Racial Bias in Telemedicine: A Within-Subjects Study of Medical Student Attitudes and Affect

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Abstract

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Health disparities are a matter of grave public health significance. Racial health disparities have complex etiologies and correlates but remain when controlling for other social determinants of health and patient factors such as treatment refusal. Residual disparities reflect differences in provider treatment of White and minority patients. One factor contributing to disparate treatment of minority patients is provider implicit bias—non-conscious biases that alter behavior. However, research suggests that intervening directly on implicit bias may not be effective, indicating that novel directions are needed to understand and address health disparities.

Effects of implicit bias on disparities may be clarified by articulating and examining the constructs underlying implicit bias. This dissertation examines intergroup anxiety (anxiety that manifests in interracial interactions in response to negative expectations) as a mediator of the relationship between implicit bias and provider behavior.

I first conduct a narrative review to understand the literature related to implicit bias and intergroup behavior. Then, I report on a within-subjects study in which medical student participants (N = 71) interacted with Black and White standardized patients in a telemedicine context. In Aim 1, I conducted preliminary video review in hopes of developing a coding scheme to assess nonverbal behaviors indicative of anxiety. In Aim 2, I used regression analysis to examine the associations between intergroup anxiety and communication behaviors. In Aim 3, I used regression analysis and the Baron and Kenny mediation approach to assess the relationships between implicit bias and intergroup anxiety and the direct and indirect effects of implicit bias on communication behaviors.

I report that one of six mediation models tested was significant; observer-rated nervousness was negatively associated with observer-rated warmth. However, as I explore in the results and discussion, low interrater reliability and concerns related to model assumptions indicate that readers should exercise caution in interpreting results. Despite methodological concerns, our preliminary findings indicate weak support for intergroup anxiety as a construct that contributes to disparate provider behaviors.

While many health disparities researchers are conducting research to reduce health disparities, and research has produced important findings contributing to real-world reductions and improvements in care, it is the experience of this author and my dissertation that the research paradigm itself produces significant obstacles to real-world impact and external validity. My project, like many other mechanistic studies in this field, would have benefited from an approach that focused on connecting with the marginalized communities of concern in deeper and more intimate ways, such as Community-Based Participatory Research.

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Introduction

Health disparities produce large differences in life expectancy and other health outcomes and are a small component of a wholly inequitable social order under the American Empire. Many dedicated people devote their careers to understanding factors that contribute to health disparities. Most of these researchers hope that their work will improve the lived experiences of marginalized individuals and perhaps shift systems of oppression to reverse the harm done to marginalized communities.

Research on health disparities can have real, tangible impacts. Research has revealed the importance of culturally tailored interventions (e.g., Chin et al., 2007) contributing to shifts in major medical systems including integrating community health workers and implementing community-involved screening and intervention strategies for cancer (aligned with Kale et al., 2023). At the University of Washington Medical Center, as one example, health disparity research influenced the development of a diabetes clinic for Latinx patients, which incorporates multiple evidence-based health disparities reduction processes to improve care. Research can change federal and local policy – for instance, influencing recommendations for breast cancer screening (Henderson et al., 2024), and can validate new federal policies (e.g. demonstrating the effectiveness of the Affordable Care Act for disparity reduction; Baumgartner et al., 2020). Research can also be used to support grant applications. As one local example, SeaMar Clinics in Seattle received funding to start supplying grocery vouchers and fresh produce to patients, a grant which was successful in part because of clear evidence of racial and socioeconomic disparities in diabetes (Walker et al., 2024) and research supporting the truism that food access relates to diabetes development and management (Union of Concerned Scientists, 2016). Research can also help shift public opinion and validate lived experiences of marginalized

people. When led by marginalized researchers, research can impact perceptions about what a researcher "looks like," with downstream impacts including diversifying the research field and providing paths to socioeconomic mobility.

Research has the potential to improve people's lives within systems of oppression. With this awareness, I undertook the following dissertation, wherein I conduct a narrative review exploring how White doctors inadvertently perpetuate a cycle of disparities and then present a study designed to explore the impacts of provider factors on cross-racial health care quality.

However, **academic research will never end the cycle of oppression**. As I came to realize over my 8 years conducting the research summarized in this document, most research does not have the desired impact of changing the world – or even improving the material realities of disadvantaged people. An enormous amount of research sits in a metaphorical file drawer, with little to no real-world impact. The research that makes it out of the file drawer rarely creates significant change. Methodological flaws produce major interpretability issues within health disparities research studies (Bilheimer & Klein, 2010), an issue that is particularly prevalent in research on implicit bias (e.g., a recent systematic review exploring impacts of implicit bias trainings found that all included studies lacked external validity; Hagiwara et al., 2024). Furthermore, even interventions with strong scientific support are often unable to be implemented at a scale that can shift national disparities (Pérez-Stable & Webb Hooper, 2023).

One major problem with health disparities research is the inability of research to address the root causes of systemic racism and structural inequities across society, including ongoing socioeconomic inequities (Berger & Miller, 2021). Experts in the field of health disparities, including Eliseo Pérez-Stable, the Director of the National Institute on Minority Health and Health Disparities, discuss limited impacts of decades of health disparities research (Pérez-Stable

& Webb Hooper, 2023). In my research to understand the literature on implicit bias in health care, I have come to doubt the validity and importance of this subfield, and to have serious reservations about the way much academic health disparities research is conducted in general.

My reservations aside, a written psychology dissertation is expected to review the scientific literature, propose hypotheses based on this review, and conduct research to evaluate these hypotheses. To fulfill the expectations of my University and Department, I present the following.

In the Introduction I: (1) Describe the problem of racial health disparities and present evidence that patients of color are treated differently by providers than white patients. (2) Discuss implicit bias and demonstrate that implicit bias is at least partially associated with threat. I suggest that our understanding of the disparate treatment of Black patients is improved with the recognition that implicit bias is a non-specific and questionably helpful umbrella term for a variety of biased behaviors and reactions to interracial interactions that occur without awareness. Threat-related behavior is one reaction that relates to or is encompassed by the construct of implicit bias. (3) Conceptualize threat-relevant factors that impair provider behavior in interactions with Black patients, using two theories of interracial threat and anxiety (aversive racism and integrated threat theory). I suggest that anxiety may be a more meaningful and effective target for bias interventions in the medical field than implicit bias. (4) Provide suggestions to improve trainings for medical providers based on our conclusions, with potential to improve the efficacy of cultural competency and bias reduction trainings.

Following the introduction, I describe a within-subjects study designed to test the impacts of intergroup anxiety, implicit bias, and their interaction on medical student behavior in telehealth examinations of Black and White standardized patients. Since this study represented

the first systematic exploration of intergroup anxiety in a medical context, my aims were to: (1) Develop a behavioral coding system for evaluating nonverbal behaviors indicative of anxiety in medical contexts; (2) Examine direct effects of anxiety on medical student behavior, and (3) Explore the interaction of anxiety and implicit bias by (a) examining direct effects of implicit bias on medical student behavior and (b) testing a mediation model with intergroup anxiety as a mediator of the relationship between implicit bias and medical student behavior.

The Need to Focus on Provider Behavior

Racial Disparities in Health Outcomes

There are large racial disparities in health across a range of illnesses. In total, 13% of Black people report being in fair or poor health (Russell, 2010). As described by Russell, Black people are nearly twice as likely to have diabetes as White people (15% versus 8%). Black people also have higher rates of hypertension and heart disease than White people. Black children are more likely than White children to have asthma and are 500% more likely to die from asthma. There are significantly higher incidence rates for many types of cancer in Black people, and Black patients are more likely to die from prostate, breast, and lung cancers. Similarly, The Kaiser Family Foundation reported that, of 29 health status and outcome measures, Black people had worse outcomes than White people on 24 measures, and only had better outcomes than White people on one measure (Artiga et al., 2016).

Another concerning area of health disparities relates to maternal health. Fetal death rates are twice as high for Black as for White people, after controlling for prenatal care (Vintzileos et al., 2002). Black birthing parents have significantly higher odds ratios of dying or almost dying in childbirth (7.4 compared to White birthing parents; (Goffman et al., 2007), and of experiencing severe postpartum hemorrhage (Grobman et al., 2016). Black people are nearly

twice as likely to give birth preterm, including early preterm and Black infants born preterm are more than three times more likely to die than White infants born preterm (Culhane & Goldenberg, 2011).

Racial Disparities in Health Treatment

There is extensive research showing racial disparities in health care treatment. In general, Black people are significantly less likely to receive influenza immunization, and significantly more likely to receive amputations and orchiectomy (Gornick et al., 1996). Black patients are less likely to receive analgesia (Heins et al., 2006; Todd et al., 2000) as validated in a recent metaanalysis (Lee et al., 2019). Disparities also affect people across a wide range of specific health issues. This section highlights some disparities in treatment of specific disorders, to underscore the importance of improving parity in medical treatment. I provide evidence of disparities in care for three discrete illustrative illnesses: diabetes, cancer, and cardiac health, and highlight treatment disparities in pre- and post-natal care.

Black people are less likely to receive optimal diabetes care than White people. Epstein et al. (2000) used medical charts from a sample of Black and White patients that were undergoing dialysis and had experts' rate whether patients were appropriate for renal transplant. They found that, among good candidates for transplantation, Black patients were significantly less likely to be referred for evaluation or placed on a waiting list. The odds ratio of Black patients being put on a kidney transplant list prior to beginning dialysis was .47 compared to White patients (Kasiske et al., 1998), and this is reflected in a lower rate of transplantation among good candidates (16.9% vs 52.0%; Epstein et al., 2000). Black diabetic patients also have lower quality care, including less frequent hemoglobin measurement and influenza vaccination, and fewer ophthalmological appointments (Chin et al., 1998).

Black patients undergo suboptimal cancer screening and cancer care. Black patients are less likely to be treated with optimal modern technology (colonoscopy) for detecting colorectal cancer (Mcmahon et al., 1999), and are less likely to receive mammographs (Gornick et al., 1996). Black men are less likely to be diagnosed with prostate cancer before it has spread and thus are less likely to be eligible for radical prostatetctomy (Imperato et al., 1996). Treatment disparities also affect cancer pain management--elderly Black patients are more likely than elderly White patients to be refused analgesics (OR: 1.63; Bernabei et al., 1998)

There are racial differences in cardiac procedures, with a literature review showing odds ratios of helpful procedures for Black patients compared to White patients as low as .23 (Kressin & Petersen, 2001) Specifically, the review reveals that Black patients had lower rates of cardiac catheterization, percutaneous transluminal coronary angioplasty, and coronary artery bypass grafting following a cardiac event. Schneider and colleagues (2001) show that this was not exclusively due to these procedures being overused in White patients. These disparities appear to be especially pronounced for Black women; when patient charts differed only in patient race and gender, putative Black women were significantly less likely to be referred for cardiac catheterization than Black men or White people (Schulman et al., 1999).

There are large racial disparities in pre- and post-natal care. There are significant differences in the likelihood that Black and White women will have any prenatal care; this is important because lack of prenatal care is predictive of fetal death. Black women are also less likely to attend postpartum visits or to receive contraception following delivery (Thiel de Bocanegra et al., 2017), or to receive clinically necessary mental health care after delivery. Even among women who do initiate treatment, Black women are less likely than White women to receive follow-up treatment (Kozhimannil et al., 2011).

Provider Behavior: A Promising Intervention Target

Intervening on provider behavior has potential to improve outcomes, both by directly improving treatment decision-making and by improving patient satisfaction and adherence with medical recommendations. There is some evidence demonstrating that physician behaviors are directly associated with patient adherence cross-racially (Zolnierek & Dimatteo, 2009)and reasonable evidence that provider behaviors affect patient satisfaction and trust, factors with downstream impacts on patient adherence (Bartlett et al., 1984). However, research that examines patient outcomes in medical research is still rare, with the majority of studies examining provider self-report as the primary outcome.

Some evidence suggests that physician behaviors are associated with patient adherence with treatment recommendations. More provider empathy is correlated with more patient compliance generally (Kim et al., 2004). Of specific import given disparities in diabetes care is research suggesting that various provider behaviors, including both medical (e.g. number of tests ordered) and interpersonal (e.g. tendency to answer patient's questions) skills, are associated with adherence to various recommendations, including medication, exercise, and diet recommendations (DiMatteo et al., 1993).

Furthermore, provider behavior impacts patient satisfaction. Provider behaviors correlated with patient satisfaction include listening behavior, information giving, and courtesy (Comstock & Others, 1982). Furthermore, higher focus on psychosocial (over biomedical) questions is associated with more satisfaction, as is a more affiliative (less verbally dominant; Bertakis et al., 1991; Buller & Buller, 1987) and more empathetic style (Kim et al., 2004). Provider behavior may also impact trust--provider care and competency were associated with patient trust towards the physician. Importantly, given diabetes care disparities in referral rates

(highlighted above), appropriate referrals are associated with trust for many patient subgroups (e g. women, younger patients; Thom, 2001).

There is evidence that intervening at the level of provider behavior can be effective. One systematic review of diabetes disparity reduction interventions (Peek et al., 2007) revealed that interventions improved various best-practice procedures such as conducting foot care (Fox & Mahoney, 1998), eye examinations (Benjamin et al., 1999), and hemoglobin tests (Din-Dzietham et al., 2004; Fox & Mahoney, 1998). Furthermore, many of these interventions revealed improved patient outcomes, such as reduced blood sugar (Benjamin et al., 1999; Din-Dzietham et al., 2004; Fox & Mahoney, 1998; Phillips et al., 2002, 2005) and improved prescription intensification when appropriate (Thaler et al., 1999; Ziemer et al., 2006). Furthermore, Beach et al. (2005) review 34 cultural competency studies and find that the 14 studies that targeted provider skills found significant improvements in skill following intervention. Despite this promising base of literature, the impacts of provider behavior on patient outcomes require further exploration.

Implicit Bias and Anxiety: A Review and Reformulation

Mainstream social-cognitive science identifies implicit bias as a well-researched construct that alters behavior in intergroup contexts. I question whether this is the most useful way to conceptualize implicit bias and take a more clinical approach with clearer intervention targets. To do this, I suggest that implicit bias is an umbrella term encapsulating a variety of behaviors and reactions, one of which is threat.

Before exploring the association between implicit bias and threat, I first provide a summary of the mainstream understanding of implicit bias. Within social-cognitive theory, implicit bias is defined as an “introspectively unidentified (or inaccurately identified) trace of

past experience that mediates" a response. In other words, bias is triggered in some people in response to a cue (e.g., race) and impacts the response to the cue (e.g., verbal and nonverbal behavior; judgments); this entire process proceeds outside of conscious awareness. A meta-analytic review of 122 studies examined the predictive validity of implicit bias; the subsample of studies that examined racial bias included 32 studies and almost 1,700 individual participants. In this subset, there was an average correlation of r=.24 between implicit bias and intergroup behaviors, judgments, and physiology (Greenwald & Krieger, 2006).

The theory of implicit bias was developed to explain prejudicial behavior, especially by people who espouse anti-racist beliefs. The theory, first named "implicit social cognition" was described in the early 1990s, when several prominent social psychological theorists were exploring the role of unconscious processes in various aspects of life (Greenwald, 1992; Nisbett & Wilson, 1977). Drs. Greenwald and Banaji (1995) brought this focus on the unconscious to bear on the understanding of prejudiced behavior. Greenwald and Krieger (2006) first used the term "implicit bias" and argued that implicit attitudes and implicit stereotypes are the two primary factors that drive implicit bias.

Implicit bias is measured most often with the Implicit Association Test (IAT), which was designed in 1998 (Greenwald et al., 1998). In this test, people are asked to sort words and pictures by pressing buttons. In the congruent phase, people press the same button when they see a favored group or read a positive word (e.g., when seeing a White face or reading the word "good") and press a different button when they see a stereotyped group or read a negative word (e.g., when seeing a Black face or reading the word "bad"). In the incongruent phase, people press one button in response to the favored group and negative words (e.g., when seeing a White face or reading the word "bad") and another button in response to the stereotyped group and

positive words (e.g., when seeing a Black face or reading the word "good"). The initial validation study had two important conclusions. First, the IAT was testing something other than explicit bias; scores on the IAT were weakly and inconsistently correlated with explicit measures of attitudes, likely reflecting cultural pressures to be anti-prejudiced. Second, of the White people studied, only one showed evidence of pro-Black implicit bias; most White people (65% of the initial IAT validation sample) have implicit preference for White people.

Implicit Bias and Health Disparities

There is evidence that many health care providers are biased. Providers are biased in their perceptions of Black patients, rating them as less likely to be intelligent and educated, adherent to medical recommendations, or socially supported, and more likely to be substance abusers and over-reporters of discomfort (Van Ryn et al., 2006; Van Ryn & Burke, 2000). Differences in perceptions of patients remain even after controlling for various factors such as income, education, and personality (Van Ryn & Burke, 2000). About 50% of 418 White medical students and residents surveyed stated that one or more of 9 false beliefs about pain in Black people (e.g. "Blacks' skin is thicker than Whites'") was at least possibly true (Hoffman et al., 2016). Furthermore, a recent metaanalysis reported significant implicit anti-black attitudes among physicians and medical students, with a pooled IAT score of .28 across 29 studies (Ahadinezhad et al., 2022).

Implicit bias in medical providers is a barrier to health equity, impacting diagnosis and treatment decisions. Doctors primed with stimuli evoking Blackness (e.g. Black faces, words stereotypically associated with Blackness) had quicker reactions to diseases that are stereotypically associated with Black people (Moskowitz et al., 2012) and were less likely to accurately diagnose cases with coronary heart disease and angina, and less likely to refer cases to

specialists (Stepanikova, 2012). Thus, implicit bias amongst medical providers may have real-world impacts on clinical care for marginalized patients.

I know of two relevant systematic literature reviews examining the impacts of provider implicit bias. First, FitzGerald & Hurst (2017) identified 42 eligible articles. Of these, only 17 used an implicit measure (either Implicit Association Test or subliminal priming). The remainder used vignettes to examine the relationship between patient characteristics and health care professionals' treatment decisions and attitudes. The authors suggest that this vignette approach is considered a way to detect "possible presence of implicit bias." for concerns about this approach, see 2B.) Of the 42 total studies the authors identified, they reported that 27 examined racial biases and the rest examined bias towards various other social determinants of health, such as gender, socioeconomic status, age, mental illness, and weight. The authors state that 35 of the studies report evidence of implicit bias.

However, the conclusions of FitzGerald and Hurst (2017) are somewhat suspect. First, the authors state that Sabin et al. (2008) is one of "Four studies examining the correlation between IAT scores and responses to clinical vignettes [which] found a significant correlation between high levels of pro-white implicit bias and treatment responses that favoured patients specified as white." Yet, according to Sabin et al. (2008), "No significant relationship was found between [...] implicit measures and treatment recommendations." The reason for this discrepancy is unclear, though perhaps they intended to reference the Sabin and Greenwald (2012) secondary data analysis of the same study that cherry-picked a significant finding.

Furthermore, the systemic review takes as an indication of implicit bias research that examines multiple biases, even if there are only treatment differences based on one of the categories examined. For instance, Arber et al. (2004) examined telephone screening of patients

who differed on age, gender, race, and socioeconomic status, and reported that patient age and gender influenced how many questions providers asked. To say that this is one of the studies that demonstrates that providers hold implicit biases may be technically accurate according to FitzGerald and Hurst (2017)'s definition of implicit bias, but clearly obscures the complexity of the prevalence of implicit bias in the medical field.

The second systemic review, by Hall et al. (2015), focused on implicit racial bias specifically. The authors found 15 studies that examined implicit racial bias in medical providers. Most studies identified used the Implicit Association Test, and all but one found evidence of implicit racial bias. The 14 studies that found differences reported implicit racial bias scores similar to the general population. Studies assessed bias against Black, Hispanic, and dark-skinned people. The meta-analytic effect size reported based on 13 of these studies with sufficient statistical information was .34, representing a moderate effect size. Despite reporting prevalence of implicit bias similar to that found in FitzGerald and Hurst (2017), Hall et al. (2015) reported a more complex picture of the association between implicit bias and outcomes. They reported that, overall, 10 studies examined relationships between implicit bias and outcomes, and these studies reported on a total of 136 associations. They divided these into 4 categories. They reported implicit bias is at least marginally significantly associated with patient-provider interactions in 33 out of 80 associations; with treatment decisions in 7 out of 40 associations; with treatment adherence in 1 out of 5 associations; and with patient health outcomes in 3 out of 11 associations. The authors did not meta-analyze these associations because they represented findings from only 10 samples and thus were not independent estimates. I argue that this report does not support the enthusiasm for implicit bias in the medical literature and instead bolsters our argument that researchers should shift focus to other intervention targets.

To clarify the findings presented by FitzGerald and Hurst (2017) and Hall et al. (2015), I next summarize the literature examining effects of implicit bias on treatment decisions and health outcomes. I take a more conservative approach to defining implicit bias, and do not include studies that purportedly represent "possible presence" of implicit bias. Instead, studies presented here use the Implicit Association Test or subliminal priming, which are both more direct metrics of implicit bias.

The earliest research on implicit bias in medicine used a clinical vignette basic science approach, in which medical providers are given an IAT and then presented with a case description varying only in patient race. They then must make treatment decisions based on the description. This is a limited research approach because of low external validity: participants in vignette studies may have more time than in interactions with real patients, or words on a page may trigger fewer stereotypes than real Black people. That said, vignette studies represent a good starting point because patient characteristics can be carefully controlled and internal validity is high. In the earliest vignette study of implicit bias in health care, Green et al. (2007) showed that there was an association between IAT scores and likelihood to recommend thrombolysis, a state-of-the-art treatment for coronary artery disease. Doctors with high implicit bias were more likely to suggest thrombolysis for White patients, but less likely to suggest it for Black patients.

Other vignette studies have focused on pain assessment and management, finding less consistent results. Haider et al. (2011) found that there was no association between pain assessment by race and IAT scores, but it is unclear whether equitable pain assessment leads to equitable pain management. One study suggests not: Sabin and Greenwald (2012) report that pain management decisions (specifically, likelihood of prescribing narcotic medications) were associated with implicit bias, but treatment recommendations for urinary tract infection, attention

deficit hyperactivity disorder, or asthma were not. This finding makes some intuitive sense, based on expectations about the types of stereotypes that providers will hold about racial differences in narcotic abuse.

However, there is reason to be skeptical. Sabin and Greenwald (2012) present a re-analysis of 2008 data; in 2008, they reported no association between implicit bias and decision-making in any of the vignettes (including pain management; Sabin et al., 2008). In this dataset, providers rated enthusiasm (from "this is clearly the wrong option" to "this is clearly a good option") for two possible care strategies, one of which represented optimal care and the other adequate care. In 2008, Sabin et al. analyzed the data by computing a difference score between the endorsement of the optimal option and endorsement of the adequate option, which represented conviction that the ideal strategy was superior. In 2012, Sabin and Greenwald computed associations between implicit bias and agreement with each care strategy separately, reporting that implicit bias was associated with higher likelihood to endorse both the optimal and adequate strategies for White patients, and lower likelihood to endorse the optimal strategy for Black patients. Because the optimal and adequate strategies are both highly endorsed for White patients, this effect was obscured by the difference computation. This post hoc finding should be replicated to determine whether it represents a true relationship or a statistical anomaly.

While the vignette study findings are somewhat contradictory, studies that involve providers interacting with interracial patients show consistent impacts of implicit bias on both patient perceptions and provider behavior-but most only report one significant association out of several hypothesized associations, leading to questions about p-value inflation and replicability. Black patients rate providers with high implicit bias as less likely to respect them, less likable, and less warm (Cooper et al., 2012), and overall observers rate doctors with implicit stereotyping

about compliance lower on patient-centered care with Black patients. Patients are less likely to be confident in or recommend doctors with high implicit bias (Cooper et al., 2012) and have more difficulty remembering interactions with these doctors (Penner et al., 2016). Furthermore, blind observers report that patients have less positive affect when interacting with doctors with high implicit bias (Cooper et al., 2012). Behaviorally, providers with high implicit bias show slower speech, more verbal dominance (Cooper et al., 2012; Hagiwara et al., 2013), more social dominance in language, and more anxiety-related word usage (Hagiwara et al., 2017a). The literature conflicts on the impacts of implicit bias on some provider behaviors – Cooper et al. (2012) report that implicit bias predicts longer visits, while Do Bú et al. (2024, 2025) find the opposite – implicit bias is negatively associated with visit length in a secondary data analysis of real patient examinations and simulation studies in a medical trainee population. Thus, while many studies report that implicit bias is associated with racially disparate behavior, there is reason to be skeptical because most implicit bias studies are exploratory or secondary data analyses, and many researchers report contradictory findings.

There are only 3 studies that examine downstream patient outcomes such as adherence or various measures of health. Hagiwara et al. (2017b) find no direct effect of implicit bias on patient adherence but do report that higher verbal dominance is related to both implicit bias and patient adherence at 16 weeks (but not 4 weeks) post-appointment. Blair et al. (2014) used medical records to assess medication adherence and blood pressure and found no association between implicit bias and these outcomes.

Interestingly, the Blair et al. (2014) analysis is based on the same sample that reported significant differences in patient-centered care for Black patients with doctors high in implicit bias (Blair et al., 2013). This may suggest that patient satisfaction in this population does not

correlate with patient outcomes--perhaps the impacts of implicit bias on medical decision-making are relatively minimal in providers who interact with a high percentage of minority patients. It is also possible that participants whose satisfaction was most negatively impacted in the 2013 study were not included in the 2014 study, which only accepted patients who saw the same clinician at least annually for 3 years. One final possibility is that the effects of satisfaction on downstream outcomes take longer to accumulate--daily stressors encountered by marginalized groups contribute to epigenetic changes over time through repeated stress hormone exposure, which ultimately impact mortality and other health outcomes (Hertzman & Boyce, 2010). It is possible that patients can tolerate lower satisfaction for a certain amount of time after which it begins to negatively impact outcomes; this interpretation seems consistent with the Hagiwara et al. (2013) finding that adherence effects of talk ratio differences do not manifest until 16 weeks post-treatment.

A final study examining downstream patient outcomes takes a holistic approach and shows that provider implicit bias is associated with patient depression, social integration, and life satisfaction among patients with spinal cord injury (Hausmann et al., 2015). However, importantly, Haussman et al. (2015) does not report differences on these outcomes for Black versus White patients. That is, it appears that outcomes are poor for patients of any race who see providers with high implicit bias. This is certainly still cause for concern but appears to be unrelated to health disparities.

Across studies of implicit bias in healthcare, the most common finding is that implicit bias is negatively associated with patient-provider interactions and relationships (Hall et al., 2015). Some researchers suggest that patient-provider interactions and relationships may mediate the relationship between implicit bias and health outcomes, but this hypothesis has not been

evaluated--and the discrepancy between Blair et al. (2013) and Blair et al. (2014) suggests that the relationship may not be so clear-cut. More research is needed to explore the effects of implicit bias on downstream outcomes of interest, and the degree to which disparities remain. There is reason to doubt that implicit bias accounts for the entirety of provider contribution to racial health disparities. Furthermore, there are virtually no evidence-based strategies that have proven effective for reducing implicit bias.

It is clear both that implicit bias in providers can impact some patient outcomes and clinical decision making, and that research is in its infancy and includes contradictory and weak findings. I believe that calls to intervene on implicit bias are counter to the very foundations of modern medicine, which prioritize intervention targets that are discrete and show demonstrated mutability (see below for evidence of implicit bias immutability). In this review, I encourage a reconceptualization of implicit bias in terms of intergroup anxiety. I suggest that anxiety presents a more tangible target for intervention. I next present evidence of the overlap between implicit bias and intergroup anxiety.

Problems with Intervening on Implicit Bias

The data is clear that, on average across studies, implicit bias is associated with outcomes. While the association between implicit bias and outcomes is small (r=.24), it is nevertheless imperative to take seriously when considering the millions of people affected (Maina et al., 2016). The relationship between implicit bias and health outcomes is less clear, but the data supports a cautious conclusion that implicit bias impairs interracial medical interactions. Yet, there is reason to doubt the practical utility of this construct in terms of bias reduction. In fact, there is limited research suggesting that implicit bias trainings are effective (Lai et al., 2016; Nelson et al., 1996). From a contextual behavioral science and medical health science

perspective it is critical to identify targets that represent observable behaviors, so that behavior can be altered, change measured, and improvements reinforced.

Furthermore, similarly to the complaint about FitzGerald and Hurst (2017) using clinical vignettes as a proxy for implicit bias, I argue that measures of implicit bias are recursive and self-referential. Implicit bias refers to unconscious social cognition or attitudes; therefore, asking participants about their implicit bias is impossible. Researchers typically rely instead on priming or speed of association. However, either of these approaches could reasonably be considered a behavioral manifestation of the underlying construct. For instance, findings demonstrating that people who are subliminally primed with a Black face are less likely to refer cases to specialists could represent a behavioral difference in referral when faced with a Black patient. The Implicit Association Test is presumably a behavioral manifestation of an underlying construct (bias) which is itself impossible to measure directly. It is therefore unclear whether optimal disparity reduction interventions should be expected to alter implicit bias--making it an arbitrary, ill-defined target. How can researchers intervene on a construct that is poorly defined, especially when there is no consensus about whether adequate interventions should attempt to change the construct?

Nevertheless, my original proposal suggested exploring the possibility that elements of implicit bias theory could be meaningfully applied to disparity reduction efforts. The theoretical and empirical link between implicit bias and threat seemed a particularly promising avenue for exploration because of the myriad extant evidence-supported psychotherapeutic interventions for threat that could be parlayed into disparity reduction trainings. Therefore, to further understand the role of threat in racial disparities and the relationship between threat and implicit bias, I did a research project to understand the associations between implicit bias, threat, and health-related

outcomes. I will next describe the state of research on the association between implicit bias and threat and then analyze several theories of threat in interracial contexts. I end this introduction by reviewing my original theory about the specific types of threat likely activated in interracial medical contexts, with implications for disparity reduction trainings.

Implicit Bias and Threat

The concept of threat is largely ignored by the IAT. The IAT includes various negative words (i.e. hatred, nasty, disaster, negative, angry, disgust, bothersome, and ugly) but does not include any threat-related terms. This is an obvious and surprising oversight, especially in light of research suggesting that implicit bias is associated with behavioral, psychophysiological, and neurological markers of fear responding (Amodio, 2014; Amodio & Cikara, 2021). Perhaps this is a consequence of the selection strategy for pleasant and unpleasant words in the original IAT publication: "The pleasant and unpleasant words were selected from norms reported by Bellezza, Greenwald, and Banaji (1986)." Bellezza et al. (1986) presented students with 1,545 words and asked them to rate the words for pleasantness. Thus, the design of the IAT did not prioritize theoretical, conceptual understanding, leading some scholars to question the construct being probed by the IAT (Schimmack, 2021). Despite the lack of threat in the IAT itself, there is significant evidence that implicit bias is associated with anxiety.

Behaviorally, implicit bias is associated with anxiety word use. Hagiwara et al. (2017) use a word count software to demonstrate that providers with higher implicit bias use a higher percentage of anxiety words in interactions with Black patients than providers with lower implicit bias. Implicit bias is also associated with greater perception of anger in Black faces, which likely cues a fear response. In one study, researchers presented White or Black animated faces that showed different facial expressions along a gradient ranging from hostile to happy.

Participants with high implicit bias took longer to report that Black faces were no longer hostile than participants with low implicit bias or looking at White faces (Hugenberg & Bodenhausen, 2004).

There is also psychophysiological and neurological evidence that implicit bias may activate fear or anxiety circuits. One of the most researched brain areas associated with implicit bias is the amygdala. The amygdala has a known role in fear learning (Pessoa & Pereira, 2013). Several studies show a relationship between implicit bias and amygdalar activation to Black faces. As implicit bias increases, so too does amygdalar activation in response to unfamiliar Black faces (Phelps et al., 2000), especially when presented subliminally (Cunningham et al., 2004). Krill & Platek (2009) showed an association between implicit bias and amygdalar activation to a racial exclusion ball toss game, indicating that even stimuli that might cue sadness for most people instead triggers fear for people with high implicit bias. There is additional evidence that this amygdalar activation represents a fear response: Richeson et al. (2008) show that the amygdala is only activated when the Black face is looking directly at the participant, which is a more threatening stimulus property. Some researchers consider threat so inherently tied to implicit bias that they view psychophysiological markers of threat responding as a measure of implicit bias itself (see Eberhardt, 2005)

The findings elucidating the link between implicit bias and the amygdala are complex; stimuli presented for longer than a few milliseconds (Richeson et al., 2003) or depicting familiar, well-liked Black faces (Phelps et al., 2000) may not be associated with differential amygdalar activation. Some scientists point to inconsistent findings across studies as indicative of different levels of threat activated by different experimental manipulations (Chekroud et al., 2014). I suggest that when Black faces are presented for longer than a few milliseconds, people may use

effortful control to quell automatic threat response. With relevance to medical encounters, this effortful control may operate until there is some additional racial stimulus, such as a patient requesting painkillers activating stereotypes about addiction and pain tolerance of Black people, which overwhelms attempts to control threat responding.

Other research examines the association between implicit bias and stress hormones, such as cortisol and dehydroepiandrosterone (DHEA; Mendes et al., 2007). Cortisol is a catabolic hormone that rises in response to psychological stressors, while DHEA is an anabolic hormone thought to protect organisms from detrimental effects of catabolic hormones. That is, DHEA represents adaptive coping, and cortisol is linked with problematic coping with stressors. The researchers found an association between implicit bias and DHEA, wherein people with higher implicit bias showed less change in DHEA than people with lower implicit bias when interacting with a different race interviewer (but not a same race interviewer). Differences were maintained for at least 30 minutes. However, the article reported no association between bias and cortisol. It appears that implicit bias is associated with multiple (but not all) metrics of threat.

Furthermore, a threat interpretation of implicit bias is consistent with beneficial effects of repeated intergroup contact on prejudice. Having multiple intergroup contacts decreases prejudice, but a single interaction does not (MacInnis & Page-Gould, 2015). This is consistent with a role for threat in maintaining prejudice and impairing interracial behavior: many evidence-supported theories of threat propose that repeated exposures to threatening stimuli lead to cross-exposure habituation, but a single exposure is unlikely to have the same effects. Similarly, one interracial interaction does not improve prejudice, whereas repeated contacts decrease prejudice (presumably through habituation to threat). This is also consistent with

Allport (1954) assertion that interactions need to go well--for optimal exposure effectiveness, expectancy violation is needed.

Interracial Threat in Medical Contexts

I next attempt to clarify forms of interracial threat in a medical context. In order to elucidate the threat most likely experienced by providers with high implicit bias when interacting with Black patients, I first delineate two social psychological theories that directly and explicitly propose that people feel threatened in intergroup interactions: aversive racism and integrated threat theory.

Aversive Racism Theory

The theory of aversive racism is similar to the theory of implicit bias in that it postulates that *unconscious* negative beliefs and feelings about Black people create significant consequences. Aversive racism specifically states that many White people have high implicit bias and simultaneously hold egalitarian, anti-racist values; thus, implicit and explicit values conflict and uneasiness arises. The theory of aversive racism directly mentions fear as one negative characteristic of aversive racism, and thus provides useful theoretical context for the threat response of people with high implicit bias.

History of Aversive Racism. Aversive racism was coined by Kovel (1970), who recognized that blatant racism was decreasing yet disparities remained. The term referred to subtle racism held by liberal Whites, resulting from the intersection of liberal values of egalitarianism and simultaneous negative feelings toward the outgroup. Kovel (1970) argued that this hidden racism has huge impacts in many domains of life, including employment, housing, and health. Aversive racism was popularized by the work of Gaertner (1973). The seminal chapter defining the phenomenon (Gaertner & Dovidio, 1986) argues that aversive racism is

virtually unavoidable because people in most modern Western societies are steeped in a racist culture and humans in general possess innate preferences for in-groups (see Brewer, 1979; Tajfel, 1970). There is significant evidence that people give more help to members of their in-group than members of the outgroup. For instance, people distribute more rewards and fewer punishments to in-group members and engage in the opposite pattern with outgroup members--even if this strategy is suboptimal in terms of *personal* benefit (Tajfel et al., 1971). This preference exists whether the groupings are meaningful according to cultural context (e.g. race, Clark et al., 1980) or gender (Hayden-Thomson et al., 1987), or arbitrary, such as based on shirt color (Dunham et al., 2011) or putative performance on a meaningless task (Tajfel, 1970). These preferences emerge as early as 4 years of age. Our cultural context establishes race as a prominent difference between people, and natural cognitive processes therefore utilize race as a prominent social categorization and lead people to prefer and help others that share their racial identity.

Gaertner & Dovidio (1986) showed in a series of experiments that aversive racism results in worse treatment of Black than White people, but only if there is plausible deniability. For instance, if the White person can discriminate indirectly or has a reasonable justification, unconscious beliefs and feelings lead to automatic, uncontrolled discrimination. In contrast, if discrimination requires direct, intentional action, the value of anti-racism wins out and drives careful, controlled egalitarian behavior.

The initial research on aversive racism showed that avoiding Black people is one strategy for justifying discriminatory behavior. Gaertner (1973) studied conservative and liberal responses to a putative stranded motorist calling for assistance. As hypothesized, White conservatives were less likely to help a Black than a White caller, while liberals were equally

likely to help Black and White callers who made a request for assistance. Unexpectedly, however, liberals (but not conservatives) were significantly more likely to hang up on a Black than White caller before a request was made. Gaertner argued that because hanging up was an indirect refusal to help, it was a less direct challenge to the liberal person's egalitarian self-concept. Further supporting this hypothesis, Gaertner (1973) found that there was no difference in helping behavior when a White person was the only witness to a fabricated emergency involving either a White or Black victim, but when there are multiple witnesses the White victim is helped fully twice as often.

Basic science research supports a societal impact of this aversive form of racism. For instance, when a simulated jury is presented a non-race-related justification for harsher punishment (e.g. damaging but inadmissible evidence) jurors are significantly more likely to judge a Black person as guilty of a crime than a White person (Johnson et al., 1995) and to recommend longer (Knight et al., 2001) and more severe (Dovidio et al., 1997) punishment. Similarly, aversive racism affects simulated hiring decisions: if a hiring decision is unambiguous, race does not impact hiring decisions, but if candidates have moderate qualifications a Black person is significantly less likely to be recommended than a White person (Dovidio et al., 2002; Gaertner & Dovidio, 2000).

Early research on aversive racism assumed that most Americans had this pattern of bias, and rarely controlled for explicit bias (c.f. Gaertner, 1973; Hodson et al., 2002, who assumed that conservativism is a proxy for explicit bias). In the early 2000s, researchers showed that implicit and explicit biases represent overlapping but distinct constructs (correlation between explicit and implicit bias r=.24; Dovidio, 2001)). Dovidio et al. (2002) demonstrated that these two forms of bias impact behavior differently: implicit bias is associated with non-verbal friendliness, which

strongly predicts Black participants perceptions of their White interaction partners. In contrast, explicit bias correlates with verbal friendliness, which affects White people's self-perception. In other words, White people are more aware of verbal cues than nonverbal cues, and therefore may assume that they are being friendly towards a Black interaction partner because of verbal friendliness. However, the Black partner is more attuned to non-verbal indicators of discomfort. This may result in White people genuinely believing that they are non-biased, while simultaneously holding significant implicit biases. In medical interactions, this may be particularly troubling--doctors who truly believe that they are non-biased may be less likely to question decision-making that reflects racial disparities, instead believing that they are accurately using clinical judgment.

Aversive Racism and Health Disparities. Only a small number of studies examine the effects of provider aversive racism on provider behavior and patient outcomes. Providers with low explicit bias and high implicit bias were given lower scores on a composite patient-report measure of satisfaction than even providers with high explicit and high implicit bias (Penner et al., 2010). Hagiwara et al. (2016) reported that behavior of both patients and providers was impaired if the provider showed aversive racism: providers showed more negative and less positive affect, and less engagement, and patients showed less positive affect. These effects of provider aversive racism on behavior were only apparent if the patient reported past experiences of discrimination.

Problems with Aversive Racism. The concept of aversive racism adds nuance to the understanding of the impacts of implicit bias on behavior. However, there is not much literature examining impacts of aversive racism on health outcomes or provider behavior. Furthermore, the theory leaves open the question of what drives implicit bias. Therefore, similarly to the theory of

implicit bias, the theory of aversive racism can be reconceptualized as an umbrella term which encompasses various reactions to intergroup contact; intergroup anxiety is one such reaction that is particularly likely when there is a discrepancy between stated and felt racial attitudes (i.e. high implicit and low explicit bias). In the case of aversive racism, the association with threat is theoretically derived: the theory of aversive racism specifically postulates that threats are triggered by interracial contact. Aversive racism describes various threats, including discomfort, uneasiness, and fear. I next examine one theory that puts forth four distinct threats encountered in intergroup contexts and explore which of these are most likely activated in doctors during interracial medical exams.

Integrated Threat Theory

Integrated threat theory clarifies the multiple forms of threat that could be triggered in an intergroup context and contribute to prejudice. The theory, first developed by Stephan & Stephan (2000), represented a synthesis of several other theories that proposed different prejudice-associated threats. The authors describe four threats potentially activated by outgroup interaction, which they argue (and in one case, demonstrate causally--see below) lead to prejudiced feelings. Though Stephan and Stephan (2000) describe effects of threats on prejudice, which is a form of explicit bias, I believe that these same threats may operate without awareness, i.e., implicitly.

Realistic threats refer to real or perceived ways in which the outgroup threatens the very existence of the ingroup, such as through war. There is a myth in modern American society that non-White people are more likely to be criminals; this perception of criminality is a form of realistic threat. Symbolic threats refer to ways in which the outgroup threatens the morals or values of the ingroup due to holding different morals. Symbolic threat may be at play when people perceive that non-White people have different morals in regards to sexuality. Intergroup

anxiety refers to threats of negative personal outcomes because of intergroup interaction, such as being embarrassed, rejected, or ridiculed. Finally, negative stereotypes refer to expectations about the behavior of a stereotyped group which create threat that an interaction will be conflictual.

History of Integrated Threat Theory. Stephan and Stephan (2000) review research on the relationship between each of these four forms of threat and prejudice. They find strong support for an association between intergroup anxiety and prejudice (Renfro et al., 2006; C. W. Stephan et al., 2000; W. G. Stephan et al., 1998, 1999, 2000). However, the findings about associations with other types of threat and prejudice are more mixed. Negative stereotypes were associated with attitudes in all samples except a sample of Israeli participants reporting on feelings about Ethiopian immigrants (Stephan et al., 1998). Realistic threat and symbolic threat both show mixed associations with prejudice, with no clear rationale for the inconsistent findings. The authors make some hypotheses about specific immigrant groups that may uniquely activate different types of threat. However, it also seems possible that the positive correlations between symbolic and realistic threat and attitudes are artifacts attributable to running many correlations without correcting for alpha inflation. If the associations are to be believed, it is unknown if threat increases prejudice, prejudice manifests as threat perception, or some underlying construct drives both attitudes and threat perception.

One study attempted to determine causality in the integrated threat theory. Stephan et al. (2005) manipulated each type of threat and examined attitudes. To manipulate threat, participants were told about a novel outgroup. In the realistic threat condition, participants learned that the outgroup had a propensity for violence. In the symbolic threat condition, participants were told that the outgroup had different work and democracy values. Participants who were exposed to

both symbolic and realistic threat showed higher prejudice, but neither form of threat alone was sufficient to increase negative attitudes. In the negative stereotype condition, participants heard characteristics of the outgroup that were all negative. Participants in this condition showed worse attitudes than participants in control conditions who heard outgroup characteristics that were either positive or mixed. The effect was found regardless of the race of the outgroup. Finally, in the intergroup anxiety condition, participants were told that other students had interacted with the outgroup members and felt nervous. Participants in this condition had worse attitudes than participants in a control condition who were told that other students did not feel threatened. Taken together, this supports a directional relationship in which threat, especially intergroup anxiety and negative stereotypes, causally affects attitudes. To our knowledge, the integrated threat theory has never been studied in a medical context. I next move to discussing which types of threat are most likely to be activated in a medical exam.

Integrated Threat Theory and Health Disparities. I theorize that the threats most likely in an interracial medical exam are negative stereotype threat, intergroup anxiety, and, perhaps, symbolic threat. Doctors interacting with patients of color are presumably not afraid that their patients will hurt or kill them and should have the medical knowledge necessary to assuage fears of disease transmission, blocking realistic threat. It is, in contrast, easy to imagine doctors having thoughts such as “this patient might think I am racist” (intergroup anxiety), “this interaction might be unpleasant or awkward” (negative stereotype), or “they might have different morals around medication adherence or Western medicine” (symbolic threat). Understanding what threats are activated in a medical context will inform intervention strategies, and our argument that realistic threat is unlikely to be triggered in a medical exam informs how I define intergroup threat--this is the topic I turn to next.

Threats in an Interracial Medical Exam: Fears or Anxieties? Based on the types of threats likely triggered by medical interactions with patients of color, I begin to disentangle anxiety from fear in interracial threat. Craske (1999) delineates the difference, saying that a threat may only engender fear when it is imminent and involves real or perceived danger. In contrast, a threat that results in anxiety may be temporally removed from the present and need not involve real or perceived danger to bodily integrity. Furthermore, anxiety is differentiated from fear because it involves higher-order cognitive processing rather than the automatic responding characteristic of fear. Determining whether threats in medical interactions represent anxiety or fear is important both because it informs intervention and because calling something a fear implicitly calls to mind the definition of fear that includes a real or imagined danger; this then contributes to the reification of stereotypes about people of color being dangerous and removes responsibility from the person holding the bias.

I suggest that some realistic threat represents a fear-related threat stimulus, because it involves thoughts that implicate immediate danger, such as "the outgroup member might kill or hurt me," "they are more likely to be criminals," or "they bring diseases." These thoughts could be viewed as similar to a phobia, and a person having these thoughts may think-implicitly or explicitly-that they are in imminent danger. Yet, other realistic threats do not represent fears, such as threats of economic instability.

The other three types of threat are all more consistent with an anxiety response. Symbolic threats include thoughts like "they'll have different morals than me." It seems unlikely that a person having these thoughts will believe themselves to be in imminent danger. Intergroup anxiety triggers thoughts such as "they'll think I'm racist" or "this will be awkward." While these thoughts are doubtless painful, they do not meet the criteria of indicating imminent danger.

Finally, negative stereotype threat is associated with thoughts such as “the interaction will be unpleasant.” Here again, the threat is not dangerous to bodily integrity. All these types of thoughts involve higher-order cognitive processing, which is also consistent with an anxiety response. For instance, thinking that someone will have different morals (i.e. symbolic threat) requires a solidified sense-of-self and ability to make connections between complex conceptual stimuli. In medical interactions, these three types of threats are most likely.

The most parsimonious explanation is that anxiety is at play in intergroup medical interactions that go awry, rather than fear. This interpretation is consistent with cognitive-motivational-relational thinking about emotions. For instance, (Lazarus, 1991) proposes that anxiety often is associated with an existential goal (that is, centered on self-identity). Anxiety arises when there is incongruence in appraisal. In the case of providers, prejudiced thoughts challenge appraisals of self as justice- and equality-oriented, and thus the resulting incongruence results in anxiety. According to cognitive-motivational-relational theory, anxiety may also focus on vague or symbolic threats related to uncertainty, with no clear action to address the threat (Lazarus, 1991). This certainly applies to interracial patient exams if the threat is that the interaction may be awkward or unpleasant, but cannot be avoided or easily improved.

The anxiety theory of intergroup communication suggests a connection between intergroup communication and other theories of performance, such as performance anxiety, choking, or fear of failure. In all of these theories, people get hooked by thoughts about performing well (e.g. behaving in a non-racist way) and these thoughts paradoxically impair performance because of exhausted cognitive resources. If, across these theories, anxiety impact behavior similarly, it may indicate that there is some common psychological process--understanding this underlying process could improve performance in a variety of domains. In

other words, perhaps bias-reduction interventions for providers could be adapted to improve athletic, public speaking, or test performance.

Intervention Implications

Future research is needed to explore the degree to which anxiety may be a significant process underlying racial disparities in health care. If a role of anxiety in interracial interaction is supported, it may have implications for how best to improve these interactions and address race-based anxiety in providers.

Interventions for provider anxiety could take two primary approaches. First, following an exposure therapy model, interventions could involve real or imaginal contact with racial outgroup members, which--over time--should lead to habituation of anxiety (Van Minnen & Hagenaars, 2002). This strategy is consistent with findings that repeated intergroup contact leads to reduced prejudice (MacInnis & Page-Gould, 2015). One consideration with this approach is that medical providers likely already have significant exposure to racial outgroups in their medical practice. Therefore, interventions should be intentional about creating exposure hierarchies and moving providers through the hierarchy rather than assuming that any exposure will shift anxiety and disparate treatment of patients based on race. For instance, it is possible that face to face contact with a patient of color is relatively low on the exposure hierarchy. More challenging stimuli might include sharing more vulnerably with a patient of color, utilizing self-involving self-disclosure (e.g. “as your doctor, the fact that your medication usage is sporadic really worries me”); addressing race with a patient of color (e.g. “I know that it is harder for Black women to get calls back from therapists”); or expressing a lack of expertise in the cultural background of a patient of color (e.g. “I don’t know much about cultural expectations about meal preparation in the Black community. Do those influence the kinds of foods your family eats?”).

An alternate approach uses a stance more consistent with Acceptance and Commitment Therapy. This strategy would not focus on changing anxiety as an outcome. Instead, providers would be instructed to notice anxiety rather than avoiding it, and remember and move towards valued goals even while anxious (Hayes, 2004). In this approach, the role of avoidance is viewed as the primary problem, while anxiety as a feeling is considered normative and not harmful. The behavioral consequences of anxiety, worsened by psychological avoidance, are the intervention target. In this way, lack of eye contact and other nonverbal behaviors indicating warmth are natural but not immutable consequences of anxiety. That is, providers who feel anxious and accept that anxiety will be able to behave in values-consistent ways, such as engaging in nonverbal communication of warmth. Furthermore, for these providers, anxiety could serve as a reminder to follow protocol with all patients rather than letting subjective factors such as clinical judgment influence decision-making.

Measurement Issues

One important methodological issue in intervention design and testing is how to measure provider change. Interventions to this point have focused on a few primary outcomes. Most cultural competency interventions report improvements in provider self-reported outcomes. Far fewer studies have explored effects of interventions on provider behavior, and even fewer report intervention effects on patient satisfaction, adherence, or medical outcomes. This limits external validity of intervention effectiveness studies. I present a brief overview of the research on each of these three outcomes (but see Beach et al., 2005; Jongen et al., 2018 for more thorough reviews), and provide our view of how the field of intervention effectiveness testing can maximize external validity without sacrificing study feasibility.

Provider Self-Report. The majority of studies of cultural competency interventions report on provider *knowledge* about cultural differences. Unsurprisingly, participants tend to report increases in understanding of specific issues discussed during the training (e.g. Mao et al., 1988; Nora et al., 1994), including ways in which physicians' ignorance of patient's health beliefs can adversely affect the clinical encounter (Rubenstein et al., 1992) and the important of incorporating sociocultural factors into care (Tang et al., 2002) These improvements in knowledge are often corroborated by improvements on some sort of written examination (e.g. Mao et al., 1988; Nora et al., 1994; Rubenstein et al., 1992). However, some studies show no effects of interventions. For instance, Beagan (2003) find no change in the percent of students who agree that characteristics of patients or providers affect treatments.

Provider *skills* are another frequent outcome assessed using provider self-report (e.g. Crandall et al., 2003). These improvements are occasionally supported with case vignette or case study assessments. Dogra (2001) shows no differences in case vignette responses from pre- to post-intervention, but Mao et al. (1988) reports significant improvement in making treatment choices in all 3 case studies presented.

Finally, provider *attitudes* towards outgroup members are sometimes assessed by self-report. There are occasional modest improvements following cultural competency trainings (e.g. Crandall et al. 2003). Copeman (1989) finds that a three-part cultural competency training improves some attitudes towards Aboriginal Australians, but increased endorsement of the belief that "all Aborigines [are] the same." Other authors find no significant differences (Culhane-Pera et al., 1997). Nora et al. (1994) shows no significant difference in openness to people "not like oneself" from pre- to post-intervention.

Provider Objectively Coded Behavior. Effects of interventions are occasionally supported with objective behavioral coding. One study demonstrates that faculty member's ratings of provider competency correlate with self-report competency only after (but not before) an intervention. However, this study does not find significant improvements in faculty-rated competency from before to after the intervention (Culhane-Pera et al., 1997). Another study includes psychologist-rated competency in communication with patients who do not speak English (Farnill et al., 1997), which shows high competency after an intervention but no pre-intervention assessment.

Patient Outcomes. There are very few studies examining effects of cultural competency training on patient satisfaction. One study shows that community volunteers had positive experiences being interviewed by intervention participants, but lacks a pre-intervention assessment (Farnill et al., 1997). Mazor et al. (2002) reports on real patient satisfaction and finds that families have an increased likelihood of strong agreement that physicians were "concerned about my child" at post-intervention compared to pre-intervention. This study also showed changes from pre- to post-intervention in family comfort and belief that they had been listened to by the physician and that the physician was respectful.

Future Directions for Testing Intervention Effectiveness. Our outcome of ultimate interest is patient health and reduction of health disparities. However, using patient health as a dependent variable is likely not tenable for the multiple, randomized, large-scale intervention effectiveness trials needed to solidify best practices for health disparity interventions. In this section, I suggest that provider behavior represents the simplest unit of measurement which is likely to be closely associated with patient outcomes, and provide suggestions for assessing the relationship between provider behaviors and patient outcomes of interest. Once a strong

relationship between certain provider behaviors and patient outcomes is established, it will be sufficient to measure intervention effectiveness by assessing these provider behaviors. A dependent variable strategy of provider behavioral coding will enable researchers to test intervention effectiveness by observational coding of providers interacting with standardized patients, which may be achieved during extant medical student competency examinations. Furthermore, I believe that provider behaviors will be less susceptible than patient outcomes to third variables, minimizing necessary sample size to detect intervention effects.

I believe that testing intervention effectiveness by collecting self-report cultural competency or cross-cultural skill is insufficient, because I know of limited evidence that self-report measures are associated with patient outcomes of interest (see Lie et al., 2011). Effectiveness measured using clinical vignettes may be sufficient for testing intervention effectiveness in contexts unrelated to racial disparities. However, the conflicting associations between implicit bias and clinical vignette disparities (see 2a: Implicit bias and health disparities) makes clinical vignettes an inappropriate outcome assessment in the context of cultural competency, implicit bias, and intergroup anxiety intervention research.

In contrast, various provider behaviors are closely linked to patient outcomes. For instance, some research suggests that physicians gazing at their patient's faces was associated with increased likelihood that patients would self-disclose (Duggan & Parrott, 2001) and especially provide more psychosocial information (Bensing et al., 1995; Van Dulmen et al., 1997; Verhaak, 1988). Additionally, Bensing (1991) provides evidence that physician observers rate sessions characterized by physicians gazing at patient's faces as involving higher psychosocial care than sessions with less physician face gazing. In contrast, other authors find that physician face gazing is associated with less observer-coded rapport (Harrigan et al., 1985)

or physician reassurance (Van Dulmen et al., 1997). These findings have significant downstream patient health consequences; provider face-gazing and body orientation impacts patient understanding (Larsen & Smith, 1981; Smith et al., 1981) and patient satisfaction (Larsen & Smith, 1981) which has effects on patient adherence with medical recommendations (Barbosa et al., 2012). Provider behavior can even lessen narcotics requests, pain, and stress in post-operative patients (Egbert et al., 1964; Langer et al., 1975) and improve physiological functioning such as blood pressure (Kaplan et al., 1989).

Conclusions

This narrative review accomplishes several goals. First, I show that research on the association between implicit bias and outcomes in a medical context is not straightforward, and suggest that implicit bias is, at best, a flawed intervention target. The mixed evidence suggests that mediating factors are important to consider. One possibility is that implicit bias can be reconceptualized as at least partially representing intergroup threat. This may explain inconsistent findings about the effects of implicit bias on provider behavior. For instance, in vignette studies, perhaps anxiety is not triggered because there is no chance that providers will be viewed as racist or that the interaction will be awkward. This would explain stronger associations between implicit bias and provider behavior in simulated patient interaction studies, wherein providers may be afraid of simulated patient judgment or interaction awkwardness. Clearly, more research on downstream patient effects of provider implicit bias is needed.

I review evidence supporting a reconceptualization of implicit bias as threat and describe two theories that help us define this threat: aversive racism and integrated threat theory. I provide evidence that these theories relate to behavior in interracial contexts, and underscore the lack of research on their role in a medical context. I propose that providers in a medical context are most

commonly experiencing the threats of intergroup anxiety, negative stereotype threat, and, to a lesser extent, stereotype threat. Future research should examine the role of these threats in patient treatment, including strong experimental design such as inducing different types of threats (e.g. by telling providers that previous doctors felt ill at ease around this patient to induce intergroup anxiety).

I specify that threats engendered by intergroup medical examinations trigger anxiety, rather than fear, responses. The distinction between fear and anxiety raised in this review is useful for several reasons. First, it minimizes the legitimacy of the threat response and places the onus for change on the provider, rather than suggesting that patients need to be less threatening. More importantly, there are extant evidence-based treatments for anxiety disorders that could be harnessed to decrease bias, such as exposure-based treatments and Acceptance and Commitment Therapy. I provide two theoretical rationales for appropriate interventions for provider intergroup anxiety. One remaining question is whether exposure-based treatments can be executed without burdening people of color, such as using imaginal exposure (i.e. asking White participants to imagine interracial contact) or online interactions (i.e. with a bot pretending to be a person of color). If future research supports the role of anxiety in biased behavior, interventions to decrease bias would benefit, with downstream effects on racial disparities in health.

The Present Study

This dissertation tested the hypothesis that in interracial medical interactions, provider intergroup anxiety has detrimental effects on provider communication behaviors (Figure 1), and that this effect is related to the association between implicit bias and intergroup anxiety. I tested this hypothesis using mediation modeling, with intergroup anxiety as the mediator of the relationship between implicit bias and provider communication behavior. Full or partial

mediation would support our hypothesis that intergroup anxiety is one of the constructs being measured by the implicit association test with significant impact on outcomes of interest.

Anxiety is defined as a mood state associated with worry about possible upcoming negative events that are not catastrophic (Craske, 1999). Anxiety is a well-studied construct in clinical psychology, but research on its relationship to implicit bias, particularly in the medical field, is sparse. Intergroup anxiety specifically refers to worry that an interracial interaction will be aversive due to possible negative evaluations of the self or negative psychological outcomes such as discomfort (Stephan & Stephan, 1985).

As reviewed above, there is theoretical and empirical support for the association between implicit bias and anxiety in interracial interactions (Path A), including greater amygdala activation when people with high implicit bias view Black versus White faces (Ronquillo et al., 2007). Furthermore, high implicit bias providers use more anxiety-related words when examining Black patients (Hagiwara et al., 2017a) There is also evidence supporting an association between anxiety and important communication behaviors (Path B). In non-provider samples, anxiety influences behaviors(e.g. Cheek & Buss, 1981; Oakman et al., 2003; Pilkonis, 1977) with relevance to patient outcomes (e.g., anxious people display more negative affect, Headey et al., 1993). Finally, there are links between provider anxiety and downstream patient outcomes, including patient information recall (Shapiro & Wilk, 1965), drug compliance, and satisfaction (Carter et al., 1982).

I explored the role of intergroup anxiety in a medical context using a within-subjects approach that prioritized internal validity. Each medical student in the study interacted with one White and one Black standardized patient actor, matched on age, each of whom was randomly assigned to present one of two cases developed in consultation with medical experts. Medical

student anxiety was assessed at multiple time points, and other medical student characteristics including implicit bias were assessed once using a survey. Undergraduate researchers coded the video recorded interactions for non-verbal affect and anxiety, and the words used in each interaction were quantitatively assessed using the Linguistic Inquiry and Word Count software. Field experts examined the taped interactions to develop a coding system for nonverbal behaviors.

My aims were to: (1) Develop a behavioral coding system for nonverbal behaviors indicative of anxiety, based on expert consensus. (2) Examine the impacts of anxiety on provider communication behaviors. (3) Explore the relationship between implicit bias and anxiety in a medical interaction by testing a mediation model wherein anxiety mediates the relationship between implicit bias and provider communication behaviors.

The Telehealth Context

In February of 2020, I was finalizing preparations to launch my dissertation data collection for Spring quarter. I had set up a room in the lab to mimic a medical examination room, collaborated with medical providers and standardized patients to prepare and hone standardized patient presentations, piloted methods for assessing electrodermal reactivity, and trained research assistants to conduct study sessions. In early March, I discussed the emerging public health crisis with experts in medicine, who advised me not to conduct in-person data collection. I paused study planning, hoping that the COVID health emergency would be over quickly and the study could resume in-person. However, the following Spring the health guidance was similar, particularly given the health statuses of my elderly standardized patients. Campus closures were ongoing, and I determined that it was time to transition my study to a telehealth context.

The transition to telehealth offered some new opportunities. Implicit bias has, to my knowledge, never been studied in telehealth, which increased my interest in the direct association between implicit bias and provider behavior. In addition, the telehealth context provided the opportunity to explore technological literacy as another patient characteristic that could impact quality of care; I added a technological literacy manipulation based on standardized patient feedback.

However, the telehealth context limited some proposed research activities. Most notably, while I considered several strategies to maintain collection of electrophysiological and cortisol data, my advisor and I ultimately decided that the increased complexity and workload of collecting saliva samples and skin conductance data from virtual participants was not feasible. This made my anxiety measurement significantly weaker, as will be discussed further in the discussion.

In addition, the telehealth context was ultimately not conducive for proposed Aim 1. My advisor and I conducted preliminary analyses by (1) generating a list of candidate behavioral indicators of anxiety (e.g. avoiding eye contact, smiling frequency) and (2) reviewing tapes of 5 randomly selected high-anxiety participants to analyze themes in non-verbal behaviors. I did not notice any consistent patterns in how high anxiety providers interacted cross-racially versus in same-race exams. In consultation with my advisor, I decided to eliminate Aim 1 from my project and remove the non-verbal behavior dependent variable.

Methods

Participants

Data collection occurred at a large medical center in the Pacific Northwest. Participants were medical students. Eligibility criteria initially included being a 3rd or 4th year medical

student; eligibility was expanded to all medical students following an administrative error that resulted in 1st and 2nd year students being permitted to sign up for the study starting in year 2. By the end of data collection, 64 of my participants were 3rd and 4th year medical students. School standing of my participants is detailed in Table 1.

My target sample size was n=70. I computed power analysis and determined that 70 participants would power us to find small direct effects and moderate mediation effects. 81 students were enrolled and completed the study over 2 years. Of these students, the majority were female (72.8%), and heterosexual (85%). The majority described their race as White (66.6%). Racial demographics are further detailed in Table 2.

Experimental Design

I used a within-subjects design where participants interacted with one Black and one White standardized patient (SP), counterbalanced to control for nuisance variables. SPs were randomly assigned before each study session to portray one of two clinical cases (see appendix) developed in consultation with medical experts to provide similar levels of clinical complexity. One SP was randomly assigned to have technological difficulties during the study visit, an experimental modification proposed by one standardized patient actor, James.

Study Procedure

The study was conducted on zoom. Medical students were greeted by a research assistant, who took participants through an informed consent process. Participants were told the basic mechanics of the study but were not told that the SPs would be different races to enable study of racial dynamics in telemedicine. Medical students completed baseline measures and saw the standardized patient chart, which was a screenshot from an EPIC patient SnapShot (see appendix). Medical students saw the patient name, age, pronouns, a problem list, health

maintenance information, medications, and blood test results if applicable. Medical students completed a brief assessment of their pre-exam anxiety levels. The research assistant turned off their video, hid non-video participants in the zoom, and invited the SP into the zoom room. Medical students were told that they could spend the time they needed to complete their examination and were instructed to ask the SP to leave and to raise their hand to alert the research assistant when they had gathered the information they needed to decide on next step clinical care.

After the examination, medical students completed post-exam survey 1 and were transitioned to the second SP exam, which proceeded as the first. Medical students viewed the patient chart, completed a brief anxiety assessment, conducted an SP exam, and completed post-exam survey 2. After both exams were completed, participant awareness of study hypotheses was assessed with a series of three questions (e.g. “Did you think there was anything about the patients that researchers were particularly interested in, such as their conditions, presentations, personalities?”). Then, participants completed a final measure of implicit bias, after which they were fully debriefed about the study purpose. Participants were sent a link to a $50 gift card through TANGO within 48 hours of study completion.

After completing data collection, a group of video coders was assembled to rate “thin slices” of 30 seconds taken from 3 randomly selected time points in each experimental session. The length of each patient encounter within the study session was computed to the nearest 1 second. The length of the encounter was divided into 3 sections, and a 30 second segment was randomly selected from each section. An independent coder watched each 30 second segment and rejected any segments that did not include the medical student participant talking. Ten video

coders were asked to rate all of the 30-second segments on 13 dimensions, with metrics of participant behavior such as “warm,” “cheerful,” and “nervous.”

Standardized Patient Case Preparation

Standardized patients were paid for roughly 20 training hours, which included time spent helping develop realistic and actionable clinical cases. I developed two SP cases. All actors learned and enacted both cases, randomly assigned. In year 1, four SP actors met monthly for focus group working sessions, to develop, memorize, and rehearse the roles. In year 2, several original SP actors were unavailable to continue the study; replacements were trained in 1:1 sessions with the SP coordinator and author of this manuscript.

Freddie. Freddie was a 60-year-old man with type 2 diabetes, hyperlipidima, and hypertension. His case complexity included slowly rising HbA1c levels according to blood tests, increased fatigue, and trouble standing for the past 6 months. Freddie was described as using Metformin and Glipizide twice daily with moderate to high adherence. Freddie was scripted as friendly and compliant, but somewhat resistant to medication change (e.g. introducing insulin).

Tom. Tom was developed as a 58-year-old man reporting for a COVID assessment, with symptoms including cough, fatigue, and low-grade fever, but no difficulty breathing or loss of taste or smell. His case complexity included a ten-year history of no general checkups, some indicators for colon cancer screening, and daily moderate alcohol consumption (2-3 beers per day). Tom was scripted as friendly, but medically hesitant.

Measures

Independent Variables. My independent variable measurement strategy suffered the most from the onset of the pandemic. I had planned a minimally intrusive multi-timepoint measurement strategy for assessing in-the-moment SUDs, complemented by ongoing

physiological measurement. When I made the transition to telehealth, my methodological rigor suffered and I administered a retrospective SUD, complemented by a linguistic proxy to assess for anxiety that may not manifest in a self-report measure.

Subjective Units of Distress. The Subjective Units of Distress scale (SUDs) involves participants rating, on a 0 to 100 scale, how distressed they feel. The measure is fast and correlates well with other markers of fear, including physiology (Foa et al., 1995). I measured SUDs multiple times throughout the study. Participants completed baseline SUDs at the beginning of the experimental session, pre-exam SUDs after reviewing the patient chart but before patient interaction, and post-exam SUDs in two ways: reporting on current SUDs immediately post-exam, and reporting on highest SUDs during the exam retrospectively.

Observer-rated nervousness. Given shortcomings of *my* anxiety assessment strategy, *I* also used observer ratings of nervousness as a proxy for anxiety. Blind coders used a "thin slice" method to watch and rate randomly selected 30 second segments from the beginning, middle, and end of medical interactions. This approach increased the feasibility of completing coding within the grant period without sacrificing predictive validity (Ambady & Rosenthal, 1992). Raters were given no instruction beyond "provide ratings in the following categories using the following scale. Please use the entire scale." This is consistent with approaches of prior studies and the guidance of mentor Hagiwara. Scores were averaged.

Brief Implicit Association Test. To measure implicit bias, I used the Brief Implicit Association Test: Race (B-IAT), which is designed to measure the strength of association between negative words and White faces versus negative words and Black faces (Nosek et al., 2014). The B-IAT shows convergent validity with implicit bias measures, and divergent validity

with explicit bias measures. Furthermore, the B-IAT is brief, showing reliability in as little as 1 min.

Dependent variables. The telehealth context also impacted my dependent variable assessment strategy. Namely, I determined that it was not scientifically meaningful to conduct my planned assessment of non-verbal behaviors, as described in "The Telehealth Context" subsection above.

Observer-Rated Warmth. I assessed global medical student warmth(Penner et al., 2010). Blind coders used the same "thin slice" methodology as described above.

Linguistic Inquiry and Word Count (LIWC) - Anxiety-related word usage. The Linguistic Inquiry and Word Count (LIWC) software(Pennebaker et al., 2015) identifies and counts words in more than 70 categories and computes the percentage of words in each category (number of words in a category divided by total number of words in the transcript). One category is anxiety-related words, which has been examined in the context of implicit bias (Hagiwara et al., 2016, 2017b). I use anxiety-related word count as a proxy measure of anxiety.

Session Length. I *c*oded the start and end time of each session and computed the length, in minutes, to the second.

Moderator variables. For completeness, I report on all measures collected during the study even if they were not a part of primary analyses.

Social Desirability Scale. The Marlowe-Crowne social desirability scale (SDS) was added to the study battery when transitioning to a telehealth context (Reynolds, 1982). The SDS was designed to correct for instances of social desirability response bias contaminating survey data. I used the Reynolds (1982) short form of the SDS, which contained 13 items (e.g. "I am

always courteous, even to people who are disagreeable.") A higher score on this measure indicates higher social desirability bias.

Demographics. Year in school, age, height, weight, race and ethnicity, biological sex at birth, and sexual orientation were assessed. Participant's membership in marginalized social groups (including race) are potential moderators to be controlled for and examined in secondary data analyses.

Internal and External Motivation to Avoid Prejudice. The Internal and External Motivation to Respond Without Prejudice scale was developed by Plant and Devine (1998). Exploratory data analysis demonstrates that this scale contains two factors, one of which represents internal motivation to avoid prejudice (e.g. "I am personally motivated by my beliefs to be nonprejudiced toward Black people") and the other which reflects external motivation to avoid prejudice (e.g. "I try to hide any negative thoughts about Black people in order to avoid negative reactions from others.")

Social Interaction Phobia Scale. I measured social anxiety using the Social Interaction Phobia Scale, which uniquely predicts social anxiety(Menatti et al., 2015). The SIPS has strong convergent validity with other measures of social anxiety and fear of evaluation.

State Trait Anxiety Inventory. I measured trait anxiety using the trait subscale of the State Trait Anxiety Inventory (STAI; Spielberger, 2010). The STAI correlates with physiological anxiety and anxiety diagnoses. I measured state anxiety to measure and control for anxiety triggered by SP case difficulty.

Data analysis

For primary analyses, I first computed difference scores for all multi-timepoint measurements. I subtracted scores in the Black patient exam from scores in the White patient

exam, such that positive numbers indicate that more of the variable was present in the White patient exam and negative numbers indicate that more of the variable was present in the Black patient exam (e.g. mean interracial session length = 3.15, indicating providers spent over 3 minutes more on average with White patients. Intercorrelations between Black and White study statistics are presented in Table 3.

I used the lm function in r to conduct regression modeling for each direct path in my proposed mediation model. To assess mediation and indirect effects, I used the mediate function in psych, which uses the multi-step approach outlined by (Baron & Kenny, 1986) to test mediation of the path between implicit bias and behavioral outcomes by intergroup anxiety. To explore whether a latent anxiety variable would better represent my diverse anxiety metrics, I used the lavaan function in R.

The transition to a telehealth context provided an opportunity to explore possible interaction effects between multiple patient factors impacting dependent variables. I added an experimental manipulation related to technological literacy by randomly assigning one patient to enact difficulty unmuting themselves on the zoom call. I computed a mixed model anova with patient race as the within-subjects factor. I operationalized a between-subjects factor of tech illiteracy impacting the Black patient examination.

Results

Preliminary analyses

Subjective Units of Distress. At baseline, participants reported SUDs ranging from 0 to 85, with a mean of 36.18 (*sd* = 20.76). At the pre-exam timepoint, SUDs ranged from 8 to 81. Participants reported significantly higher anxiety before their first SP examination (*m* = 36.211, *sd* = 15.96) than their second exam (*m* = 32.77, *sd* = 14.93), $t(69) = 2.73$, $p = .008$, supporting

my methodological decision to randomize order of patient cases and races. There were no significant differences between how anxious participants felt anticipating the two SP cases (mean anxiety anticipating Tom SP = 34.65, *sd* = 15.42; mean anxiety anticipating Freddie SP = 33.71, *sd* = 15.58; *t*(69) = .02).

At post-exam, participants reported current SUDs ranging from 3 to 83, with mean = 30.63 (*sd* = 16.10). There were no significant differences between post-exam SUDs following Black SP exams (*m* = 29.91, *sd* = 16.56) and following White SP exams (*m* = 31.34, *sd* = 15.63; *t*(84) = 1.21). I found a non-significant difference between self-reported highest SUDs in Black SP exams (*m* = 39.83, *sd* = 18.46) and White SP exams (*m* = 42.82, *sd* = 18.88; *t*(84) =-1.96).

There was a high correlation between post-exam SUDs and retrospectively reported highest SUDs (*r* = .77). For my primary analyses, I computed a mean anxiety score collapsing across post-exam and retrospective highest SUDs.

Brief Implicit Association Test. My sample ranged from -1.04 to .99 on the B-IAT, with a hypothetical range of -2 to +2. The sample had a mean of .04 (*sd* = .47). This score indicates that this group of people did not, on average, have implicit anti-Black bias.

Observer-rated affect. I assessed inter-rater reliability by computing Krippendorff's Alpha (Krippendorff, 2011) on mean Warmth scores for each patient exam. I found very low inter-rater reliability (exam 1 *alpha* = .20; exam 2 *alpha* = .27). In an effort to correct for this low inter-rater reliability, I created a correlation matrix to assess outliers. One rater had markedly lower agreement with the other raters, and I removed them as an outlier. However, this did not increase my inter-rater reliability to acceptable levels (*alpha* = .23 and .31). I explored outliers by examining correlations between each rater and the mean amongst raters, and found 3 outlines. Rater 2 had a correlation with the mean of .28. Raters 7 and 10 both had a correlation with the

mean of .58. I computed Krippendorff's Alpha for the global warmth dataset minus raters 2, and minus raters 2, 7, and 10, but alpha remained < .31. I proceeded with my analyses using the mean warmth score across raters as my dependent variable.

There was no significant difference between average global warmth in interactions with White (m=5.51, sd = .86) and Black (m = 5.63, sd = .79) patients, $t(77)$= .822.

Linguistic Inquiry and Word Count. I found that on average, 0.123% (SD = .14) of words spoken by the doctor were related to anxiety. There was no significant difference between the percent of anxiety-related words in conversations with Black (m = .13, sd = .15) vs White (m = .12, sd = .13) standardized patients, $t(83) = -.71$.

Session Length. I found a significant difference in exam length based on race, with Black standardized patient examinations taking 12.56 minutes on average, while White standardized patient examinations took 15.71 minutes on average, $t(83) = 4.03$, p =.00012.

Moderator variables

I computed means and standard deviations of scales and subscales of moderator variables, and report correlations amongst all self-report and dependent variables in Table 4.

Primary Analyses

I first used confirmatory factor analysis to attempt to create a latent variable representing an underlying anxiety construct. I then computed a series of linear models testing associations between my variables. I ran tests of assumptions of linear regression following guidance of Khan (2021).

Latent Variable Creation. I used confirmatory factor analysis to model a latent variable as an alternative anxiety predictor, as proposed in my prospectus. I modeled a latent anxiety variable with indicators: subjective units of distress post-exam, retrospectively reported highest

subjective units of distress, observer-rated nervousness, and anxiety-related word use on the LIWC. I chose to use anxiety-related word use as a manifest variable in my latent modeling because research suggests that word choice can provide an unobtrusive measure of psychological states that is relatively less impacted by social desirability concerns (Gottschalk, 2020).

I found high indicators of model fit. The chi-square test statistic for my model was $\chi^2(2) = 3.572$, $p = .17$. The non-significant p-value indicates that the model fits the data. The chi-squared test statistic for the baseline model (no relationship amongst variables) was $\chi^2(2) = 3.572$, $p = .17$. The CFI of my model was .981, which surpasses the acceptable threshold of .90. The RMSEA of .068 also indicated acceptable model fit, being below the threshold of .08. Similarly, the SRMR value of .039 was well below the .08 threshold of good fit.

However, none of my parameter estimates indicated significant latent variable loading ($p > .29$). This indicated that none of my parameters were strong indicators of the latent construct, suggesting that my latent anxiety variable lacked construct validity in my confirmatory factor analysis. Therefore, I dropped the latent variable from further analyses, and instead report on repeated analyses with my manifest variables. Estimates of factor loading and variance are reported in Figure 3, though audiences are cautioned that the statistics are of limited validity.

Path A: Implicit bias predicting intergroup anxiety. Implicit bias did not have a significant impact on the composite self-report anxiety measure ($B = .3.36$, $se = 2.82$, $p = .24$). Implicit bias similarly did not have a significant impact on either of the disaggregated anxiety measures (post-exam SUDs $B = 2.68$, $se = 2.62$; highest SUDs $B = 4.04$, $se = 3.37$). The assumption of linearity of the data appeared not to be met based on visual inspection indicative of a quadratic relationship. The residual errors appeared not to have a mean value of 0. I failed to reject the null hypothesis of the Durbin-Watson test and the Non-constant Variance Score Test,

indicating that my analyses met assumptions of no autocorrelation and constant variance of residual errors. Implicit bias had a marginally significant impact on my observer-rated anxiety variable (B = .14, se = .09, p = .11). All of the assumptions of linear regression were met in this analysis.

Path B: anxiety as a predictor of warmth, word choices, and session length. Anxiety did not have a significant impact on observer-rated warmth (B = .007, se = .005), anxiety-related words on the LIWC (B = -.001, se = .002), or session length (B = -.022, se = .07). It is difficult to interpret a null result in general, and is further complicated in this study because my data did not meet many of the assumptions of linear regression. A graph of the residuals of all three variables shows significant non-linearity between the variables. The residual plot approximates a quadratic relationship for the warmth and session length analyses, and an exponential relationship for the LIWC analysis. I also found that my model fails the assumption that residual errors have a mean value of 0. I next tested the assumption that my data was not autocorrelated. I used the Durbin-Watson test, which specifies the null hypothesis that the autocorrelation between the two variables is 0. I failed to reject the null hypothesis for my analyses, suggesting that I meet the assumption of non-autocorrelation of data. I performed the Non-constant Variance Score Test and found that the linear regression model regressing warmth on anxiety fails the assumption of constant variance of residual errors. The regression models with LIWC anxiety-related word use and session length as DVs met the assumption of constant variance. I observed a similar pattern of results when I disaggregated the interracial anxiety variables.

I also computed analyses with observer-rated nervousness as the dependent variable, due to concerns that social desirability may limit the truthfulness of self-reported interracial anxiety. I found a significant linear relationship between interracial nervousness and interracial warmth (B

= -.65, *se* = .17, *p* = .0002), indicating that as observer-rated participant nervousness increased, observer-rated participant warmth decreased. I used a Bonferroni correction to account for the 12 analyses I conducted regressing dependent variables on anxiety variables, and found that the relationship between interracial nervousness and warmth remained significant even with a corrected *p* value = .004. However, these results should be interpreted with caution; visual inspection reveals that the assumption of linearity may be violated and the residual errors may not have a mean value of 0. The other assumptions of linear regression - no autocorrelation and constant variance of residual errors - were met. There was no significant relationship between interracial nervousness and anxiety-related word use (*B* = -.001, *se* = .067) or session length (*B* = -3.04, *se* = 2.44).

Path C: Implicit bias predicting warmth, word choice, and session length. Implicit bias did not have a significant impact on observer-rated warmth (*B* = .01, *se* = .14), anxiety-related words on the LIWC (*B* = -.03, *se* = .05), or session length (*B* = -.10, *se* = 1.80). The assumptions of linear regression were met in these models, which supported the validity of this analysis. The assumption of linearity of the data appeared to be met, and the residual errors had a mean value of 0, based on visual analysis of a plot of residuals. I failed to reject the null hypothesis of the Durbin-Watson test for my associations, indicating that the assumption of no autocorrelation was met. I performed the Non-constant Variance Score Test and found that the associations met the assumption of constant variance of residual errors.

The mediation models

The data did not meet assumptions for mediation analyses according to Baron and Kenny's methodology, because I did not find a significant a path, representing the association between the IV (IAT score) and mediator (interracial anxiety) nor a significant b path,

representing the association between the mediator and the DVs (observer-rated warmth, anxiety-related word use on the LIWC, or session length). Regardless, I conducted bootstrap analyses to determine fit of mediation models. Only one model had fit statistics that reached significance (R = .43, p = .0003, see Figure 2). Brief IAT predicted observer-rated nervousness (B = .14, *se* = .08) with marginal significance (p = .08), observer-rated nervousness predicted observer-rated warmth (B = -.68, *se* = .16) with high significance (p = .00005), and brief IAT did not have a direct effect on observer-rated warmth (B = .01, *se* = .13) but had an indirect effect (c') of B = -.1 (*sd* = .07).

There were no significant indirect effects in any of my mediation models with self-report anxiety as the mediator; the indirect effect of IAT on warmth was B = .03, se = .03, *CI* = [-.11, .02], the indirect effect of IAT on LIWC was B = 0, se = .01, *CI* = [-.03, .02], and the indirect effect of IAT on session length was B = -.12, *se* = .44, *CI* = [-1.33, .6]. When testing observer-rated nervousness as the mediator, I report a significant indirect effect between IAT and observer-rated warmth, B = -.1 (*se* = .07 CI = [-.26, .01], p = .00003. There was not a significant indirect effect through observer-rated nervousness of IAT on anxiety-related words of the LIWC (B = 0, se = .01, *CI* = [-.02, .03]) nor of IAT on session length (B = -.46, se = .47, *CI* = [-1.58, .21]).

Exploratory analyses

I ran a series of repeated measures ANOVAs with patient race, patient technological illiteracy, and their interaction term as predictors and observer-rated warmth, anxiety-related words on the LIWC, and session length as dependent variables. In the model with warmth as the DV, the assumptions of ANOVA were met. There were no significant outliers, the relationships amongst variables were roughly normal (as verified by no significant coefficients in a Shapiro-

Wilk test, $p > .06$). In the model with anxiety-related words as the DV, the assumptions of ANOVA were not met; there were 12 outliers, one of which was an extreme outlier, and the normality assumption was violated because the Shapiro-Wilk test coefficients were significant for all conditions ($p < .03$). In the model with session length as the DV, the assumptions of ANOVA were also violated; there were 5 outliers, 4 of which were extreme outliers, and more than half of the Shapiro-Wilk test coefficients were $p < .03$.

There were no significant direct effects of the Black patient indicating technological illiteracy, and there was a significant direct effect of patient race only on session length, as reported in preliminary analyses. There were no interaction effects, indicating that technological literacy did not interact with patient race to impact provider behavior. The highest interaction effect, with session length as the dependent variable, had an F statistic of $F(1,82) = 2.18$, $p = .14$.

Discussion

This dissertation aimed to (1) explore non-verbal indicators of anxiety in medical examinations; (2) test effects of intergroup anxiety on provider communication behaviors and (3) probe the associations between implicit bias and intergroup anxiety by testing a mediation model wherein intergroup anxiety mediates the relationship between implicit bias and provider communication behavior.

As discussed in The Telehealth Context, above, I was unable to complete Aim 1 because the virtual study environment was not conducive to detailed behavioral coding. However, my attempts to explore non-verbal behavior revealed an interesting trend that could help explain the sometimes contradictory and unclear findings in the field of implicit bias. Namely, we observed that high-anxiety providers engaged in a variety of patterned yet often contradictory ways. Some high-anxiety providers appeared cold and distant, while others appeared to compensate for

anxiety by engaging in highly affiliative ways. It is possible that there are multiple "profiles" for how people respond to internal anxiety states, and that contradictory results in the literature reflect the existence of a bimodal or multimodal relationship between the predictor and outcome variables.

Before discussing my other results, I reiterate that model testing indicated that assumptions of regression modeling were not met. Failure to meet model assumptions for direct effect modeling included non-linearity, residual error mean value not equal to 0, data autocorrelation, and non-constant variance of residual errors. Failure to meet model assumptions for mediation modeling included non-significant direct effects. With caution against overinterpreting results, I report on the significant effects found despite model fit concerns.

Related to Aim 2, I report a significant association on only 1 of 6 tests of associations between intergroup anxiety and provider communication behaviors. Observer-rated nervousness was significantly correlated with observer-rated warmth, meaning that our video coders on average rated providers that they perceived as more nervous as being less warm. This finding may indicate support for our hypothesized model yet must be interpreted with caution given the other 5 non-significant findings. Namely, observer-rated nervousness was not correlated with session length or anxiety-related word use, and SUDs were not associated with any outcome variables.

There are a few factors that problematize the non-significant results and necessitate further study of the anxiety construct in the medical context. First, I failed to develop an adequate interracial anxiety measurement strategy when I shifted the experimental protocol to a virtual context. My anxiety assessment strategy of using post-exam SUDs and retrospective SUDs likely introduced bias, including social desirability bias and recency bias. I wish I had

consulted with experts in the measurement of anxiety, such as Dr. Zoellner, when I made the decision to pivot the study to a virtual context so that I could have a more comprehensive anxiety analytic strategy. Most urgently, research must be done that prioritizes anxiety measures besides self-report. My initial proposal included self-report and physiological measures; including psychophysiology introduces other limitations but would address concerns that providers may hesitate to admit anxiety because they lack self-awareness, want to appear competent, or are otherwise unwilling or unable to honestly describe their psychological state. In addition, future research would benefit from a more momentary assessment of anxiety, such as (in line with my initial study proposal) using a button to administer quick in-the-moment SUDs throughout a patient encounter.

I attempted to strengthen my anxiety measurement strategy by including observer-rated nervousness as another anxiety proxy measure, but this variable suffered from low interrater reliability, rendering results of analyses reliant on this variable difficult to interpret. The significant negative association between observer-rated nervousness and observer-rated warmth is intriguing, yet the other null associations with observer-rated nervousness render the finding more suspect; perhaps the correlation is a consequence of measurement similarity rather than construct association. An alternative hypothesis is that the other dependent variables are not meaningful measures of provider behavior; we included session length because we observed significant racial differences in this variable, but there was not a theoretical or empirical reason to explore this as an outcome variable. The anxiety-related word use variable was theoretically derived yet may have suffered from a floor effect because providers rarely used anxiety-related words. Thus, interpretation of our findings related to Aim 2 is difficult and indicates a need for further research with more rigorous and multi-faceted assessment strategies.

My Aim 3 findings related to the association of implicit bias to intergroup anxiety and communication behaviors are similarly challenging to interpret. I report that one of the 6 mediation models I ran was a significantly better fit than no model. In this model, implicit bias had a direct effect on observer-rated nervousness, which in turn had a direct effect on observer-rated warmth. Implicit bias had a marginally significant indirect effect on observer-rated warmth. The significance of the model with observer-rated metrics provides further support for the need for research that utilizing a multidimensional anxiety measurement strategy. If this association is supported by further research with higher reliability and a more comprehensive anxiety assessment strategy, it might indicate support for the theorized model of intergroup anxiety mediating the relationship between implicit bias and provider behavior. If this relationship is supported, it could have major implications for implicit bias and other disparity-reduction training.

These significant findings should be interpreted conservatively, in recognition of the significant limitations of this study. First, as discussed above, the anxiety assessment strategy used in this study was primarily self-report, which is a significant methodological concern. Demand characteristics and desire to avoid appearing prejudiced may have impacted participants' willingness to accurately disclose or even recognize their own anxiety in the interracial medical exam context. Future research should include physiological and observer-rated metrics of anxiety, particularly metrics with higher reliability than the present variables.

Another major limitation of this study is the low interrater reliability of the video coding. My measurement strategy was informed in consultation with field expert Dr. Hagiwara, who has successfully implemented a method of thin-slice video analysis with very high interrater reliability (ICC >.9; Hagiwara et al., 2016). There are several possible explanations for the

divergent findings. Hagiwara had a larger sample of video coders, with 19 coders in total. To understand whether my small number of coders impacted my interrater reliability, I generated a random sample of 10 more video coded scores to assess if more raters pulled from the same distribution as my first 10 coders would have increased my reliability. I did not find evidence of acceptable reliability at higher numbers of coders from the same coder pool. I also assessed the impact of removing some of the outliers, but (as described in results) removing the 3 coders with lowest reliability did not increase reliability to acceptable levels.

It is unclear why my reliability was so poor, given previous research that successfully and reliably implements a thin-slice method for video coding in a medical context (Henry et al., 2017). One possibility is that, in my attempt to hire diverse video coders, I inadvertently introduced too much variability in social norms and lived experiences, resulting in coders responding to different verbal and non-verbal signifiers of warmth. I caution against using this thin slice video coding methodology if rater reliability is an important consideration, particularly if studying issues of cultural difference.

A major limitation of this study was the transition to telehealth. While there is a lack of literature studying racial bias in telemedicine, and disparities in telemedicine care are a significant concern, this study was not well designed for a telemedicine context for a few reasons. First, one of our key dependent variables and the focus of Aim 1 was non-verbal behavior, which may present very differently and be more difficult to portray in a telehealth context (Duffy & Benotsch, 2025). Second, this study was designed to explore a mechanism (anxiety) predicted to mediate the well-studied relationship between implicit bias and provider communication. However, racial disparities in communication behaviors in a telehealth context

have not been explored, meaning that preliminary research is needed to understand what if any communication behaviors are impaired in cross-race telehealth interactions.

A final limitation was the decision to only measure implicit bias one time. I made the choice to administer this survey after the debrief questions were answered because I thought that taking an obvious measure of implicit bias might reveal the study purpose. However, the single time point measurement of implicit bias limits my ability to make strong claims, especially given the well-established issues related to test-retest reliability for the IAT (Rezaei, 2011). In future studies, it might be prudent to sacrifice deception for measure reliability by administering the IAT at least twice. One possibility is to administer the IAT in a screening survey; separating the IAT in time from the study session could decrease the likelihood that participants will draw connections between the IAT and the study purpose.

Despite the many limitations, these preliminary results lend support to the importance of continuing to explore interracial anxiety as a predictor of interracial behavior. The significant findings despite major methodological limitations could indicate preliminary support for the proposed mediation model, and further research should be conducted to more rigorously explore interracial anxiety as a mediator of the relationship between implicit bias and interracial behavior. It is important to understand and address these relationships in dynamics where race and power intersect, such as medical, school, and legal settings.

Overall Conclusion

This study represents an effort to understand the mechanisms and constructs that underlie implicit bias. Implicit bias is a psychological construct with significant social relevance and import (Greenwald & Krieger, 2006), yet it lacks a clear underlying construct (Schimmack, 2021). This makes it difficult to accurately understand and meaningfully intervene on implicit

bias, contributing to the mixed and largely ineffective implicit bias interventions (Lai et al., 2013). It is unsurprising that the construct of implicit bias is not clearly defined when we explore the origins of the primary method for assessing implicit bias: the implicit association test. This test was designed by using words rated as most pleasant and most unpleasant by a group of college students, with no effort to functionally reflect on the words chosen. It is time for researchers to take seriously the need for more specificity related to what the implicit bias construct is examining.

This work could be valuable because of evidence that implicit bias predicts important behaviors, including in the medical context. Provider implicit bias is associated with subtle behavioral differences in interactions with minority patients, including more anxiety-related word usage (Hagiwara et al., 2017b), more negative affect (Penner et al., 2010), and different nonverbal behaviors (Sekaquaptewa, 2011). These provider behaviors predict lower patient satisfaction and adherence, with health and mortality consequences (Beck et al., 2002; Haskard et al., 2008).

In light of the significant impacts of implicit bias and the concerns about the effectiveness of direct implicit bias reduction trainings, some researchers examine communication behaviors associated with physician implicit bias, with the goal of intervening directly on problematic provider communication and avoiding the difficulty of direct intervention of implicit bias. Most take a data-driven approach to determining communication behaviors of interest (e.g. Cooper et al., 2012; Hagiwara et al., 2013). A range of behaviors have thus been associated with provider implicit bias, from verbal behaviors such as anxiety-related word use to nonverbal behaviors such as physician talk time.

However, this piecemeal approach to defining behaviors of interest is problematic if the goal is disparity reduction. Asking providers to monitor and alter multiple problematic behaviors is likely to require significant cognitive resources, and diminished cognitive resources results in worse outcomes in interracial interactions (Macrae et al., 1993; Spears & Haslam, 1997). Yet, communication behaviors are important to consider because of their known association with patient outcomes such as adherence (Beck et al., 2002). It is therefore necessary to identify constructs that are functionally associated with multiple problematic provider behaviors, that when intervened on may improve the full functional set of behaviors.

The preliminary significant findings reported in this dissertation offer encouragement that intergroup anxiety may be a useful construct predicting intergroup behavior, and if further research supports the role of anxiety in provider communication behaviors, the implications for disparity reduction efforts will be significant. However, there is reason to be skeptical about the role of anxiety in driving interracial behavior. One primary argument is that the focus on White anxiety obscures other, less sympathetic factors impacting intergroup behavior, such as anger (Cheung-Blunden & Blunden, 2008) or superiority (Tajfel et al., 1971). Thus, focusing on threat as a major driver of discriminatory behavior may let White people off the hook for the crueler components of their racial discrimination. Dobbins and Skillings (2000) offer a different perspective with significantly different intervention implications, describing racism as an addiction rather than a consequence of anxiety.

Focusing on individual-level anxiety as a major contributor of discriminatory behavior in medicine may also obscure the broader social forces that underlie this relationship. For instance, we see countless examples of media propaganda that introduces fear of minoritized outgroups. The media uses dehumanizing and extreme language to describe Palestinian casualties (Osman,

2023), reports disproportionately on Black perpetrators of crime (Gregory et al., 2014) and even asks leading questions in the wake of a discriminatory act; for instance, after George Zimmerman murdered Ahmaud Arbery, he was asked by Sean Hannity "so its almost from the very beginning, you felt [...] are you saying that on the 9-11 tape you felt (Gregory et al., 2014) threatened?" Zimmerman answered "No," yet the framing of the question reveals the bias inherent in our media. When the general population hears the term anxiety, they are unlikely to appreciate the impact of these biased social forces on their understanding and experience of it..

Finally, the emphasis on fear as a driver of discriminatory behavior may belie situations where anxiety and discriminatory behaviors are correlated because the person engaging in discrimination is intentionally using the language of fear for self-protection or to exact revenge. For instance, police officers may indicate that they felt fear after using extreme force on a civilian to justify their actions and avoid legal consequences. Critiques of the focus on fear in intergroup bias can be allayed somewhat if scientists are specific and precise about the anxieties experienced when people are feeling "intergroup anxiety." Allport (1954) synthesizes this by saying that bigoted people are not afraid of the minoritized person, but are afraid of "[themself], of [their] own consciousness, of [their] liberty, of [their] instincts, of [their] responsibilities, of solitariness, of change, of society, and of the world-of everything except the [minoritized group]."

This exploration of some cautions related to understanding racially biased behavior as an anxiety response does not indicate that the construct should be abandoned. Its utility as an intervention target underscores the importance of clarifying its role and impacts. However, the critiques highlighted above do emphasize the need for responsible, methodologically rigorous research which adequately considers social and psychological influences and intentionally

recognizes and teases apart the multiple intersecting influences that create racially disparate behavior. It is this author's perspective that responsible research on racial disparity is not possible without deep and ongoing relationality with impacted communities.

Figures and Tables

Figure 1

Conceptual Model of the Present Study

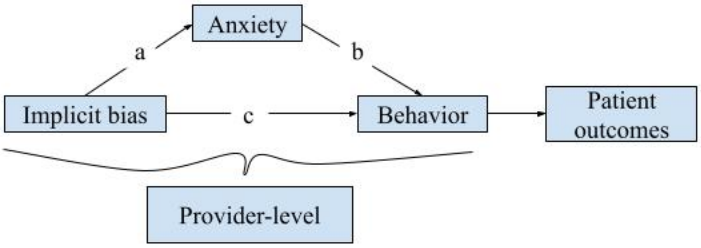

Figure 2

Anxiety latent variable model statistics

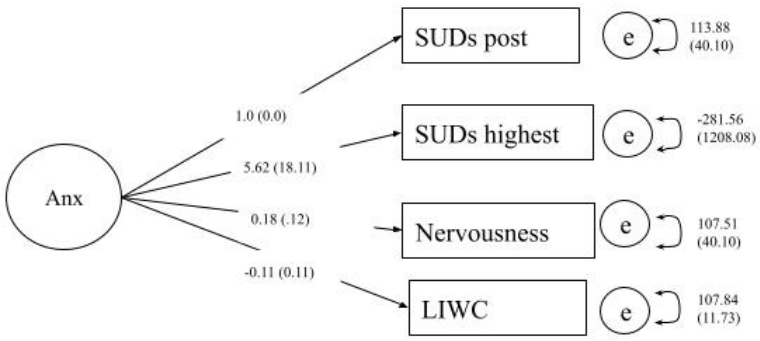

Figure 3

Effect sizes of variable paths in regression analysis

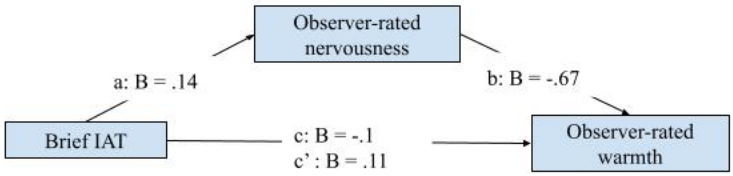

Table 1

Participant medical school standing at the time of study participation

Year in school	Number of participants
First year	20
Second year	1
Third year	27
Fourth year	37

Table 2.

Participant race

Race	Number of participants
White/Caucasian	54
Asian/Asian American	16
Mixed Asian/Asian American	2
Black/African American	3
Hispanic/Latinx	5

Table 3.

Means, SD, and correlations of multi-timepoint measures

	m	sd	1	2	3	4	5	6	7	8	9	10
1. White post SUDS	31.34	15.63										
2.White highest SUDS	42.67	18.88	.88**									
3.White LIWC anx	.12	.13	-.04	0								
4.White session length	15.71	6.64	0	-.02	-.03							
5.White observer- rated nervous	1.81	.36	.1	.13	-.19	-.23*						
6.White observer- rated warmth	5.57	.86	-.14	-.17	-.04	.24*	-.27*					
7. Black post SUDS	29.91	16.56	.77**	.65**	-.05	-.02	.04	-.13				
8.Black highest SUDS	39.72	18.46	.73**	.72**	-.04	-.02	.06	-.15	.89**			
9.Black LIWC anx	.13	.15	.08	.05	.11	-.01	-.11	.18	.01	-.04		
10.Black session length	12.56	5.57	0	.04	.04	.32**	0	-.05	-.1	.04	.07	
11. Black observer- rated nervous	1.83	.38	-.05	.02	-.15	-.1	.56**	.01	.03	.13	-.11	-.04
12. Black observer- rated warmth	5.64	.78	.03	.01	-.06	.15	-.26*	.76**	-.04	-.07	.13	-.05

Table 4

Means, SD, and correlations of summary scores, dependent and independent variables

	m	sd	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. STAI state	52.19	.23														
2. STAI trait	29.27	8.69	-.44**													
3. SIPS factor 1	10.87	4.4	-.43**	.5**												
4. SIPS factor 2	15.88	5.99	-.47**	.58**	.94**											
5. SIPS factor 3	21.04	7.84	-.50**	.54**	.90**	.91**										
6. SDS mean	2.74	2.74	-.11	-.25*	.04	.03	.02									
7. IMS mean	2.86	.53	.02	.19	.02	.03	-.02	-.04								
8. EMS mean	4.78	1.93	-.04	.06	-.02	-.03	-.09	.18	.13							
9. Interracial LIWC	-.01	.19	-.22	.09	.06	.06	.09	.21	.13	.07						
10. Interracial post-SUDs	1.44	10.91	-.06	-.07	.04	0	.02	-.12	-.05	-.03	-.08					
11. Interracial highest SUDs	2.95	13.87	0	.01	.09	.09	.05	0	-.05	.05	-.05	.77**				
12. Interracial session length	3.15	7.15	-.01	.13	-.15	-.09	-.12	.02	.02	-.13	.01	-.09	.01			
13. Interracial observer-rated nervous	-.02	.34	-.03	-.11	-.08	-.1	-.08	.05	-.16	.2	-.03	.22*	.26*	-.15		
14. Interracial observer-rated warmth	-.03	.57	.16	-.12	-.17	-.16	-.12	-.01	.01	-.14	-.06	-.15	-.2	.15	-.44**	
15. D	.04	.46	-.08	.03	-.11	-.1	-.05	-.01	.21	.07	-.07	.11	.13	-.01	.2	-.02

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