITB effect on patient impression formation occurs in racial contexts other than Brazil, particularly where the prevalence of Black individuals is lower than that of White ones. Furthermore, it is important to examine whether the ITB effect also occurs where the quality of health care service offered to the population is higher than that offered in Brazil (Araújo et al., 2018). We addressed these issues in Study 2 and intended to replicate the findings by varying the stimuli and social context used in this study.

Study 2

We aimed to replicate the ITB effect in an impression formation of White and Black people with White medical trainees using a diverse set of traits and a different cultural context from those used in Study 1. Moreover, we aimed to test the role of aversive racism in such an effect. Therefore, we conducted this study in Portugal, where the majority of the population is White, and the quality of the health care system is considered to be higher than in Brazil (Araújo et al., 2018). Based on the previous findings, we predicted, despite strikingly different cultural contexts between Brazil and Portugal, that White Portuguese medical trainees would invest more time in forming impressions of White than Black individuals. We also predicted that the ITB effect would be stronger for individuals with an aversive racial profile. Furthermore, we examined whether the avoidance of forming prejudiced impressions was related to the ITB effect.

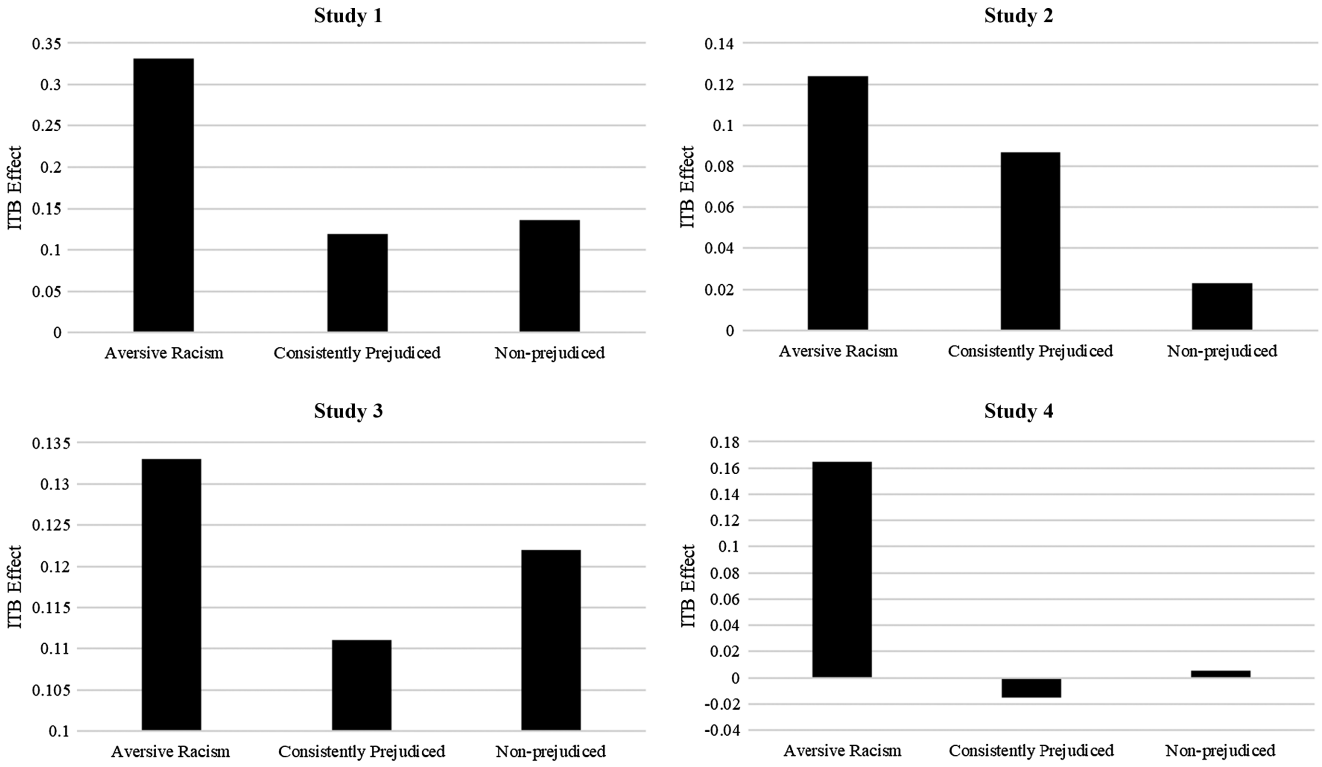
Table 3
Estimated OLS Regression Coefficients of the Correlates of the ITB Effect (Studies 1–4)

	Study 1			Study 2			Study 3			Study 4		
Predictors	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Intercept	.189	.039	.001	.068	.019	.001	.093	.026	.001	.042	.051	.404
Implicit racial bias	.089	.096	.358	.089	.045	.048	.081	.067	.227	.254	.200	.204
Racism	−.058	.052	.264	−.008	.028	.769	−.002	.033	.962	.002	.023	.928
AFPI	.011	.024	.656	.047	.018	.011	.028	.027	.309	.034	.016	.034
Implicit Racial Bias × Racism	−.194	.110	.078	−.043	.062	.487	−.061	.098	.533	.123	.091	.179
Egalitarianism							−.014	.027	.610	.044	.041	.274
Implicit Racial Bias × Egalitarianism							.004	.068	.953	.263	.163	.107
Racism × Egalitarianism							−.060	.030	.047	.003	.022	.880
Implicit Racial Bias × Racism × Egalitarianism							.158	.090	.080	.164	.088	.061
Adjusted R^2		.053			.061			.113			.243	

Note. OLS = ordinary least squares; AFPI = avoidance of forming prejudice impressions; ITB = intergroup time bias; *SE* = standard error.

Figure 1

ITB in First Impressions of Patients According to Racial Attitudes Profiles (Studies 1–4)



Note. Aversive Racists = high implicit racial bias, high egalitarianism, low racism; Consistently Prejudiced = high implicit racial bias, low egalitarianism, high racism; Nonprejudiced Participants = low implicit racial bias, high egalitarianism, low racism. The figure shows that the ITB effect among individuals with an aversive racist profile is significantly greater than zero in all studies. The values depicted in the figure correspond to estimated marginal means. ITB = intergroup time bias.

Method

Participants and Experimental Design

One hundred ninety-four Portuguese medical trainees were invited to participate in a study of impression formation, in exchange for a €5 gift card. Twenty-three identified themselves as non-White and so were ineligible for the final sample because they did not meet the study's inclusion criteria. After exclusion, 171 White medical trainees remained, mostly female (70.8%), aged between 18 and 45 years old (M = 21.05; SD = 3.24). Participants were in their first (9.9%), second (12.9%), third (18.7%), fourth (18.1%), fifth (24.6%), and sixth (15.8%) year of training. A sensitive power analysis indicated that this sample size had a power of .80 to detect an expected effect of f = .22 with α = .05. We used the same experimental design as Study 1.

Procedure and Measures

We conducted an online survey using the Qualtrics platform to collect data. We used a recruitment approach similar to Study 1. Specifically, we contacted all universities in Portugal that have medical schools and requested that they distribute a link to the online study to their students. After confirming their status as medical students, self-enrolled participants completed the impression formation task, and the implicit association task, as well as answered an explicit racism and sociodemographic measures.

We adapted the impression formation task used in Study 1 to the Qualtrics platform, while retaining all instructions and target pictures.[3] However, we used the same eight nonstereotypical pretested traits used in the previous studies on the ITB (Vala et al., 2012, Study 2). Four of them were positive (e.g., appealing, delightful, favorable, and sincere) and four were negative (e.g., awful, horrible, repulsive, and upsetting). Measures from the impression formation task were obtained using the same procedures as in Study 1 to assess the ITB, trait judgments and participants' avoidance of forming prejudiced impressions.

Implicit Racial Bias. We used iatgen (survey-software IAT) to measure the implicit bias towards White and Black targets (Carpenter et al., 2019). Iatgen is an R package that allows researchers to create IATs to be run online (through Qualtrics). Because iatgen originally provided the instructions for the IAT in English and the native language of our participants was Portuguese, we translated these instructions using an R feature that allowed this (Santos et al., 2023). D-IAT scores varied from −.84 to 1.30 (M = .429; SD = 0.423). As in Study 1, an implicit pro-White racial bias was found, $t(170)$ = 13.28, p = .001, d = 2.03).

[3] We followed procedures validated by Carpenter et al. (2019) to limit participants' access to the questionnaire to only computers.

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Explicit Racism. We used the Racial Beliefs Scale to measure explicit racism as in the previous study (Vala et al., 2012). Its internal consistency for this study was $\alpha = .63$; $\omega = .59$.

Results

Intergroup Time Bias

As in Study 1, participants invested more time in forming impressions of White than of Black targets, $F(1, 170) = 11.792$, $MSE = .059$, $p = .001$, $\eta_p^2 = .065$. Also, the main effect of valence was significant, $F(1, 170) = 144.864$, $MSE = .107$, $p = .001$, $\eta_p^2 = .460$, indicating that participants invested more time judging targets with positive than negative traits. Moreover, the Target Skin Color × Valence interaction was significant, $F(1, 170) = 14.545$, $MSE = .050$, $p = .001$, $\eta_p^2 = .079$: Participants invested more time judging negative traits for White (vs. Black) targets ($b = .129$, $SE = .022$, $p = .001$, $d = .912$), but this difference did not occur when the traits were positive ($b = .001$, $SE = .029$, $p = .961$, $d = .007$). The mean values of response latencies are shown in Table 2.

Trait Judgments

The second panel of Table 2 presents the descriptive statistics of trait judgments. The results of the analysis of variance (ANOVA) showed that the main effect of the target skin color was not significant, $F(1, 170) = .027$, $MSE = .167$, $p = .870$, $\eta_p^2 = .001$. However, there was a significant main effect of trait valence, $F(1, 170) = 353.601$, $MSE = 1.158$, $p = .001$, $\eta_p^2 = .675$, as well as a Target Skin Color × Valence interaction, $F(1, 170) = 15.794$, $MSE = .253$, $p = .001$, $\eta_p^2 = .085$. Consistent with the findings from Study 1, participants judged male targets more positively than negatively in general. When considering the Target Skin Color × Valence interaction, participants judged Black targets more positively than White targets ($b = .148$, $SE = .064$, $p = .022$, $d = .35$). Conversely, more negative judgments were made towards White targets compared to Black targets ($b = .158$; $SE = .029$, $p = .001$, $d = .85$).

Correlates of the ITB

Ordinary least squares regression estimates showed a significant positive association between the avoidance of forming prejudiced impressions and implicit racial bias with the ITB effect (Table 3). Also, a significant positive association between the implicit racial bias and the ITB in participants low in explicit racism was found ($b = .119$, $SE = .057$, $p = .037$), but not in those with high explicit racism ($b = .059$, $SE = .067$, $p = .382$). However, these different patterns were not captured by the interaction between implicit racial bias and explicit racism (see Figure S2 in Supplemental Material).

The ITB in Racism Profiles

Mirroring the results we found in Study 1, participants with an aversive racist profile exhibited a significant ITB effect that differed significantly from zero ($b = .124$, $SE = .040$, $p = .002$, $d = .472$). A similar effect emerged in participants with a consistently prejudiced profile ($b = .087$, $SE = .032$, $p = .007$, $d = 414$), but it did not occur in nonprejudiced participants ($b = .023$, $SE = .031$, $p = .450$, $d = .115$; see Figure 1). The ITB in individuals displaying aversive racism did not significantly differ from the other two racist profiles pooled ($b = .068$, $SE = .044$, $p = .119$, $d = .238$). In fact, although the estimated ITB effect was stronger in aversive racist participants than in nonprejudiced ($b = .100$, $SE = .048$, $p = .037$, $d = .318$), differences found among aversive racists and prejudiced participants did not reach significance ($b = .037$, $SE = .051$, $p = .469$, $d = .110$).

Discussion

Using a different set of nonstereotypical stimuli and a different cultural context, the pattern of results in the present study generally replicated the main findings we found in Study 1. In this way, we observed that Portuguese White medical trainees invested more time forming impressions of White than Black male people and avoided forming prejudiced impressions of Black individuals. Moreover, participants with aversive racist and consistently prejudiced profiles showed stronger bias (vs. nonprejudiced participants) in the time invested in forming impressions of White and Black targets.

The present study showed a noteworthy effect we did not detect in Study 1, namely that the avoidance of forming prejudiced impressions was associated with the ITB. This finding is consistent with the aversive racism theory predictions. Previous research provides evidence that people with an aversive racist profile often engage in overcompensation bias by explicitly denying negative attributes and exacerbating positive ones to Black individuals because they are motivated to avoid either seeing themselves as prejudiced or being perceived as prejudiced by others (Aberson et al., 1999; J. F. Dovidio & Gaertner, 2004; Hing et al., 2005). Given the task employed in this study and the aversive racism framework, it is possible that participants may have attempted to disengage from developing negative impressions of Black targets by responding consistently "no" to negative traits and "yes" to positive traits as rapidly as possible. Consequently, in certain circumstances, particularly when the social context favors aversive racism, participants may have exhibited a pattern of behaviors that facilitated the association of the ITB effect with the avoidance of forming prejudiced impressions. Thus, the current evidence further supports our proposal that the ITB effect may be driven by aversive racist individuals who strive to avoid being seen as holding negative attitudes towards Black individuals.

However, even though we have framed the impression formation tasks in Studies 1 and 2 within the physician–patient context, the frame of stimuli used cannot necessarily correspond to those used by medical trainees in their actual interactions with patients. That is, the instructions did not explicitly present the targets as patients from the national health care system, although we assumed that this would be inferred from the study's contextual frame. Another limitation concerns the operationalization of the aversive racist profile. In both Studies 1 and 2, we specified aversive racism as a combination of explicit denial of racism and implicit racial bias towards Black people. However, denying racism is only one of two core aspects of aversive racism. According to J. F. Dovidio and Gaertner (2004), aversive racists support equality and genuinely believe they are not prejudiced. Thus, another core aspect of aversive racism is explicit support for egalitarian values (Pearson et al., 2009). We consider individual differences in egalitarianism when examining the aversive racist profile in Study 3.

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Study 3

In this study, we tested whether White medical trainees invest more time evaluating White than Black patients while emphasizing that the targets were patients from the national health care system. We also tested whether the disproportionate time invested in forming impressions of White (vs. Black) patients (i.e., ITB effect) was related to the avoidance of forming prejudiced impressions and the aversive racism. Critically, while in the previous studies we operationalized the aversive racist profile by merely combining explicit racism and implicit racial bias (J. F. Dovidio, 2001; Hagiwara et al., 2016; Penner et al., 2010), the present study goes further by using a different operationalization of aversive racism. Specifically, we examined whether aversive racists, now classified as those individuals who deny explicit racism, support strong equalitarian principles (Pearson et al., 2009), and still harbor implicit racial bias, invest more time in forming first impressions of White rather than Black patients.

Method

Participants and Experimental Design

We invited 143 Portuguese medical trainees to take part in a study on the impression formation of patients from the national health care system. Twenty-three were non-White participants and did not meet the study's inclusion criteria. The final sample consisted of 120 White medical trainees, predominantly female (70.8%) and aged between 18 and 35 years ($M = 21.73$; $SD = 3.03$). Participants were in their first (13.3%), second (21.7%), third (12.5%), fourth (12.5%), and fifth (40%) year of training. A sensitive power analysis revealed that this sample size had a power of .80 to detect an expected effect of $f = .26$ with $\alpha = .05$. The experimental design we used in this study was the same as in previous studies. The trainees received a €5 gift card for participating in the study.

Procedure and Measures

Data collection procedures were similar to that of Study 2. We used the Qualtrics platform to conduct an online survey and applied the same recruitment procedures to invite medical students to participate. Consistent with previous studies, we utilized the same procedures for the impression formation task, with the exception of emphasizing in the instructions that the individuals being evaluated were patients from the national health care system. Time invested and trait judgments in forming impressions of patients were calculated using the same methods as in prior research. Moreover, building upon the approach of Studies 1 and 2, we also calculated participants' avoidance of forming prejudiced impressions of patients.

Implicit Racial Bias. As in Study 2, we used iatgen to measure implicit bias towards Black people (Carpenter et al., 2019; Santos et al., 2023) and calculated the D-IAT scores (ranged from .76 to 1.27; $M = 0.474$; $SD = 0.423$). Mirroring results from the previous studies, we found an implicit pro-White racial bias, $t(119) = 12.30$, $p = .001$, $d = 2.24$.

Explicit Racism. We used the Racial Beliefs Scale (Vala et al., 2012) to measure explicit racism ($\alpha = .69$; $\omega = .76$).

Egalitarian Beliefs Measure. We measured egalitarianism with the following four items from the egalitarianism dimension of the Social Dominance Orientation scale (Ho et al., 2015): "Group equality should be our primary goal"; "It is unjust to try to make groups equal" (reversed); "We should do what we can to equalize conditions for different groups"; and "We should work to give all groups an equal chance to succeed." The participants indicated their agreement with each item on a 7-point scale (1 = *totally disagree*; 7 = *totally agree*). We averaged participants' scores, in that higher scores indicated greater egalitarianism ($\alpha = .65$, $\omega = .78$).

Results

Intergroup Time Bias

Replicating previous results, participants invested more time in forming first impressions of White than Black patients, $F(1, 119) = 19.797$, $MSE = .074$, $p = .001$, $\eta_p^2 = .143$. The main effect of trait valence was also significant, $F(1, 119) = 103.130$, $MSE = .078$, $p = .001$, $\eta_p^2 = .464$: Participants spent more time making judgements of positive traits than negative traits. However, these significant main effects were qualified by a significant Race × Valence interaction, $F(1, 119) = 3.868$, $MSE = .040$, $p = .001$, $\eta_p^2 = .031$. Simple effects showed the same pattern of results found in Study 1; that is, a stronger ITB effect when participants were judging negative traits ($b = .146$, $SE = .028$, $p = .001$, $d = .938$), as compared to positive traits ($b = .074$, $SE = .033$, $p = .027$, $d = .409$; see mean values of response latencies in Table 2).

Trait Judgments

Consistent with the previous findings, we observed no significant main effect of patients' skin color on trait judgments, $F(1, 119) = .453$, $MSE = .139$, $p = .453$, $\eta_p^2 = .004$. However, we found a significant main effect of traits' valence, $F(1, 119) = 299.550$, $MSE = 1.346$, $p = .001$, $\eta_p^2 = .716$, indicating that participants judged patients more positively than negatively. Moreover, participants judged Black patients less negatively than White patients ($b = .056$, $SE = .028$, $p = .047$, $d = .37$) but did not differ between the two groups when judging positive traits ($b = .102$, $SE = .069$, $p = .143$, $d = .27$). The interaction was not strong enough to reach the significance threshold, $F(1, 119) = 3.860$, $MSE = .195$, $p = .052$, $\eta_p^2 = .031$ (see the second panel of Table 2).

Correlates the ITB

We regressed the ITB effect on the D-IAT, racism and egalitarianism scores and explored the interaction between these variables (Table 3). In Figure S3 of the Supplemental Material, the estimated interaction effect is further elaborated. It reveals a significant IAT × Racism interaction for less egalitarian participants ($b = -.211$, $SE = .106$, $p = .046$), an effect that is absent for more egalitarian participants ($b = .089$, $SE = .146$, $p = .543$). Despite this contrasting effect pattern, the three-way interaction among egalitarianism, explicit racism, and implicit racial bias was not significant.

The ITB in Racism Profiles

The results of this study indicated that aversive racist participants exhibited an ITB effect that was significantly higher than zero ($b = .133$, $SE = .059$, $p = .024$, $d = .412$). This effect was also observed in nonprejudiced participants ($b = .122$, $SE = .055$, $p = .028$, $d = .402$). However, the effect was not significant among consistently

prejudiced participants ($b = .111$, $SE = .066$, $p = .091$, $d = .308$; see Figure 1). Further comparisons revealed that the ITB effect in aversive racists did not differ significantly from the other profiles pooled ($b = .016$, $SE = .071$, $p = .817$, $d = .042$). Contrast-based comparisons showed that the ITB effect in participants with an aversive racist profile did not significantly differ from that observed in consistently prejudiced ($b = .022$, $SE = .089$, $p = .807$, $d = .044$) or nonprejudiced participants ($b = .011$, $SE = .076$, $p = .885$, $d = .026$).

Discussion

Results from this study show that White medical trainees invested more time forming impressions of White than Black male patients from the national health care system. Moreover, participants judged Black patients less negatively than White patients. Importantly, we replicated previous findings as participants with an aversive racist profile exhibited the ITB effect. Also, we found that nonprejudiced participants showed the ITB effect, and this was not significantly different from that found among aversive racist participants. Although the previous studies and our current research provide valuable insights into the time invested in patients' impression formation, the experimental paradigm we used did not allow us to investigate other aspects of face perception that may be involved in the impression formation processes and potentially correlated with the ITB effect.

Previous evidence suggests that patterns of visual attention related to specific areas of interest, such as the eyes, mouth, and nose, as well as the proportion of fixations toward Black and White individuals, can predict intergroup biases (Bean et al., 2012; Friesen et al., 2019; Hills & Pake, 2013). For instance, Kawakami et al. (2014) found that White individuals tend to focus more on the eyes of White (vs. Black) individuals across both free-viewing instructions and in the context of a recognition task. Although a recent re-analysis by Correll and Hudson (2020) cast doubt on such findings, subsequent investigations by Burgund (2021), Cassidy et al. (2019), and Friesen et al. (2019) provide additional evidence that the nature of visual attention in an interracial context varies based on race of both perceivers and targets. For example, Friesen et al. (2019) found that White participants spent more time looking at the eyes of White faces than Black faces when evaluating positive emotional expressions, and that attention to the eyes predicted biases in happiness ratings between true and false smiles on both White and Black faces.

In addition, race-based attentional biases exhibit different patterns as a function of individuals' motivation to appear nonprejudiced (Bean et al., 2012). Using the eye-tracking methodology, Bean et al. (2012) found that when individuals who were highly externally motivated to appear nonprejudiced were presented with images of Black and White male faces, they exhibited patterns of looking behavior consistent with a vigilance avoidance pattern. In other words, they initially looked toward Black faces and subsequently avoided them. In contrast, individuals low in external motivation demonstrated a largely indifferent-looking pattern. These findings suggest that the study of visual attention may contribute to our understanding of time investment biases in patient impression formation, as it may allow us to understand whether there are elements in the impression formation process for which medical trainees invest more time in one social group compared with another. In Study 4, we addressed such aspects by adapting the paradigm of impression formation to an eye-tracking procedure.

Study 4

In this study, we sought to replicate the ITB effect with White medical trainees while forming impressions of patients using an eye-tracking procedure. First, we analyzed whether an ITB effect emerged using a different experimental paradigm. Then, we explored how fixation on specific areas of patients' faces (e.g., eyes, mouth, nose, and whole face), as well as on positive and negative stimuli is associated with the ITB effect. Specifically, we explored whether participants would invest more time looking at the faces of White (vs. Black) patients. Previous studies by Friesen et al. (2019) have shown that White participants bias their eye gaze by looking more into the eyes of White people (a sign of more engaged interpersonal interaction), while fixating more on the nose and mouth of Black people (i.e., aspects of the face that signals Afrocentric features). Considering this, we also explored whether participants would look more at the nose and mouth of Black (vs. White) patients (Bean et al., 2012; Friesen et al., 2019). Furthermore, we predicted that positive or negative information associated with patients' faces would moderate these relationships. Specifically, racial bias might become more accessible to participants when making judgments about negative traits for Black patients, and such awareness, according to the aversive racism theory (J. F. Dovidio & Gaertner, 2004), could elicit an aversive response, prompting them to disengage from the task. Thus, it is likely that, when judging patients using negative traits, fixations on Black patients are expected to be avoided more than on White patients. Finally, we examined the relationship of these hypotheses with different racist profile expressions and participants' avoidance of forming prejudiced impressions of patients.

Method

Participants and Experimental Design

Fifty-eight Portuguese White medical students, mostly female (63.8%), aged between 18 and 29 years old ($M = 22.13$; $SD = 2.29$) took part in a study on forming impressions of patients. They were in their first (10.3%), second (6.9%), third (20.7%), fourth (15.5%), fifth (10.3%), and sixth (36.2%) year of training. A sensitive power analysis indicated that this sample size had the power of .80 to detect an expected effect of $f = .37$ with $\alpha = .05$ in our research design. Participants were rewarded with €10 gift card.

Procedure and Material

We recruited White medical trainees from two Portuguese medical schools to participate in a face-to-face experimental study. The invitation was disseminated by student organizations at these institutions, as well as by researchers through the LinkedIn social platform. Upon confirming their medical student status and indicating the year of training, participants were first asked to form patient impressions, and then complete the implicit association test and the racism and egalitarianism measures.

We adapted the impression formation task used in Study 3 to the Eye Link software. Because in eye-tracking fixation points are pivotal to observing the most relevant areas of the participants' field of vision, the fixation cross randomly appeared in one of four locations around the screen (i.e., top middle, bottom middle, left middle, right middle) before displaying each patient face (i.e., as in previous studies, participants evaluated four Black and four White

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fictitious patients from the national health care system). Participants had to look at the fixation cross for 150 ms before it disappeared and the patient's face appeared (see Bindemann et al., 2009; Hills et al., 2013a, 2013b). In addition, standardized areas of interest (i.e., patient's entire face, eyes, nose, mouth, and word stimuli) were set to measure participants' time investment and gaze fixations. The areas of interest were first defined in pixels and standardized across patients (see Supplemental Material, for the areas of interest). We then converted the areas established in pixels to centimeters. The data presented in this article were standardized from milliseconds to seconds per square inch. The resulting quotient was rescaled to vary from 0 to 10, in that the higher the value, the greater the quantity of time and number of gaze fixations in the areas of interest.

Measures obtained from the impression formation task in this study include time spent and gaze fixations on specific areas of patients' faces and word stimuli. Additionally, data were collected on the total time participants invested in forming first impressions of the patients, consistent with the approach taken in Studies 1–3. In accordance with the previous studies, we also assessed trait judgments and participants' avoidance of forming prejudiced impressions was calculated from such judgments.

Implicit Racial Bias. As in the previous studies, we used iatgen to measure implicit pro-White bias (Carpenter et al., 2019; Santos et al., 2023). D-IAT scores for participants from this study varied from −.103 to 1.13 ($M = 0.599$; $SD = 0.285$). In this study, we also found an implicit pro-White racial bias, $t(57) = 15.975$, $p = .001$, $d = 4.19$.

Explicit Racism. Racial Beliefs Scale (Vala et al., 2012) was used to measure explicit racism as in the previous studies ($\alpha = .72$; $\omega = .73$).

Egalitarian Beliefs Measure. We assessed the participants' egalitarian beliefs using the egalitarianism dimension of the Social Dominance Orientation scale (Ho et al., 2015), as in Study 3 ($\alpha = .54$, $\omega = .63$).

Results

Intergroup Time Bias

The main effect of patients' skin color was significant, such that participants invested more time in forming impressions of White than Black patients, $F(1, 57) = 4.227$, $MSE = .018$, $p = .044$, $\eta_p^2 = .069$ (see first panel of Table 2). Also, the main effect of the trait valence was significant, $F(1, 57) = 40.830$, $MSE = .027$, $p = .001$, $\eta_p^2 = .417$. Participants spent more time making judgements about positive traits than negative traits for the patients. Moreover, participants significantly invested more time forming first impressions of White than of Black patients regarding negative traits ($b = .058$, $SE = .018$, $p = .002$, $d = .834$), but this effect did not reach significance when the traits were positive ($b = .016$, $SE = .025$, $p = .545$, $d = .158$). However, the interaction between the patient's skin color and valence was not significant, $F(1, 57) = 2.597$, $MSE = .010$, $p = .113$, $\eta_p^2 = .044$.

Trait Judgments

ANOVA analysis indicated a significant main effect of patients' skin color on trait judgments, $F(1, 57) = 10.595$, $MSE = .092$, $p = .002$, $\eta_p^2 = .157$, such that more traits were judged as characteristic of White than Black patients. The main effect of trait valence was also significant, $F(1, 57) = 190.921$, $MSE = 1.544$, $p = .001$, $\eta_p^2 = .770$: participants judged patients more positively than negatively overall. Unlike previous studies, we find a nonsignificant interaction between the patients' skin color and trait valence on trait judgments, $F(1, 57) = 1.757$, $MSE = .297$, $p = .190$, $\eta_p^2 = .030$ (see the second panel of Table 2, for descriptive analysis). Pairwise analyses revealed that participants judged White patients more positively than Black patients ($b = .224$, $SE = .094$, $p = .021$, $d = .63$), whereas there was no significant difference regarding negative traits between White and Black patients ($b = .034$, $SE = .067$, $p = .608$, $d = .14$).

Correlates of the ITB

Consistent with Study 2, we found a significant association between the avoidance of forming prejudiced impressions and the ITB effect. Figure S4 in the Supplemental Materials further elucidates the relation among implicit and explicit racial biases, and egalitarianism support with the ITB effect, highlighting a distinctive relationship between implicit prejudice and explicit racism among more egalitarian individuals ($b = .286$, $SE = .158$, $p = .070$) compared to their less egalitarian counterparts ($b = -.041$, $SE = .083$, $p = .626$). However, this nuanced pattern was not reflected in the three-way interaction among the variables.

The ITB in Racism Profiles

As predicted, results showed that aversive racist participants exhibited an ITB effect that significantly differed from zero ($b = .165$, $SE = .071$, $p = .021$, $d = .607$). For the other racial attitudes profiles, the effect was nonsignificant: consistently prejudiced ($b = -.015$, $SE = .083$, $p = .854$, $d = -.048$); and nonprejudiced profiles ($b = .001$, $SE = .083$, $p = .996$, $d = .001$; see Figure 1). Additional analyses showed that the ITB effect was slightly higher for aversive racists than for the pooled other profiles, but the difference was not large enough to reach the significance threshold ($b = .173$, $SE = .099$, $p = .081$, $d = .458$). A similar nonsignificant pattern of results emerged when comparing the ITB effect for individuals with an aversive racist profile and consistently prejudiced ($b = .180$, $SE = .111$, $p = .104$, $d = .426$), and nonprejudiced participants ($b = .165$, $SE = .118$, $p = .160$, $d = .368$).

Time Investment and Gaze Fixations in Areas of Interest

Time Investment. Concerning the time invested by participants looking at patients' faces and word stimuli (i.e., traits), we found significant effects of the valence, $F(1, 57) = 28.258$, $MSE = .427$, $p = .001$, $\eta_p^2 = .335$, and the area of interest, $F(1, 57) = 10.149$, $MSE = 6.383$, $p = .002$, $\eta_p^2 = .153$: Participants invested more time looking at faces and traits when the valence was positive (vs. negative) and invested more time looking at traits than at the patients' faces. Additionally, participants invested more time looking at the faces of White than Black patients when faces were associated with negative traits ($b = .172$, $SE = .072$, $p = .020$, $d = .30$). This was not the case with positive traits ($b = -.110$, $SE = .087$, $p = .208$, $d = -.17$). Considering the amount of time participants invested looking at the traits, the same pattern of results was found. Participants gazed longer at negative word stimuli associated with White patients than Black patients ($b = .236$, $SE = .088$, $p = .010$, $d = .35$). No significant differences were found for positive stimuli ($b = .099$, $SE = .144$, $p = .496$, $d = .10$). Mean values of response latencies are shown in Table 4.

Table 4

Area-Standardized Total Fixation Duration and the Number of Fixations to Each Area of Interest (With Standard Deviations Study 4)

	Face		Stimuli		Eyes		Nose		Mouth	
Valence	White	Black	White	Black	White	Black	White	Black	White	Black
Latencies										
Positive	3.02 (1.44)	3.13 (1.67)	3.48 (1.24)	3.37 (1.22)	2.00 (1.16)	2.01 (1.43)	3.55 (1.49)	3.66 (1.73)	1.55 (.727)	1.51 (.916)
Negative	2.44 (1.21)	2.27 (1.15)	3.65 (1.42)	3.39 (1.08)	1.58 (.865)	1.51 (.628)	3.55 (1.49)	3.08 (1.26)	1.40 (.638)	1.36 (.687)
Fixations										
Positive	3.70 (1.57)	3.99 (1.86)	4.06 (1.85)	4.12 (2.03)	1.23 (1.20)	1.39 (1.44)	2.74 (1.79)	2.75 (1.98)	.730 (.667)	.728 (.757)
Negative	3.25 (1.29)	3.08 (1.22)	4.08 (1.85)	4.07 (1.86)	1.07 (1.00)	.896 (.817)	2.32 (1.46)	2.25 (1.42)	.653 (.651)	.623 (.538)

Note. Data were standardized from milliseconds to seconds per square inch. After, it was rescaled to vary from 0 to 10. The higher the value, the greater the time and number of fixations in the areas of interest.

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In relation to the three specific patient face areas (i.e., eyes, nose and mouth), we also found significant effects of the valence, $F(1, 57) = 25.105$, $MSE = .378$, $p = .001$, $\eta_p^2 = .404$, and area of interest, $F(1, 57) = 74.092$, $MSE = 2.341$, $p = .001$, $\eta_p^2 = .667$. Participants fixated longer on positive than negative stimuli. They also invested more time looking at the patients' noses than their eyes ($b = 1.645$, $SE = .207$, $p = .001$, $d = 1.12$) and mouths ($b = 2.00$, $SE = .165$, $p = .001$, $d = 1.83$; see Table 4). No other main or interaction effect was significant. The associations of these results with the different racist profiles were also not significant.

Gaze Fixations. Regarding the gaze fixations frequency in the patients' faces and traits, we also found significant effects of the valence, $F(1, 57) = 22.120$, $MSE = .629$, $p = .001$, $\eta_p^2 = .280$, and the area of interest, $F(1, 57) = 4.080$, $MSE = 9.555$, $p = .048$, $\eta_p^2 = .067$: Participants gazed more frequently when the valence was positive (vs. negative) and more in the traits than the patients' faces. Of greater importance, the interaction between skin color, valence, and area was significant, $F(1, 57) = 5.898$, $MSE = .175$, $p = .018$, $\eta_p^2 = .094$. When the traits associated with the patients were negative, participants gazed more frequently at the faces of White than Black patients ($b = .168$, $SE = .076$, $p = .032$, $d = .29$). When the information was positive, however, they gazed at the faces of Black patients more frequently than White patients, ($b = .290$, $SE = .063$, $p = .001$, $d = .61$). Means of gaze fixations are presented in Table 4.

Considering the gaze fixations in specific patients' facial areas (eyes, mouth, and nose), the main effects of the valence of traits, $F(1, 57) = 28.886$, $MSE = .514$, $p = .001$, $\eta_p^2 = .336$, and the area of interest, $F(1, 57) = 41.253$, $MSE = 5.207$, $p = .001$, $\eta_p^2 = .596$, were significant. Participants gazed more times when the traits associated with the patients' faces were positive than negative. They also gazed more frequently at patients' noses than mouths ($b = 1.840$, $SE = .202$, $p = .001$, $d = 1.19$) and their eyes ($b = 1.373$, $SE = .247$, $p = .001$, $d = .73$). The three-way interaction between the patients' skin color, valence of the traits, and area of interest was significant, $F(1, 57) = 4.325$, $MSE = .163$, $p = .018$, $\eta_p^2 = .134$. Simple effects showed that when the traits were negative, participants gazed more frequently at the eyes of White than Black patients ($b = .182$, $SE = .062$, $p = .005$, $d = .38$). However, the opposite pattern of results was found for positive traits: participants gazed more frequently at the eyes of Black (vs. White) patients when positive traits were associated with them ($b = .152$, $SE = .047$, $p = .002$, $d = .42$; see Table 4). Nevertheless, the relationship between these outcomes and racist profiles was not statistically significant.

Gaze Fixations and the ITB Effect

Next, we explored the relationship between the ITB effect and race-based differences in visual attention by examining gaze fixations on specific areas of patients' faces and word stimuli (i.e., traits). Our results demonstrate that the ITB effect is positively correlated with the frequency of gaze fixations on the faces of White patients when traits associated with them were either negative ($r = .436$, $p = .001$) or positive ($r = .326$, $p = .013$). In contrast, the correlation between the ITB effect and the frequency of gaze fixations on the face of Black patients was nonsignificant ($r = .159$, $p = .232$) when traits were negative, but significant when traits were positive ($r = .272$, $p = .039$). Upon comparing these correlations using Fisher's *r*-to-*Z* Transformation (Eid et al., 2011), we observed a trend suggesting a slightly stronger correlation for White patients with negative traits compared to Black patients, though this difference did not reach statistical significance ($Z = 1.61$, $p = .054$). For positive traits, no significant difference was found in the strength of correlations between White and Black patients ($Z = .311$, $p = .378$).

Interestingly, we found a positive correlation between the ITB effect and the number of fixations on the eyes of White patients when traits associated with patients were negative ($r = .446$, $p = .001$) and positive ($r = .404$, $p = .002$). Although the correlation between the ITB effect and the frequency of fixations on the eyes of Black patients was not strong enough to reach significance when traits were negative ($r = .238$, $p = .072$), it was significant when traits were positive ($r = .405$, $p = .002$). Subsequent analyses comparing the strengths of these correlations revealed that when considering negative ($Z = 1.243$, $p = .107$) and positive ($Z = -.006$, $p = .497$) traits, there was no significant difference in the strengths of the correlations between White and Black patients.

With regard to gaze fixations on word stimuli, when considering Black patients, there was a negative correlation between the ITB effect and the frequency of fixations on negative traits ($r = -.307$, $p = .019$), but not positive traits ($r = -.176$, $p = .187$). For White patients, the negative correlations between the ITB effect and the frequency of fixations on positive traits ($r = -.240$, $p = .070$) and for negative traits ($r = -.212$, $p = .110$) did not reach the significance threshold. Further comparisons showed no significant differences in the strength of the correlations for negative traits between White and Black patients ($Z = -.535$, $p = .296$). Similarly, no significant differences emerged for positive traits ($Z = .351$, $p = .363$).[4]

[4] The correlations between the ITB effect and the other areas of interest, such as the mouth and nose, were not significant.

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Discussion

Replicating previous studies, White medical trainees invested more time in forming impressions of White (vs. Black) male patients from the national health care system. Moreover, participants who exhibited an aversive racist profile demonstrated a significant ITB effect. Notably, these findings further demonstrate that participants invested more time assessing the information (i.e., traits) associated with patients' faces than evaluating those faces themselves. In addition, more time was invested in assessing the faces of White (compared to Black) patients, especially when the information associated with them was negative. This was also reflected in the frequency of gaze fixations in the face and eyes of White (vs. Black) patients. In other words, when Black patients were associated with negative traits, participants invested less time in forming impressions, as well as they gazed less at them. Correlation analyses captured this pattern of results, as the ITB effect was associated with increased gaze fixations on White patients' faces and eyes, particularly when these patients were associated with negative traits. However, this effect occurred only when traits were positive for Black patients. Also, our study revealed a correlation between the ITB effect and participants' gaze fixations on negative traits that were paired with Black patients. Specifically, the more biased the participants' time in favor of White (vs. Black) patients, the more they tended to fixate on negative traits associated with Black patients.

Again, this pattern of associations of the ITB with gaze fixations is consistent with the aversive racism framework. When judging Black patients with negative traits, participants may become aware of the possibility of being racist or perceived as racist by others, both of which are aversive to them and lead to faster disengagement and lower visual attention to Black individuals in the negative valence domain. In fact, this possibility is also consistent with the association of the avoidance of forming prejudiced impressions with the ITB effect, which replicates findings from Study 2. That is, participants responded quicker, stating "no" to negative trials for Black patients, potentially to show that they do not hold negative attitudes toward Black individuals.

An alternative, yet complementary, explanation for the results relies on the violations of expectations that participants might have toward social groups (Jussim et al., 1987; Nicholls & Rice, 2017). For instance, if individuals have aversive negative expectations of Black people, they may be more likely to fixate on them when they exhibit positive traits, possibly to confirm the authenticity of the positive trait. Conversely, if individuals have positive expectations of White people, they may be more inclined to fixate on them when they exhibit negative traits, possibly to validate the genuineness of the negative trait. This possibility alludes to some physiological effects observed in the brain by Li et al. (2016). They found that the dorsomedial prefrontal cortex, a brain region known to support impression formation, exhibits higher activity when individuals are exposed to stimuli that contradict race-related expectations. Our findings could inform future studies examining the intersection between the ITB effect and cognitive expectations in the process of impression formation.

Given that participants in our study invested more time evaluating the information (i.e., traits) associated with patients than assessing their faces themselves, our findings point to experimental evidence for a phenomenon currently observed in the context of the doctor–patient relationship: Health care providers focus more on clinical case protocols than on building relationships with patients; in other words, they invest less time in the doctor–patient interaction and observation of patients (Asan et al., 2014; Botrugno, 2021; Guimarães, 2018). This lesser time invested in observing Black patients, especially when contextual information is negative, is worrying as previous research has shown that health care providers typically determine whether patients look sick when forming first impressions about them (Balla et al., 2012; Beglinger et al., 2015; Bösner et al., 2014; Kostopoulou et al., 2016). However, although there is such evidence that physicians' initial clinical impressions of patients can be linked to subsequent diagnoses, and our previous studies have demonstrated that White medical trainees invest more time in forming impressions of White than Black patients, we have not yet examined the downstream consequences of the ITB effect on health care outcomes for patients. Additionally, one could argue that determining whether a trait matches a face is somewhat different from getting to know a patient, such as understanding the details of their injury. In Study 5, we addressed these issues by testing the hypotheses that the ITB effect occurs in other clinical tasks beyond patient impression formation and that it is stronger in participants with an aversive racist profile (vs. consistently prejudiced and nonprejudiced). Moreover, we explored the consequences of the ITB on diagnostic accuracy, pain assessment, and medication prescription.

Study 5

Accurately diagnosing medical conditions and recommending effective treatments requires physicians to exercise deliberate reasoning and diligence (Lighthall & Vazquez-Guillamet, 2015). Given the complexity of these tasks, it is crucial for doctors to dedicate sufficient time to analyzing clinical cases (Elia et al., 2016; Lighthall & Vazquez-Guillamet, 2015; Moulton et al., 2007) to achieve satisfactory results. However, if providers' investment of time in assessing clinical cases is influenced by the skin color of patients, it can lead to biased medical decisions, affecting the accuracy of diagnoses and subsequent treatment recommendations. This study investigated the impact of the ITB effect on health care outcomes. Specifically, we tested the hypothesis that White medical trainees invest more time evaluating a clinical case, diagnosing, assessing pain, and recommending medication for White than for Black patients. Additionally, we explored whether the greater amount of time invested leads to greater diagnostic accuracy, different levels of pain assessment and more appropriate medication prescriptions for patients. Based on our previous findings, where medical trainees with an aversive racist profile consistently express the ITB effect while forming impressions of patients, we further expected that the ITB effect will be higher among those who strongly endorse egalitarian beliefs and are high in implicit bias towards Black individuals, leading to better health care outcomes for White (vs. Black) patients.

Method

Participants

A total of 212 Portuguese medical trainees were invited to participate in a study on the quality of medically relevant tasks. Nineteen participants were removed because they did not meet the following inclusion criteria: self-identified as Portuguese, White, and

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enrolled in the fifth or sixth year of medical school. The last inclusion criterion ensured that the participant sample had a clinical background that roughly resembled that of newly graduated physicians in Portugal: In Portuguese medical schools, trainees in their fifth and sixth years are exposed to various hands-on learning experiences, including practical classes, patient simulation centers, and clinical internships. Our final sample consisted of 193 White individuals (69% male) between the ages of 21 and 34 ($M_{age} = 23.83$; $SD = 2.04$) who were in their fifth (39.1%) and sixth (60.9%) year of medical training. We used a between-subject design in which participants were randomly allocated to one of two conditions: Black Patient ($n = 97$); White Patient ($n = 96$). A sensitivity analysis indicated that this sample size has a power of .80 to detect an ITB effect of $f = .20$ or higher, and a power of .90 for detecting an indirect effect in a mediation analysis (Schoemann et al., 2017; Zhang & Yuan, 2018).

Procedure

Consistent with the methods used in Studies 2 and 3, data collection for this study was carried out online using the Qualtrics platform, and we adhered to the same participant recruitment procedures as previous studies. At the outset of the study, participants indicated their years in medical training and were provided with a cover story outlining the study's objectives and details. The cover story stated that the study aimed to evaluate the quality and relevance of clinical tasks for future medical studies. Participants were then instructed to assess a clinical scenario and were randomly assigned to a clinical case of either a White or Black patient. After performing the case assessment, participants were presented with six potential diagnostic alternatives in random order, one at a time. The participant's task was to indicate whether each alternative was appropriate or not for the case. Subsequently, participants were asked to indicate the level of pain they believed the patient was experiencing and then to prescribe the amount of opioid analgesics they would prescribe per day for the patient. Participants were also asked to complete an implicit association task, followed by measures of support for egalitarian beliefs and information related to their sociodemographic background. The study took an average of 14 min to complete. Participants were debriefed about the study's objectives and the use of a cover story and were compensated with a €10 gift card. Similar to Studies 2 and 3, we also restricted participants to access the questionnaire solely from computers (Carpenter et al., 2019).

Clinical Case Selection and Pretest. We selected the clinical case from a Portuguese national evaluation exam that medical trainees are required to pass before beginning their specialization practices within a medical career. The case was later adapted by a specialist physician to represent the situation of a *migraine aura* and to preserve the exam's confidentiality. Specifically, we first conducted a focus group with six Portuguese physicians who evaluated the clinical case, suggested changes, and provided feedback on the clarity, objectivity, and attribution of the clinical situation to the patient's race or gender. Subsequently, we conducted a pretest with 14 Portuguese physicians to determine whether the case portrayed symptoms commonly exhibited by specific ethnic or gender groups that could confound the study results. The pretest findings confirmed the results from the focus group, indicating that the case was equally prevalent in White and Black patients and depicted a scenario frequently encountered in daily medical practice, with medium complexity. For further details on the pretest, please refer to the Supplemental Materials.

Patient Skin Color Manipulation. To manipulate patient skin color in the study, we presented participants with digitally blurred photos of a Black or a White male individual (DeBruine & Jones, 2017), which were displayed alongside the clinical case. We informed participants that the patient's face had been blurred to ensure their privacy.

Measures

Time Investment. Similarly to previous studies, we used one of the features in Qualtrics to record participants' response time while they assessed the clinical case, diagnosed the patient, indicated their pain level, and prescribed medication. Because health care outcomes were identified progressively as participants responded to the study's tasks, it was crucial to account for the time invested in each clinical task when predicting the outcomes of interest. To this end, we computed three indices that represented the duration of assessing, diagnosing, indicating the pain, and prescribing medication as participants progressed through the study. The first index considered the time participants invested in assessing the clinical case and indicating diagnostic alternatives ($\alpha = .698$) when predicting diagnostic accuracy. The second index considered the time spent assessing the clinical case, diagnosing the patient, and assessing the patient's pain level ($\alpha = .773$) in predicting patient pain levels. Finally, the third index considered the time invested in the case assessment, diagnosing, and prescribing medication ($\alpha = .716$) to predict the amount of opioids indicated for the patient.[5] As in previous studies, outlier analyses were conducted and trials that deviated beyond 2.0*SD*s from each variable's mean were excluded (Ratcliff, 1993; Tabachnick & Fidell, 2001).

Diagnostic Alternatives. Participants were presented with six potential diagnostic alternatives, three of which were correct, and three were incorrect.[6] Participants were asked to indicate whether the diagnostic alternatives were adequate or not in diagnosing the case. We created an accuracy diagnostic indicator by scoring the responses 1 if the participant answered all options correctly and 0 if they did not.

Pain Assessment. We asked participants to indicate how much pain they believed the patient in the clinical case they evaluated was experiencing (0 "no pain"—10 "extreme pain"; Hirsh et al., 2015).

Medication Prescription. Participants were asked to indicate the amount of opioid analgesics they would prescribe per day in milligrams (ranging from 0 to 1,000) to the patient presented in the clinical situation. However, given the pathophysiological role of opioids in migraine progression, they should be avoided in migraine

[5] In our methodological approach, a key tenet was the preservation of chronological integrity. This meant that the time measure of a later task was not allowed to influence the outcomes of a preceding task.

[6] Four of these hypotheses were initially taken from the national evaluation exam that medical trainees must pass before starting their specialization. Out of these, only one hypothesis, namely migraine aura, was found to be correct, while the remaining three were related to retinal problems. To ensure our measure's robustness and avoid any unintended bias from an overemphasis on incorrect alternatives, it was essential to maintain a balanced distribution between correct and incorrect answers. Hence, our medical advisors recommended the inclusion of two additional terms synonymous with 'migraine aura'. These terms were not just randomly selected but were clinically accurate, ensuring that our diagnostic measure remained rigorous and relevant.

patients (Casucci & Cevoli, 2013; Lim et al., 2021; Lipton et al., 2020; Machado-Duque et al., 2023). Therefore, based on the patient's clinical case presented to participants, the prescription of opioids would be considered increasingly inappropriate with higher milligram amounts for medical treatment. As such, our emphasis on opioids in this study serves a dual purpose. First, it highlights the inappropriate medical practices that still persist in clinical settings. Second, and more pertinently, it allows us to evaluate biases not just in terms of treatment quantity but also in the quality of the prescribed treatment.

Implicit Association Task. Consistent with previous studies (Carpenter et al., 2019; Santos et al., 2023), we utilized iatgen to measure implicit pro-White bias. In general, participants' D-IAT scores ranged from −.875 to 1.36 ($M = 0.584$, $SD = 0.350$), and we found an implicit pro-White racial bias in both the White patient, $t(87) = 16.481$, $p = .001$, $d = .328$, and Black patient conditions, $t(78) = 13.928$, $p = .001$, $d = .376$. The implicit racial bias expressed between experimental conditions did not differ significantly, $t(2, 164) = .027$, $p = .870$, $\eta_p^2 = .001$.

Egalitarian Beliefs Measure. To measure participants' egalitarian beliefs, we followed the same procedures as in Studies 3 and 4 ($\alpha = .650$, $\omega = .638$; Ho et al., 2015).

Results

Time Invested

We first investigated differences in the time invested in the case assessment, proposing diagnostic alternatives, assessing patient pain, and prescribing medication to patients. Multivariate analysis of variance results demonstrated a significant multivariate effect of the patient's skin color, $F(4, 142) = 2.872$, $p = .025$, $\eta_p^2 = .075$. Follow-up ANOVA revealed that participants invested more time assessing the clinical case, $F(1, 182) = 9.772$, $MSE = 148.838$, $p = .002$, $\eta_p^2 = .051$, identifying diagnostic alternatives, $F(1, 178) = 4.823$, $MSE = 185.935$, $p = .029$, $\eta_p^2 = .026$, assessing patient pain, $F(1, 168) = 5.930$, $MSE = 61.796$, $p = .016$, $\eta_p^2 = .034$, and prescribing medication, $F(1, 167) = 11.123$, $MSE = 246.002$, $p = .001$, $\eta_p^2 = .062$, for the White (vs. Black) patient. Table 5 presents the descriptive statistics for the response latencies.

Diagnostic Accuracy, Pain Assessment, and Medication Prescription

A logistic regression was conducted to assess the effect of patients' skin color on diagnostic accuracy. The results indicated that skin color ($B = -.476$, $Wald = 1.870$, $p = .171$) was not a statistically significant predictor of diagnostic accuracy. Subsequently, a multivariate analysis of variance was performed which revealed a nonsignificant main effect of the patient's skin color on both pain assessment and opioid prescription, $F(2, 174) = .705$, $p = .496$, $\eta_p^2 = .008$. Further, follow-up ANOVAs indicated no significant differences in pain assessment, $F(1, 175) = 1.358$, $MSE = 3.091$, $p = .245$, $\eta_p^2 = .008$, or in opioid prescription rates, $F(1, 174) = .013$, $MSE = 35413.403$, $p = .910$, $\eta_p^2 = .014$, between White and Black patients (see the second panel of Table 5, for descriptive statistics).

Table 5
Means (and Standard Deviations) of Measured Variables in Study 5 According to Patients' Skin Color

Variables	White patient *M* (*SD*)	Black patient *M* (*SD*)
Time invested (seconds)		
Case assessment	24.9 (14.2)	19.2 (9.74)
Diagnostic alternatives	24.6 (16.1)	20.2 (10.7)
Pain assessment	17.4 (9.40)	14.5 (5.82)
Medication prescription	26.2 (19.1)	18.1 (10.9)
Decision making		
Diagnostic accuracy	.187 (.392)	.270 (.446)
Patient's pain level	6.73 (1.81)	6.42 (1.70)
Opioids prescription (mg)	159.1 (188.9)	155.9 (187.3)

Note. "Case assessment" refers to the time dedicated to assessing/reading the clinical scenario; "Diagnostic alternatives" pertains to the time spent on the diagnostic task; "Pain assessment" indicates the time allocated to determining the patient's pain level; and "Medication prescription" represents the time taken to prescribe medication to patients.

Mediation Analyses

We examined whether time investment mediates the relationship between patients' skin color and health care outcomes by performing mediation and moderated mediation analyses using MPlus software (8th version; Muthén & Muthén, 2017) with bootstrapping of 5,000 simulations. First, we examined the mediating role of the time investment in the influence of the manipulated patients' skin color (Black vs. White) on diagnostic accuracy. As hypothesized, the results showed a significant indirect effect ($b = .044$, $SE = .023$, 95% CI [.006, .081]; see Table 6). These results indicate that participants invested more time assessing the clinical case and indicating diagnosis alternatives for the White patient, as compared to the Black patient, and the more time invested, the higher the diagnostic accuracy (see Figure S5 in Supplemental Materials, for estimated parameters).

Table 6
Effects' Decomposition of the Mediation Analyses (Study 5)

Healthcare outcomes	Mediation model Estimate	*SE*	95% CI *LL*	*UL*
Accuracy				
Total effect	−.083	.061	−.183	.018
Direct effect	−.126	.060	−.226	−.027
Indirect effect	.044	.023	.006	.081
Pain assessment				
Total effect	.315	.260	−.113	.744
Direct effect	.104	.245	−.299	.507
Indirect effect	.211	.098	.050	.373
Medication prescription				
Total effect	2.98	28.2	−43.4	49.3
Direct effect	14.8	31.6	−37.1	66.9
Indirect effect	−11.8	8.79	−26.3	2.58

Note. The estimates reported in the analyses are unstandardized coefficients. *SE* = standard error; CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

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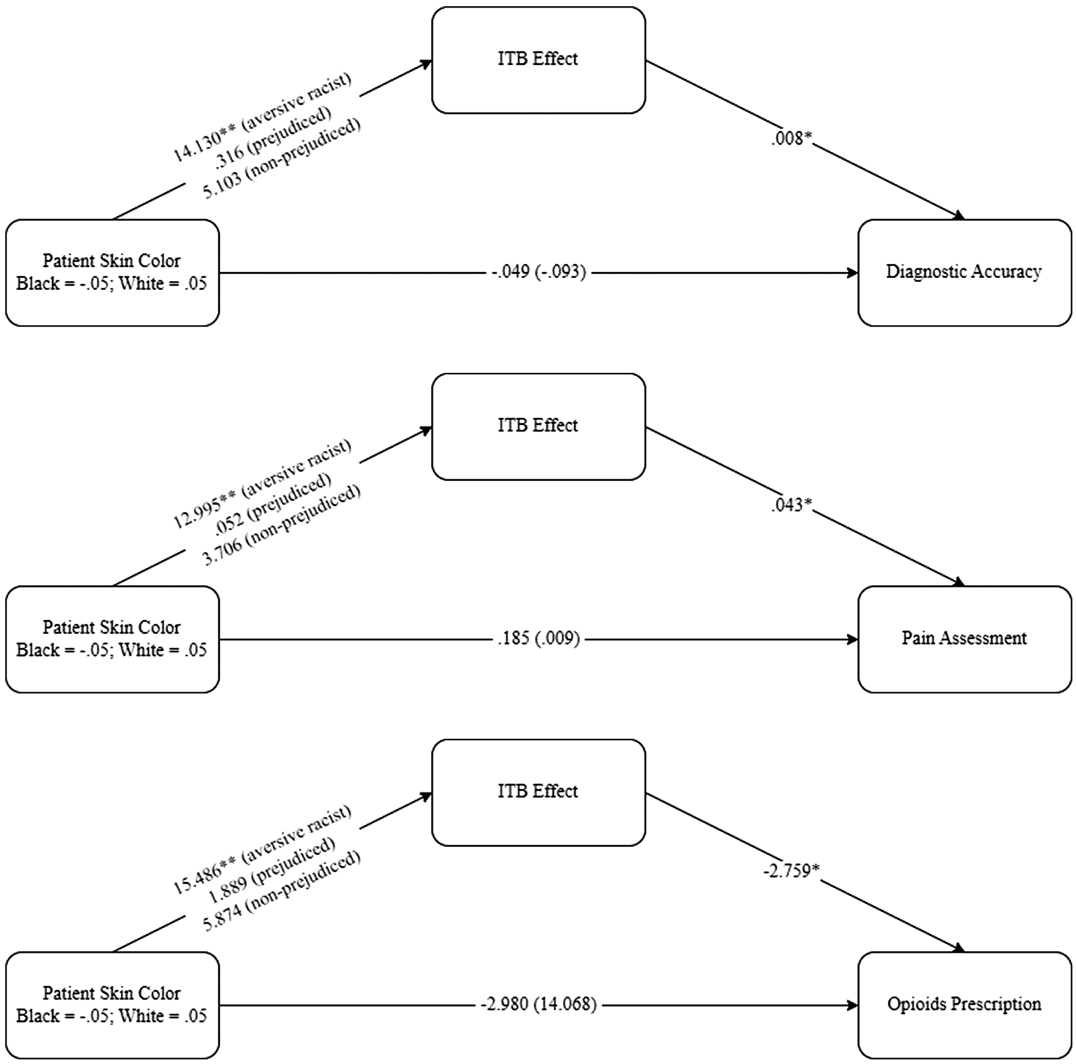
Additionally, meditated effects based on participants' racial attitudes profiles revealed that those who are high in egalitarian beliefs but still harbor implicit racial bias towards Black individuals (i.e., aversive racists) exhibited stronger ITB effect, leading to higher diagnostic accuracy for the White (vs. Black) patient ($b = .118$, $SE = .057$, 95% CI [.024, .212]). This indirect effect was not significant for consistently prejudiced participants ($b = .003$, $SE = .030$, 95% CI [−.047, .052]) or for nonprejudiced participants ($b = .043$, $SE = .050$, 95% CI [−.040, .125]). Pairwise contrasts were conducted to compare the conditional indirect effects among participants with different racist profiles. Results revealed that the indirect effect for aversive racists was significantly higher ($b = .115$, $SE = .056$, 95% CI [.023, .207]) than that of consistently prejudiced, but did not significantly differ from that found among nonprejudiced participants ($b = .075$, $SE = .065$, 95% CI [−.031, .181]). Importantly, this different pattern of moderating effects was significant, as shown by the moderated mediation index ($b = .095$, $SE = .053$, 95% CI [.008, .183]). Figure 2 presents the estimated parameters of the moderated mediation for each racist profile.

We observed the same pattern of results when predicting pain assessment. Specifically, participants invested more time performing the clinical tasks for the White (vs. Black) patient (i.e., case evaluation, diagnosis indication and pain assessment), resulting in a greater perception of pain for the White patient ($b = .211$, $SE = .098$, 95% CI [.050, .373]) (see Table 6, for mediation effects and Figure 5S in Supplemental Materials, for estimated parameters). Upon evaluating this indirect pathway through participant profiles, we found a stronger

Figure 2

Unstandardized Estimated Parameters of Moderated Mediation Analyses in Predicting Diagnostic Accuracy, Pain Assessment, and Opioids Prescription (Study 5)



Note. The figure shows that the time invested mediates the influence of the patient's manipulated skin color on each outcome for participants with different racial attitudes profiles. ITB = intergroup time bias.
* $p < .05$. ** $p < .001$.

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ITB effect in participants with an aversive racist profile, leading to higher pain perception for the White patient compared to the Black patient ($b = .558$, $SE = .279$, 95% CI [.099, 1.01]), as compared to consistently prejudiced ($b = .002$, $SE = .143$, 95% CI [−.233, .237]) and nonprejudiced participants ($b = .159$, $SE = .156$, 95% CI [−.097, .415]; see Figure 2, for estimated parameters). When comparing conditional indirect effects, we found that the indirect effect observed in the aversive racist profile was significantly stronger than that in consistently prejudiced participants ($b = .556$, $SE = .276$, 95% CI [.102, 1.00]), but not different from that found in nonprejudiced individuals ($b = .399$, $SE = .314$, 95% CI [−.118, .916]). These different mediation processes were confirmed by a significantly moderated mediation index ($b = .477$, $SE = .277$, 95% CI [.022, .932]).

Finally, regarding the prescription of opioid medication to patients, we find a nonsignificant indirect effect of the ITB on the relationship between skin color and medication prescription ($b = -11.893$, $SE = 8.798$, 95% CI [−26.3, 2.58]; refer to Table 6 and Figure 5S). However, we conducted further analysis on the indirect effects based on participants' racial attitudes profiles and found that the ITB effect did mediate the relationship between patients' skin color and opioid prescription for individuals with an aversive racist profile ($b = -42.729$, $SE = 24.201$, 95% CI [−82.540, −2.918]), but not with those who are consistently prejudiced ($b = -5.213$, $SE = 10.390$, 95% CI [−22.305, 11.878]) or nonprejudiced ($b = -16.207$, $SE = 17.494$, 95% CI [−44.985, 12.571]; see Figure 2). Participants with an aversive racist profile invested more time evaluating the White patient compared to the Black patient, and as a result, fewer opioids were prescribed to the White patient. A comparison of conditional effects revealed that the indirect effect observed among individuals with an aversive racist profile did not differ from those who were consistently prejudiced ($b = -37.515$, $SE = 24.512$, 95% CI [−77.838, 2.807]) or nonprejudiced ($b = -26.522$, $SE = 23.384$, 95% CI [−64.987, 11.944]). In fact, we did not find a significantly moderated mediation index ($b = -32.018$, $SE = 21.856$, 95% CI [−67.971, 3.935]).[7]

Discussion

In this study, we aimed to further investigate the impact of the ITB effect and its relation to aversive racism on health care outcomes. Results supported our hypotheses, demonstrating that White medical trainees invested more time in assessing the clinical case, identifying diagnostic alternatives assessing patient pain, and prescribing medication for the White (vs. Black) male patient, particularly when they had an aversive racist profile. Although we found nonsignificant differences in diagnostic accuracy, pain assessment, or opioid prescription between White and Black patients, our findings revealed indirect effects of time investment in the influence of the patient's skin color on health care outcomes. Participants invested more time evaluating and answering clinical tasks for the White patient, as compared to the Black patient, and the more time invested, the higher the diagnostic accuracy, pain perception, and lower opioid prescription. To our knowledge, this is the first experimental study to show that time investment bias, resulting from manipulated patient racial categorization, has a detrimental impact on patient health care outcomes.

In addition to replicating the findings of Hirsh et al. (2015) that showed that non-Black physicians take longer to rate the pain of White than Black patients (especially in conditions with high ambiguity), our study extends these findings by demonstrating that greater time investment leads to higher pain perception for White (vs. Black) patients. Furthermore, our findings suggest that the more time invested, the more accurate the diagnosis and treatment recommendation, with lower opioid prescriptions given by participants who exhibit an aversive racist profile. In fact, our results indicate that the ITB effect is present when participants make decisions regarding patients, resulting in biased medical decisions that can impact the accuracy of diagnoses and subsequent treatment recommendations. This provides further support that conceptualizations of disparities in care should include both process (such as time) and outcome variables (such as diagnoses and treatment recommendations; Hirsh et al., 2015).

Another key aspect of our study was the emphasis on opioids. Given the contraindication of opioids for migraines, as noted in Casucci and Cevoli (2013), Lim et al. (2021) and Machado-Duque et al. (2023), prescribing them, especially in elevated milligram amounts, indicates inappropriate treatment. This facet of our research allows for a more nuanced examination of biases. Beyond the simplistic "more or less treatment" paradigm, we delve into the critical domain of "appropriate versus inappropriate treatment," shedding light on biases in the quality of clinical decisions, particularly in the backdrop of racial disparities.

It is noteworthy that the ITB effect was significant for negative traits in all studies related to the impression formation of patients, but it was absent for positive traits in Studies 2 and 4. Also, the ITB effect was significant when clinical information that is neutral in terms of valence (as opposed to traits laden with clear valence) was associated with patients. This raises the question of whether the ITB effect consistently varies with the valence of the stimuli associated with patients; that is, whether it is stronger or only specific to negative traits (vs. positive traits or valence-neutral clinical information). As previously noted, this hypothesis is consistent with the idea that when White participants evaluate Black patients with negative traits, racial bias may become more accessible. This awareness could potentially elicit an aversive response (J. F. Dovidio & Gaertner, 2004), leading to even faster disengagement while forming impressions.

Additionally, we found that participants' avoidance of forming prejudiced impressions predicted the ITB effect in Studies 2 and 4, while this relationship did not occur in Studies 1 and 3. Moreover, while in all five studies developed, we found a significant (different than zero) ITB effect among individuals with an aversive racist profile, this effect varied across the different profiles analyzed. Specifically, Studies 1, and 5 revealed significant differences in the ITB effect for aversive racists compared to consistently prejudiced and nonprejudiced individuals, whereas Studies 2, 3, and 4 showed nonsignificant differences. Given that these specific aspects were not consistent across the studies, and considering the importance of examining whether the ITB varies based on the paradigm and cultural context employed in the studies, it is essential to meta-

[7] We further investigated a potential serial mediation pathway, analyzing the sequential influence of patient skin color on time investment, pain assessment, and opioid prescription. This analysis, however, did not yield significant mediation effects, primarily due to the noncorrelation between perceived pain and medication quantity. Full results are available in the additional online materials at https://osf.io/yj9nc.

analyze the effect sizes we found in all studies to address their reliability. To address these issues, we conducted Study 6.

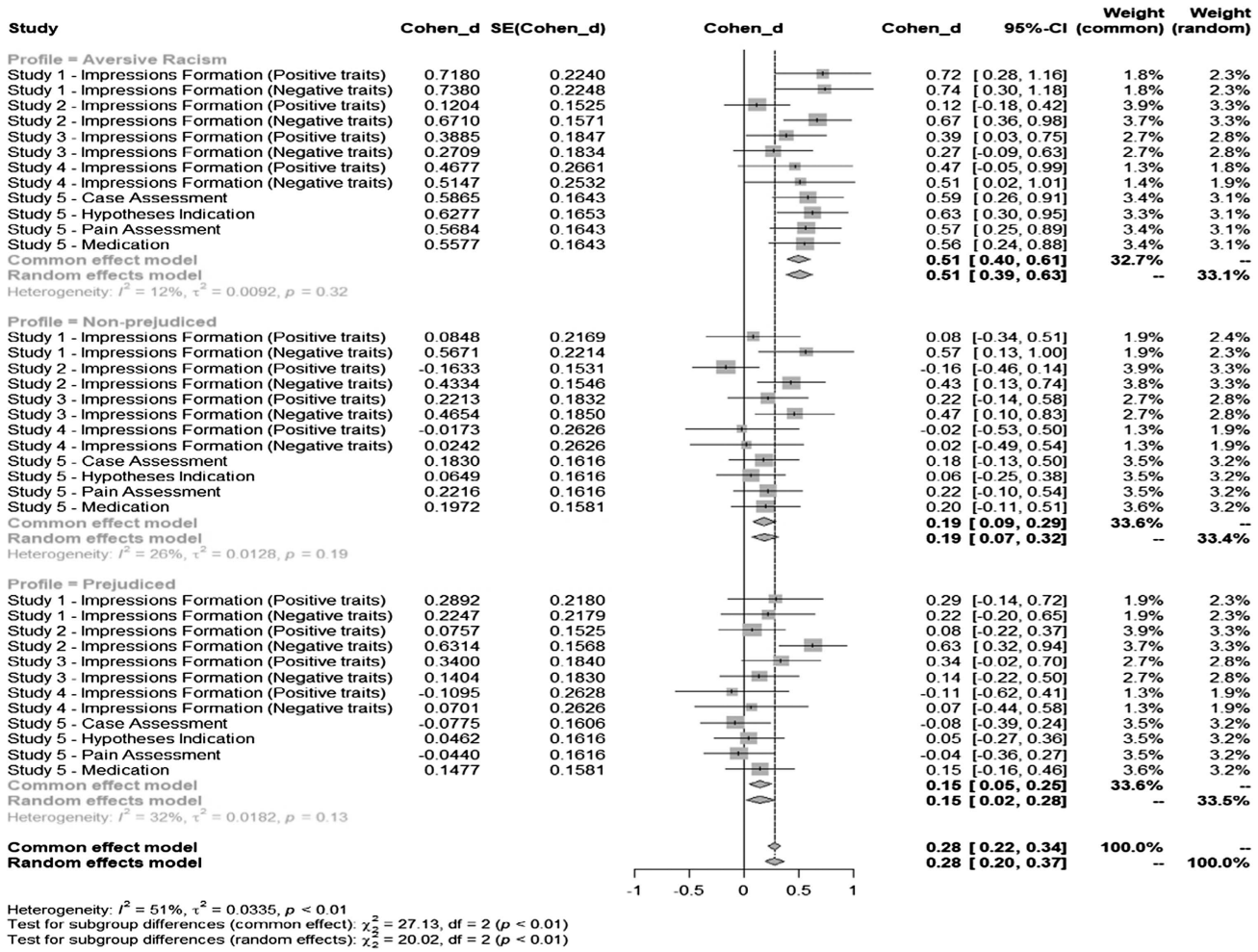
Study 6

In this meta-analysis, we aimed to assess the consistency of the impact of patients' skin color (White vs. Black) on the time investment in impression formation and clinical assessment across studies developed, as well as identify its potential moderators. We first conducted a meta-analysis considering 36 effect sizes, of which 12 were based on data from participants who exhibited an aversive racist profile, another 12 corresponded to the ITB results from participants with consistently prejudiced profile, and the remaining 12 were from nonprejudiced individuals (see Figure 3). Positive values in this analysis indicate that more time was invested in impression formation and clinical assessment for White patients than Black patients, while negative values signify the opposite. We used the metaregression command in the R Package Meta, using Cohen's *d* as an indicator of effect size (Schwarzer, 2015, 2022). Using the restricted maximum likelihood estimation method, we obtained meta-analytical effects for both random and fixed-effects models. The estimated overall meta-analytical Cohen's $d = .28$, confidence interval [CI: .20, .37], indicates the overall effect size of the ITB across studies. However, the significant heterogeneity found in the random-effects model ($\tau^2 = .033$, $p = .001$) indicates that the estimated effect size is not consistent across studies, suggesting the possibility that the ITB effect may be moderated by certain variables within the studies.

To further examine the consistent variation in the ITB effect expression, we delved deeper to explore its potential moderators. Specifically, we examined whether the valence of information (positive vs. negative vs. clinical) associated with patients across studies, the social context (Brazil vs. Portugal), the type of paradigm (impression formation vs. clinical assessment), the avoidance of forming prejudiced impressions (measured in Studies 1–4), and the participants' racial attitudes profiles (aversive racist vs. consistently prejudiced vs. nonprejudiced) moderate the effect. Initially, we conducted a univariate analysis to estimate the association of each

Figure 3

Forest Plot of Meta-Analytic Results: Aversive Racist Versus Consistently Prejudiced Versus Nonprejudiced Profiles



Note. *SE* = standard error; CI = confidence interval; ITB = intergroup time bias. The figure confirms the reliability of the ITB effect size across studies and shows variability between participants' racial attitude profiles.

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Table 7
Estimated Metanalytical Effect of the ITB Effect Moderators

Moderators	Univariate effects		Multivariate effects	
	Estimate	95% CI	Estimate	95% CI
Intercept (ITB)	.284**	[.199, .370]	.285**	[.222, .349]
Valence				
Positive (vs. clinical information)	−.066	[−.262, .131]	−.076	[−.227, .075]
Negative (vs. others)	.192*	[.016, .369]	.206*	[.067, .345]
Social context (Portugal vs. Brazil)	−.177	[−.422, .069]		
Type of paradigm (IFT vs. CAT)	.046	[−.132, .224]		
AFPI	.088	[−.025, .202]		
Attitudes profile				
Nonprejudiced (vs. prejudiced)	.041	[−.132, .214]	.039	[−.114, .193]
Aversive (vs. others)	.338**	[.188, .488]	.335**	[.201, .469]

Note. AFPI = avoidance of forming prejudiced impressions; IFT = impression formation task; CAT = clinical assessment tasks; CI = confidence interval; ITB = intergroup time bias.
* $p < .05$. ** $p < .001$.

moderator with Cohen's *d* for the ITB effect. We then proceeded to the second step, where we included the variable that demonstrated a significant association with the ITB effect in the univariate analysis to estimate the multivariate effect (see Table 7).

The results revealed that only the valence of information associated with patients and participants' racial attitudes profiles were significantly associated with the ITB effect in the univariate analysis. This pattern of results was consistent when considering the multivariate effect. This indicates that, although the ITB effect occurs regardless of the valence of information and participants' racial attitudes profiles, it is stronger in the negative domain and particularly expressed by medical trainees with an aversive racist profile, that is, those individuals who genuinely believe themselves to be egalitarian and not racist but still hold negative attitudes and beliefs towards Black people. These findings provide robust evidence for our hypothesis that time investment in the medical context is influenced by patients' skin color and individuals' racial attitudes.

General Discussion

Throughout five studies conducted in two countries with distinct cultural contexts (Brazil and Portugal), we found that White medical trainees invested more time in forming first impressions (Studies 1–4), assessing diagnostic alternatives, perceiving pain, and making medication prescriptions (Study 5) for White than Black male patients. Additionally, we found that the ITB effect was most pronounced in forming first impressions when negative information was associated with patients (as opposed to positive traits or clinical information). Finally, the ITB effect was not consistently predicted by participants' avoidance of forming prejudiced impressions, but was stronger among individuals with an aversive racist profile (vs. consistently prejudiced vs. nonprejudiced), either in the impression formation or in other clinical tasks domains (Study 6).

Specifically, Study 1 provided preliminary evidence of an ITB effect in a Brazilian medical context, suggesting the existence of a discriminatory behavior in the time investment of White medical trainees. Importantly, this effect was stronger in participants with an aversive racist profile, suggesting that White aversive racist medical trainees invested less time forming impressions of Black patients and more of their time evaluating White patients. In Study 2, using a different set of stimuli in the Portuguese context, the results were replicated, demonstrating that, regardless of the cultural context, White participants invested more time forming impressions of White than Black patients. Also, results showed that participants' avoidance of forming prejudiced impressions was associated with the ITB effect. Because aversive racists consider themselves nonracists and egalitarians, in Study 3 we introduced a measure of egalitarianism to produce a combined pattern of high egalitarianism, low explicit racism and high implicit racial bias. The results supported our main prediction of an ITB effect in aversive racist participants. Although Studies 1, 2, and 3 bring a substantial contribution to understanding bias in time invested in forming impressions of patients, the experimental paradigm used did not allow us to focus on important aspects of face perception, potentially implicated in impression formation processes and likely to correlate with the intergroup time bias. Thus, using an eye-tracking paradigm, Study 4 went further and examined time and gaze fixations on areas of interest such as patients' entire face, eyes, nose, mouth, and word stimuli. The results replicated the ITB effect and its association with participants' avoidance of forming prejudiced impressions and aversive racism, providing further insight into how the valence of traits, when paired with patients during the impression formation process, may relate to the ITB.

While findings from Studies 1–4 have shed light on the ITB effect in the medical context, we did not examine its downstream consequences on health care outcomes for patients. To address this gap, Study 5 involved a clinical assessment task to explore whether the ITB effect occurs during the evaluation of a clinical case, pain assessment, and medication prescribing tasks. Our results demonstrate that the time bias plays a mediating role in the relationship between patients' skin color and health care outcomes. Specifically, for medical trainees exhibiting an aversive racist profile, a greater time investment in White (as opposed to Black) patients led to more accurate diagnostic alternatives. These trainees also perceived more pain in White patients and prescribed them fewer opioids than their Black counterparts. Finally, meta-analyzed data (Study 6) demonstrate that the ITB effect occurs in patients' impression formation regardless of the valence of the information associated with them, the social context and task used, but it is stronger when

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the stimuli are negative and when participants do, indeed, express an aversive racist profile. Taken together, these results demonstrated the first experimental evidence that bias in time investment favoring White (vs. Black) patients is associated with aversive racism and impacts medical health care outcomes.

Theoretical Implications

The current findings provide new insights into the social value of time, its meaning, and its consequences for racialized relationships. Moreover, by demonstrating the ITB effect implications in the health care realm and its relationship with aversive racism, these results extend previous research on providers' racial bias in racially discordant, but also in concordant medical interactions. Regarding the value, meaning, and consequences of time in social relations, we note that studies developed from the social psychology of time theoretical framework have mainly focused on how people think about, organize, and perceive time (for review, see Youngreen & Silcox, 2020). In addition, previous research has sought to understand how these aspects influence the way people relate to themselves and others in their social environment (McGrath, 1988; Youngreen & Silcox, 2020). By considering bias in the investment of time in social interactions, the data from this research program advances discussions in this literature, since time is understood here as a resource that is used to favor ingroup (vs. outgroup) members (Tajfel & Turner, 1979). Furthermore, by shaping patients' assessment, these findings open up new possibilities for understanding the conditions under which time investment bias reflects aversive racist attitudes. Still, previous studies in the context of impression formation have shown that time can mean attention and motivation to form accurate impressions of a person (Brewer, 1988; Neuberg & Fiske, 1987). However, in intergroup relations, time may assume another meaning and reflect the social value of groups (Aguiar et al., 2008; Vala et al., 2012). Accordingly, in radicalized social relations, time investment bias can indicate a nonverbal discriminatory behavior.

When considering the ITB research line, this phenomenon has been demonstrated in racialized and minimal group contexts while individuals form impressions of others, regardless of the valence and stereotypicality of traits, homogenization phenomenon, and internal and external motivation to control prejudice (Aguiar et al., 2008; Vala et al., 2012). The findings from our research program advance the understanding of the ITB in critical ways. First, our studies demonstrate that the ITB effect occurs in the health care context, both in the domain of impression formation and in the performance of clinical tasks, which opens up new possibilities for predicting that this phenomenon might be pervasive across various domains of social life where racialized social relations and relevant social comparison dimensions are present. Second, our study showed that the time bias favoring White over Black patients was observed even when negative, positive, or clinical information was associated with them. However, this phenomenon was stronger when negative information was associated with individuals. Since this effect emerged in the context of impression formation, where racial bias may become more accessible by the association of Black patients with negative traits, we drew upon the aversive racism framework to provide a theoretical explanation. Specifically, we suggest that this effect might be produced by aversive reactions to the idea of showing prejudice, leading participants to disengage even more quickly from Black patients compared to White ones. In fact, our findings show robust evidence that the ITB is more strongly expressed by those who express an aversive racist profile. Finally, by demonstrating the ITB in the context of clinical evaluation, we were able to identify its implications, including worse health outcomes for Black patients compared to White ones.

The present studies also represent an advance in the previous research on provider–patient interactions, showing for the first time that White medical trainees systematically bias their time according to the patient's racial category, regardless of the cultural context that provides a higher or lower quality of health care for the population (i.e., Brazil vs. Portugal) (Araújo et al., 2018). These results corroborate previous findings from health inequalities research, which had already shown using correlational data that doctor–patient interactions tend to be quicker with Black (vs. White) patients (i.e., particularly when providing treatment planning, health education, answering questions, and accessing patients' knowledge about health) (Penner et al., 2016, 2019). Importantly, they also examine in a novel way how future providers who have an aversive racist profile invest their time when placed in situations where they are asked to form impressions, diagnose, assess the pain, and recommend medication to patients from their social group and from a different one. We highlight this theoretical contribution as previous research on the influence of aversive racism in medical care has not addressed racially concordant interactions between physicians and patients. In other words, it has solely examined interactions between non-Black doctors and Black patients and has not accounted for the effect of patients' social groups (e.g., Black vs. White) on aversive racist doctors' conduct (Hagiwara et al., 2016; Penner et al., 2010).

Still, these findings are particularly relevant in the context of medical care and build upon prior research (Elia et al., 2016; Lighthall & Vazquez-Guillamet, 2015; Moulton et al., 2007; Penner et al., 2023), indicating that investing more time in clinical tasks can lead to better health care outcomes for patients. However, our results further showed that time investment in clinical tasks is influenced by the patient's skin color, which is associated with biased health care outcomes. On this matter, a study by Hirsh et al. (2015) found that non-Black physicians invested more time rating pain in White than Black patients. Similarly, our research program has replicated this pattern of results and taken a further step by systematically addressing the consequences of this discriminatory behavior in medical decision making. Indeed, we discovered that the greater the time invested in rating pain, the higher the pain perceived in the patient (as well as better accuracy in diagnosis and medication prescription). These findings provide robust support for the notion that time investment bias has a significant impact on decision-making quality. Therefore, it is critical to understand and address this bias to reduce health disparities. However, future research and interventions should also explore whether the ITB effect manifests in other settings and what its potential consequences are. Such investigations would provide a more comprehensive understanding of this bias and inform the development of more effective strategies to mitigate its impact, ultimately improving decision making across diverse domains.

From an aversive racism perspective, it is stated that people genuinely endorse egalitarian values but nonconsciously hold negative attitudes and feelings toward Black individuals (J. F. Dovidio et al., 2017; Pearson et al., 2009). This pattern explains, to some extent, the progressive decline of expressions of blatant discrimination in several countries with strong societal egalitarian

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values (de França & Monteiro, 2013; Hodson et al., 2005). Instead, discrimination today is, to a large extent, subtler and indirect (J. F. Dovidio et al., 2017). The findings from this research program confirm this pattern of aversive racism, where a great proportion of the sample of (future) physicians endorse both egalitarian values and nonconscious negative feelings toward Black people. Notably, the results align with prior experiments on helping behavior (Gaertner, 1973). Specifically, J. F. Dovidio and Gaertner's (2004) reevaluation of Gaertner's (1973) help behavior study revealed that Democratic Party members tended to end phone calls with Black individuals more quickly than with White individuals, hinting at a possible manifestation of aversive racism. Although the underlying causes of this behavior are not yet fully explored, prior studies have suggested that intergroup anxiety may contribute to avoidance behaviors towards outgroup members (Stephan, 2014). By proposing that individuals' time investment may be unintentionally influenced by the perceived social value of their group membership, we provide further insights into why people might be more prone to disengage from interactions with Black individuals and devote more time to White individuals. Additionally, our research underscores the significance of the temporal dimension of behavior in understanding the consequences of aversive racism in racialized social relations, particularly in clinical settings involving racially concordant and discordant interactions. The present studies, as framed within the theory of aversive racism, thus offer insight into sociopsychological dimensions of time investment in health care, presenting a theoretical explanation for a form of discrimination potentially relevant to explaining the persistence of racial inequalities in medical care. Regarding the operationalization of the racist aversive profile, to our knowledge, this is the first research program to demonstrate a qualified specification of this profile by introducing a measure of egalitarianism. Most research paths have operationalized the aversive profile with a combined measure of explicit and implicit racial prejudice (J. F. Dovidio, 2001; J. F. Dovidio et al., 2017). In Studies 3, 4, and 5, the results suggest that White medical trainees who score low on explicit racism, high in egalitarian values, and yet score high on implicit racial bias, are those who are more likely to invest more time in White patients.

Practical Implications for the Health Care Context

The temporal dimension of the doctor–patient interaction is central to the findings presented here. The demonstrated existence of bias in the time invested in patients may have consequences for the quality of the doctor–patient relationship and critical consequences in medical decision making and diagnostic processes. In this sense, these findings emphasize the importance of studying time investment bias as a key component of the inequalities previously documented in doctor–patient relationships. Moreover, early psychological research on racial/ethnic health disparities largely focused on measuring implicit attitudes (Hagiwara et al., 2020; Hamed et al., 2022). This research has primarily used the Implicit Association Test (IAT; Greenwald et al., 1998) to measure health care providers' implicit bias. Assuming that time is a social value and that individuals are motivated to invest this resource in order to favor their ingroup members, the present study makes a significant contribution by proposing the assessment of an implicit form of discrimination in health care at the group-level.

Moreover, given that in the medical setting, egalitarian norms are often strongly enforced (Hagiwara et al., 2016; Penner et al., 2019), but physicians may hold implicit negative feelings towards and beliefs about Black individuals (J. F. Dovidio et al., 2016; Hagiwara et al., 2020), the aversive racism in the patient assessment context points to the need for research and interventions that consider time bias as a race-based discriminatory behavior in the medical realm. We emphasize this because interventions to reduce disparities in minority health care have primarily focused on decreasing explicit or implicit racial biases and their relationship with clinical decision making or recommendations (Penner et al., 2019). However, an essential factor that underlies practical aspects of health care is often overlooked: Health care professionals' time and effort invested in patient care procedures. Regarding this issue, Saucier et al. (2005), in a literature review encompassing 31 studies conducted between the 1970s and 2000s on aversive racism, found that as the time, difficulty, and effort to help individuals across different social groups increased, Black people received less help than White individuals in similar situations. Using this concept as an analogy to the medical realm and considering that some clinical tasks developed by physicians may be perceived as helping behaviors (as opposed to professional activities; Dugdale et al., 1999; Saba, 1999; Valente et al., 1986; Wachspress, 2020), aversive racist providers may be less likely to "help" those who are perceived as different from themselves, such as Black patients. Therefore, we propose that future research and interventions consider the time and effort hypothesis, which suggests that when a clinical activity becomes more effortful or time-consuming and is perceived as a helping behavior, aversive racist physicians may be less likely to provide resources (e.g., time) to patients from outgroups, leading to disparities in care.

Limitations and Further Directions

Notwithstanding the theoretical and practical implications of this research program's findings, our studies had some limitations. First, they did not have actual relationships between patients and medical trainees in clinical or hospital settings. However, in nonlaboratory contexts, it is difficult to measure the time invested and control for other variables that may interfere with forming impressions, assessing the pain, and indicating medication for patients. To bridge this gap, virtual reality and the possibility of "approaching" the relationship between "fictitious patients" and medical trainees could be used. Regarding this aspect, a study already conducted on the pain assessment of patients is highlighted. In this study, physicians interacted with avatars of patients expressing pain, and it took them longer to rate the pain of White than Black patients (Hirsh et al., 2015). Although this was a secondary finding in the Hirsh et al. (2015) study, it might be interpreted as a hint that using augmented virtual reality to validate the findings of this research program in encounters that are more realistic could be a viable technique.

Another limitation of the studies refers to the fact that our participants were medical trainees at different stages of their training. Although in Study 5, we specifically recruited participants who were in their fifth and sixth year of medical school as they have some practical experience in clinical care, this may limit the practical implications of the results presented here. However, this methodological procedure was useful to avoid confounding effects related to various medical specialties and clinical experiences. We

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acknowledge that such variables could potentially moderate the phenomenon identified in this study, and future research should explore these relationships. Additionally, further research can investigate whether health care providers from different ethnic and racial backgrounds exhibit the ITB effect when assessing patients in cross-racial encounters. The broader cultural context within which health care providers operate may also play a crucial role in decision making. For instance, in settings where White people are a numerical and symbolic majority, Whiteness may be normalized and rewarded in health care systems, potentially exacerbating the ITB effect and contributing to health care disparities for patients from non-White backgrounds.

Despite these potential limitations, we believe that the current studies contribute substantially by offering new insights into the meaning of time in social relations (advancing the social psychology of time theoretical framework), but also toward a greater understanding of racial disparities in health care. Further research, however, could extend the study of this time bias effect on other medical dimensions. For instance, it is necessary to experimentally investigate whether the ITB effect occurs and what its potential consequences are when health care providers communicate diagnoses to patients. Our central hypothesis regarding this novel research direction is that the ITB effect may act as a mechanism underlying the lower quality communication directed towards racially disadvantaged patients, which in turn, may result in reduced patients' trust in the care provided (American Board of Internal Medicine Foundation, 2021) and consequently lead to lower medical compliance and other adverse health care outcomes.

Moreover, future studies in this research line should address the racial attitudes of not only physicians but also how patients may impact clinical interactions. Previous studies by Hagiwara et al. (2013) and Hagiwara et al. (2016) have highlighted that Black patients' racial perceptions and attitudes also affect how physicians and patients communicate when racially discordant interactions occur. Therefore, future studies should investigate whether patients' perceptions of racial discrimination interact with aversive racism in ways that prolong or shorten medical appointments. This would enable a more comprehensive understanding of the factors that influence time investment bias and, consequently, health care disparities when non-Black physicians and Black patients interact.

The decision to use opioid prescription as an outcome metric has offered unique insights into biases within clinical decision making. Importantly, the prescription of opioids, which are typically contraindicated for migraines (Casucci & Cevoli, 2013; Lim et al., 2021; Machado-Duque et al., 2023), underscores biases that go beyond mere treatment volume. It refocuses the lens on the quality and appropriateness of care (Bigal & Lipton, 2009; Silberstein, 2000). This viewpoint becomes especially salient when addressing racial disparities in health care (Hausmann et al., 2013; Penner et al., 2023). With this foundation, multiple avenues for subsequent research become evident. It would be beneficial to investigate how the time investment of health care providers affects their treatment decisions in various medical contexts. Such an exploration could offer a holistic perspective on how time biases might impact different aspects of health care, ranging from deciding sick leave duration to recommendations for acute versus chronic pain management. Finally, while our study focused on opioids as a marker of unsuitable care in migraine treatment, a more in-depth examination of time biases associated with traditional migraine treatments could further illuminate racial biases in this medical domain.

Given the need to develop strategies to reduce racial disparities in health care (Madeira et al., 2022, 2023; Penner et al., 2023; Williams & Cooper, 2019), future research could investigate whether manipulating perceptions of time (e.g., by framing time as scarce in clinical practice vs. necessary for good clinical practice) affects the amount of actual time invested in assessing patients, and in turn, influences the quality of clinical recommendations offered to outgroup patients compared to ingroup patients. Such studies should also evaluate providers' implicit and explicit racial biases (Sabin et al., 2008). Suppose the results show that the extent of implicit racial bias among these professionals does not differ between groups that have received different primers of time, but that the actual time invested in doctors' appointments, as a function of time manipulation, is a predictor of the quantity and quality of clinical recommendations indicated for patients. In that case, this could provide evidence for interventions focusing on time perception in medical care and consultation length rather than on decreasing physicians' implicit biases to enhance clinical recommendations and physician-patient communication. Additionally, testing whether aversion is a potential underlying mechanism of the ITB effect in the medical context, as well as patients' status or educational background (Aubé et al., 2019; Rougier et al., 2021) as moderators of the effect, could be future research topics from this research line.

Beyond investigating the impact of ITB in the health care context, future studies should also explore this discriminatory behavior and estimate its implicit consequences in other crucial social domains, such as legal decision making. In this context, time investment bias may influence the quality of decisions made for individuals from different social groups and potentially impact sentencing. Additionally, in the education setting, the ITB effect may manifest as professors explaining and solving doubts of students from one social group more than another, potentially leading to disparities in academic performance. Moreover, considering that the time individuals invest in social media is used as an implicit indicator of their interest in topics, being used for adjusting the content presented to users (Claypool, Brown, et al., 2001; Claypool, Le, et al., 2001; Kim & Kim, 2017; Waheed et al., 2017), and taking into account the ITB findings that show a bias in the investment of time when individuals evaluate content associated with ingroup (vs. outgroup) members (Aguiar et al., 2008; Vala et al., 2012), future studies could investigate whether the way social media algorithms are built promotes or at least amplifies individuals' lack of contact with outgroup members, potentially increasing polarization and discriminatory behaviors among social groups on a macro level.

Conclusions

Drawing upon theories from the social psychology of time (McGrath, 1988; Vala et al., 2012; Youngreen & Silcox, 2020), intergroup relations (J. F. Dovidio et al., 2016; Tajfel & Turner, 1979), and contemporary research on implicit and explicit racial biases in the medical context (Hagiwara et al., 2013; Penner et al., 2019), we developed a theoretical framework and proposed that time is a valuable resource utilized in the medical context to favor ingroup members over outgroup members, particularly by those who exhibit an aversive racist profile. The pattern of findings provided robust experimental evidence that White medical trainees

exhibit discriminatory behavior when allocating their time, investing more of it in White patients as opposed to Black patients. This time bias has significant consequences for health care decision making and may adversely affect the quality of care provided to socially devalued racialized groups.

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