ABSTRACT

Racial Biases and COVID-19 Anxiety in America:
How Do Healthcare Workers Compare to the Public?

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Considering how often marginalized groups are ostracized during infectious disease outbreaks, it is important to revisit the relationship between outgroup bias and anxiety about said outbreaks. American healthcare workers are a group of particular interest given their frontline involvement in clinical outcomes. Using multiple regression and 2020 IAT data, I evaluate relationships between racial bias and COVID-19 anxiety. I find that bias against Black people — implicit or explicit — is negatively associated with COVID anxiety. Additionally, while American healthcare workers' implicit racial bias has a weaker association with COVID anxiety compared to the public, the association between explicit bias and anxiety is stronger among healthcare workers. Meanwhile, Black respondents show no relationship between implicit bias and COVID anxiety. Overall, my findings show that racial bias is negatively related to COVID anxiety in and out of healthcare, supporting my key contention that racism perpetuates racial inequality through increased apathy toward pandemic-related risks.

Racial Biases and COVID-19 Anxiety in America:
How do Healthcare Workers Compare to the Public?

by

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DEDICATION

To Mom, who rallied the troops when this semester had my head underwater, just to make sure I wasn't drowning.

CHAPTER ONE

Introduction

The ongoing novel coronavirus (SARS-CoV-2) pandemic has been linked to elevated anxiety within the American public (Cai et al. 2021). SARS-CoV-2 and its variants, including Delta and Omicron (and a new subtype of Omicron known as "BA.2"), have persisted for more than two years. In the United States alone, the death toll from COVID-19 is around one million. Meanwhile, much about the virus and its variants remains unknown, such as the physiological and health impacts of "long COVID," as well as impacts on children (Lopez-Leon et al. 2021).

At the same time, fears and behaviors around the pandemic have varied across the country. States have differed in their rollout or timing of mask mandates, and large employers have varied in their implementation of vaccine mandates. Moreover, although the pandemic has accelerated racial inequities in health, some states have shown more deepening of these racial inequities relative to others, and states likewise vary substantially with regard to the collection of data on these racial health disparities in the first place (e.g., Abedi et al. 2021; Douglas et al. 2021; Karaca-Mandic et al. 2021).

Even in the early months of the pandemic, disparities emerged along racial and ethnic lines. Analyzing data from Spring 2020, Pinar Karaca-Mandic and colleagues (2021) found that COVID disproportionately impacted Black, Latino, and Native populations. In some places, the proportion hospitalized was nearly triple that of general population (Abedi et al. 2021; Karaca-Mandic 2021; Douglas et al. 2021).

In this study, I draw on individual-level data from 2020, to gain more insight into the first year of the COVID-19 pandemic. Existing research has made clear that race is associated with health during the pandemic, but has yet to draw a formal connection between conceptions of racism and how individuals relate to the pandemic. Historically, Black people have experienced poor health outcomes, and have come to be implicated in theories of difference that can perpetuate public health crises by blaming or neglecting the most vulnerable subpopulations.

Whether and how individual-level racism towards Black people relates to anxiety felt about COVID-19 remains unknown. On the one hand, racism can be heightened or expressed during times of social or economic unrest, perhaps forging a positive or reinforcing link between racism towards Black people and pandemic anxiety in general. On the other hand, racism is linked historically and presently to segregation and other forms of geographic inequality that isolate vulnerable groups. By stemming from and reflecting this structured isolation, individual-level racism may instead lessen anxiety about the pandemic, by making the pandemic seem less important or vital to public health. If individuals holding racist attitudes feel more apathy toward the pandemic, this could perpetuate inequalities in pandemic outcomes, due to the continued operation of structured inequities in health. This link, however, could depend fundamentally on occupational exposure to COVID-19 as well as on a person's own racial or ethnic categorization.

Analyzing data from the Harvard Implicit Bias Project, known also as Project Implicit, I address the following questions: What is the connection between racial bias and the public's emotional response to COVID? Additionally, considering both the

history of bias in medicine and the contemporary experiences of American healthcare professionals during the pandemic, is the relationship between racial bias and COVID anxiety different for those who work in the healthcare field? I argue that healthcare workers allow for one proxy of clinical, structural processes contributing to systemic racism in America. I compare findings across implicit and explicit racial bias data, also collected by Project Implicit, to provide further insight into the interpersonal operation of racism during the COVID-19 pandemic.

CHAPTER TWO

Background

Racism and perceived threat have been interlinked throughout the course of the pandemic. Portraying COVID-19 as disproportionately affecting communities of color could make the pandemic seem more sequestered or segregated, and thus perhaps lower pandemic anxiety in the public. However, how any racial origins of the virus are narrated and understood could factor into both racial bias and perceived threat.

The wide geographic and local variation in public response is in keeping with previous pandemic and public health crises, since epidemics or other social upheavals tend to activate, reveal, and intensify structural inequities (Pappas et al. 2009). Historically, for example, institutional responses to public health issues have been connected to strongly to racial dynamics within the United States (Bailey et al. 2021; Washington 2006). This is because race and health have been linked since before the inception of the United States, and in fact continued to be linked through the reification of biological differences (Hoffman et al. 2016). Scientific racism originally supposed inherent or basic biological differences between racial groups (the term "race" itself is a reference to animal subspecies). White colonial American populations considered African slaves and their descendants (as well as the small free Black populations) to be simultaneously medically distinct enough from greater white populations to be deemed biologically inferior or subhuman (and explain away resistance to certain illnesses), but medically similar enough to warrant both medical experimentation and scapegoating for

disease spread (Washington 2006). The former was used from the antebellum to engender bias within medical spaces against Black people (and other populations of color), living and dead. The latter provides the precedent for public response to infectious disease outbreak.

In addition to Pinar Karaca-Mandic and colleagues (2021), Megan D. Douglas and colleagues (2021) evaluated the early months of the COVID pandemic, though their study period was broader (April to November 2020). In studying reported racial disparities during those months, they found that a large percentage (23% at the end of their study period) of COVID cases and deaths were reported without any accompanying racial or ethnic classification. Douglas et al. (2021) interpret this omission of racial data as evidence of a need for more consistent data collection practices. Even with missing data, clear differences in outcomes by race still emerged. Their findings are corroborated by Abedi and colleagues (2021), who also analyzed data from April 2020. They found that counties with higher rates of poverty and disability also had higher rates of death. Additionally, racial disparities emerged, with Black Americans being far more vulnerable to COVID infection and death than their White counterparts.

In 2020, Daniel Kwasi Ahorsu and colleagues created a scale of COVID-19 fear to complement other measures of disease spread (Pappas et 2009). In contextualizing Ahorsu et al.'s work, Pappas et al. (2009) posit that significant fear and anxiety from the perceived presence of infectious disease extends to the general population *and* health professionals. In fact, the authors state that part of the reason that infectious diseases are so terrifying to both parties is that infections are "transmissible, imminent, and invisible"

(Pappas et al. 2009). Moreover, management of infectious diseases requires frequent, dynamic adaptation to new variants.

In addition to these deep, dynamic threats, stigmatization shapes psychosocial response to epidemics and population health in general (Phelan et al. 2014). For instance, during the 2009 SARS outbreak, Asian populations and ethnic enclaves were dehumanized as disease vectors. The authors cite a similar occurrence with the 1993 hantavirus outbreak and Native Americans. Underlying this stigmatization linked to scapegoating was public access to misinformation about the disease, medical and scientific debates being appropriated by different social groups, and accompanying initiation or recycling of fear across groups. For instance, epidemics can reinvigorate and perpetuate false narratives about genetic or essential differences across racial or ethnic groups, thus reifying racist stereotypes during contentious times (see Takeuchi et al. 2010; Williams and Sterthal 2010). Experienced fear is both group-specific and collective, as it is shaped and reshaped by group-centric (counter)narratives of disease origin and spread.

Syndemics: How Structural Inequalities Channel Epidemic Outcomes

Pappas et al.'s (2009) psychosocial perspective on epidemics in many ways is compatible with a fundamental cause perspective on health disparities (Link 2008; Phelan, Link and Tehranifar 2010). The key component of Link's thesis is that, as populations gain more knowledge and eventual control over public health risks, health disparities between resourced and vulnerable population groups tend to *increase* rather than decrease. That is, even as overall population health tends to improve, between-group inequalities widen, due to differences in time, money, knowledge, networks, power, and

other structural factors across groups shaping the differential courses of disease and its treatment (Phelan et al. 2010). Thus, due to underlying structural inequities, epidemics lend further gravity to the uneven social shaping of health.

Indeed, despite increased technological mastery and behavioral prevention at the societal level, the COVID-19 pandemic has not only persisted, but has also more greatly harmed those who are less educated, poor, and nonwhite, thus enmeshing and intersecting viral and structural social problems. In this vein, Singer and Clair (2004) explore the concept of the syndemic, defined as "the synergistic interaction of two or more coexistent diseases and resultant excess burden of disease" (Singer and Clair 2004: 423; see also Willen et al. 2017). Singer and Clair (2004) use examples of the AIDS crisis and other communicable disease epidemics (e.g. sexually transmitted diseases, hepatitis, and pneumonia) to explain how structural factors (e.g., race, sexual orientation, or socioeconomic status) predispose individuals to HIV/AIDS infection through existing weaknesses in social or health resources (see also Watkins-Hayes 2020).

Applied to the COVID-19 pandemic, syndemicity could refer to the operation of racism in tandem with other cultural, structural, or viral inequities in ways that worsen both racism and pandemic outcomes (e.g., Mendenhall et al. 2021; Willen et al. 2017). This would occur not only because existing racial health inequities inform pandemic vulnerability, but also because racialized, and racist, narratives of disease spread and vulnerability tend to reinforce this link (Phelan et al. 2014). Importantly, syndemicity also captures geospatial vulnerability of minoritized groups on account of their segregated or stigmatized social existences, providing another mechanism for understanding the interconnections among race, place, and health.

In total, this powerful concept of a syndemic addresses how waves of viral infection combine with persistent health inequality and structural violence in ways that exacerbate public health crises overall, at the population level, while also further undermining social justice. In this way, a syndemic lens recognizes disease spread as a holistic, biosocial process.

Structural Racism in Health and Medicine

Structural racism generates and maintains racial health disparities (Washington 2006). David Williams and Michelle Sterthal (2010) give a sociological overview of how race and health connect, beginning with the foundational perspective of W.E.B. Du Bois in 1899. Du Bois contended that racial health disparities were not based in physiological differences but rather in social resources, treatment, and contexts. Building on these DuBoisian insights, Williams and Sterthal contend that clinical and medical racism serve as institutional contexts reinforcing racial inequalities (see also Takeuchi et al. 2010).

Takeuchi and colleagues (2010) also trace racial health disparities to geographic stratification — including spatial segregation — of racial groups. Marginalized racial groups are constrained via economically structured residential options into areas with poorer air quality, water quality, education, food availability, and other factors that, cumulatively, lessen opportunities for present and future good health (Bailey et al. 2021; Gee and Ford 2011; Massey and Denton 1993; Riley 2018). Because structural or systemic inequality is a multilevel reality, it is perpetuated and reinforced by social-psychological biases that vary between individuals while also being reinforced by cultural stereotypes (Phelan et al. 2014; Ridgeway 2019; Williams 2018). In the next

section, I offer an overview of how biases can be assessed as a specific mechanism perpetuating structural inequities in health by race.

Implicit and Explicit Racial Biases as Social-Psychological Mechanisms of Structural Racism

Several scholars have shown how racial bias shapes perceptions of social issues. Brigham (1993) found that Black students were more supportive than white students of programs that overtly created opportunities for and recognition of Black people. Students also differed significantly in the relationship between racial attitudes and sociopolitical engagement. Brigham's contribution is not only displaying the strengths and limitations of explicit bias measures, but also the specific scales used for those measures.

Other scholars have documented implicit bias, or bias expressed beyond conscious awareness or control (Nosek et al. 2007; Greenwald et al. 2009). Compared to explicit or self-reported bias measures, implicit bias is less affected by social inclinations to be likeable or acceptable. Corey Columb and Ashby Plant (2010) explore changes in implicit bias following the election of Barack Obama in 2008. Participants were exposed to exemplars of negative stereotypes about Black people, then exposed to a presumably positive stereotype exemplar in Barack Obama, or a neutral exemplar. Those who were exposed to imagery of Obama displayed a decrease in measures of implicit bias against Black people, implying that mere exposure to positive exemplar of certain racial groups decreases racial bias against those groups. However, in view of Trump-era politics as well as the increased salience of healthcare to public health during the pandemic, more research is needed.

Healthcare Work as a Specific, Critical Context for Structural Racism

Existing work finds that healthcare worker racial bias is close in magnitude to levels of bias observed within the public (Fitzgerald and Hurst 2017; Hall et al. 2015). FitzGerald and Hurst (2017) found that biases that do exist among healthcare workers correlate with less favorable provider-patient outcomes like lower quality care. Hall and colleagues (2015) reviewed the literature on implicit racial bias in healthcare employees. They had two key findings. The first is that 14 of 15 studies among healthcare providers found low-to-moderate racial/ethnic bias toward non-white populations (namely Black and Latino populations), at levels consistent with biases in the general population. The second key finding was that, like Fitzgerald and Hurst (2017) found, implicit racial or ethnic bias was significantly correlated with negative provider-patient outcomes. These include tendencies of providers to dominate or condescend to certain patients, or change treatments based on assumptions of patient compliance or adherence (Hall et al. 2015). Blair and colleagues (2013) additionally found that explicit bias among healthcare workers has decreased significantly over time, perhaps because respondents have become less likely to express opinions are that no longer are socially acceptable. This contrasts with implicit bias levels, which they find have not decreased at nearly the same rate.

Although these studies find considerable evidence of bias and its clinical importance among healthcare workers, they do not examine anxiety related to the COVID-19 virus as a separate but related process. Doing so would reveal more about the implications of racial bias within healthcare settings during the pandemic.

Although healthcare workers have been responsible for managing a variety of health conditions during the pandemic, whether they exhibit anxiety about the pandemic likely influences treatment practices and decision-making.

Research Questions for the Present Study

Considering the social history, epidemiology, and sociology of systemic racial health disparities, the advent of COVID-19 raises several questions: Is racial bias associated with anxiety about the pandemic? Does the relationship between anxiety and racial bias significantly differ among American healthcare workers relative to the public? Finally, do bias-anxiety relationships significantly differ across racial/ethnic backgrounds?

While I do not enter this study with formal hypotheses pertaining to these three research questions, the literature leads me overall to two main, opposing predictions concerning the relation between anxiety about COVID-19 and racial bias. The first prediction is that anxieties about COVID will become *more* likely as racial bias increases. This would be broadly consistent with some tenets of a syndemic perspective, namely the interlinked, mutually escalating nature of racism and pandemics. From that standpoint, a positive correlation could reflect a larger, situational entrenchment of racism.

An alternative prediction, however, is that increased racial bias will associate with *lower* COVID anxiety. In other words, racism could engender apathy toward the pandemic itself, and thus serve to perpetuate racial health inequities, and poorer population outcomes as well, during the pandemic. This opposing prediction, while it follows from some tenets of syndemic theory focused on the spatial and economic segregation of minoritized groups, also follows from theoretical models wherein

marginalized populations' disproportionate vulnerability to disease — as entrenched by their structured segregation from dominant, white social spaces (Anderson 2021) — would actually decrease dominant population anxiety about the disease, *due to a lesser perceived importance of or greater apathy towards the threat*. This perceived offloading of risk could happen through a situationally deepened reification of group differences; internalized racism devalues the human lives presently at stake (Pappas et al. 2008; Washington 2006).

CHAPTER THREE

Methods

The data for this study are drawn from the Harvard Implicit Association Project, housed at projectimplicit.org. In 1998, the implicit association test (IAT; Xu et al. 2014) expanded into a massive, online data collection interface known as Project Implicit, founded by Drs. Tony Greenwald, Mahjarin Banaji, and Brian Nosek. Through Project Implicit, IAT data have been collected continuously and worldwide since 2011 and cover a diverse range of bias targets including race, gender, age, sexuality, and national origin.

For the present study, I utilize the entire publicly available racial bias dataset from the 2020. The original number of respondents is approximately 1.6 million. Given the focus of my study, I restricted the analytic sample to respondents who a) were United States residents and b) had received the Covid Anxiety scale questions. This resulted in a sample size of 139,568. A subsample was selected to answer a battery of questions on explicit bias (n = 4,901). Due to some missing data within the obtained implicit and explicit bias samples (race and ethnicity have about 11-13% nonresponse across healthcare and public respondents, followed by age with about 3-4% nonresponse), I implement full-information maximum likelihood estimation (see Analytic Strategy).

Outcome Variable: COVID-19-Related Anxiety

This scale contains eight summed items, each containing a five-point Likert scale (1=strongly disagree; 2=somewhat disagree; 3=neither agree or disagree; 4=somewhat

agree 5=strongly agree). The items are statements such as “I am very worried about the coronavirus,” “I am taking precautions to infection from the coronavirus (e.g. washing hands, avoiding contact with people, avoiding door handles),” “I am constantly following all news updates regarding the coronavirus,” “I have stocked up on supplies to prepare for problems related to the coronavirus outbreak” (alpha = 0.81). This COVID Anxiety scale, and these items, are similar in content and quality to the original Fear of Covid-19 Scale (FCV-19S) developed by Daniel Kwasi Ahorsu and colleagues in March of 2020.

Predictor Variables

Key Independent Variable: Implicit Racial Bias

Implicit bias is measured using the implicit association test D (IAT D) score, which is measured on a four-point scale of -2.00 to 2.00 (Xu et al. 2014). A score of 2.00 indicates highest possible implicit bias in favor of White people and against Black people, while a score of -2.00 indicates the highest bias against White people and in favor of Black people. A score of 0 would indicate no bias toward either group. The IAT operates by asking participants to categorize four total target categories: two concept/object categories (e.g., Black and White) and two binary descriptive categories (e.g., Good and Bad) using only two keys. The stimuli for the race category were represented in the test with closed-cropped, grayscale images of faces, while stimuli for description were simple words like “joy” or “agony”. Participants more quickly associate object categories and descriptions that align with their subconscious bias. Thus bias is assessed by noting the speed with which certain associations are made compared of others (Greenwald et al. 2009; Nosek et al. 2007; Srivastava and Banaji 2011).

Key Independent Variable: Explicit Racial Bias

These measures of explicit bias were pulled from the optional items offered to participants in the Implicit Association Test. These "self-report" questions cover approximately 25 different scales of explicit, overt opinions and attitudes. Each scale contains multiple items, with some containing as many as 44 questions (Xu et al 2014). However, all participants did not receive all self-report questions. The IAT administrators divided the questions into categories, and then randomly selected questions within those categories to give to willing participants. Some categories were always included. For example, every participant received one question on racial preference, and four questions about situational racial equality, but two adjacent participants may receive different questions from those categories. In total, no single participant received more than 10 total questions about their self-reported explicit opinions.

For the present study, I selected the scale that appeared to be the most consistent with the measure of implicit racial bias. The IAT D, the measure of implicit racial bias, evaluates bias in such a way that an increase in score indicates and increase in bias specifically in favor of white people. As such, I used items from a 15-item scale that measured explicit attitudes and opinions regarding white people. However, not every item was directly applicable as a measure of bias toward/against white people. Some items, for example asked for respondents' evaluations of Black/White relations, rather than their opinions or feelings about either group. Thus, I further restricted my measure of explicit bias to six items within the scale that were more overtly evaluative of White people, or otherwise directly expressed feelings about proximity to White people. Ultimately, I used six items for my measure of explicit bias: "Most White people can't be

trusted to deal honestly with Black people," "Some White people are so touchy about race that it is difficult to get along with them," "I would rather not have White people live in the same apartment building I live in," "I would accept an invitation to a New Year's Eve party given by a White couple in their home," "It would not bother me if my new roommate was White," "If a White person were put in charge of me, I would not mind taking advice and direction from him or her." The items are Likert-scale, with a range from 1 (representing "strongly disagree") to 7 (representing "strongly agree"). Additionally, I reverse-coded some items such that higher values indicate greater bias favoring White people for all items (Litam & Balkin 2021; Uhlmann et al. 2010; Xu et al. 2020). Some of these items were reverse-coded for consistency with the implicit bias measures, such that higher values are indicative of higher bias in favor of white people.

I collected the six items into a single composite variable ranging from 6-42, with 6 representing very low bias in favor of White people, and 42 representing very high bias in favor of White people. The six items have a Cronbach's alpha of 0.62. This final variable is the measure used to represent explicit racial bias within this study.

Control Variables: Race/Ethnicity, Gender, Education, Age, Interview Time

The original race variable was eight mutually exclusive categories (American Indian/Alaska Native, East Asian, South Asian, Native Hawaiian or other Pacific Islander, Black or African-American, White, Other or Unknown, and Multiracial). A separate question, asking the respondent about their "Hispanic or Latino" ethnicity, is absorbed into this scheme. Namely, across these racial and ethnic measures, I classify respondents into five categories (non-Hispanic white, non-Hispanic Black, Hispanic

Asian, and Multiracial/Other). This scheme enables an identification of diverse effects of bias across race and ethnicity.

I treat gender as binary (i.e. respondent identifies as "male" or "female") for the presented analyses, so that gender coefficient tests are adequately powered across both the implicit and explicit bias samples. Education is provided by the respondent in terms of categories, determined from a list of possible educational credentials or levels. Age is determined by respondent-provided birth year. Finally, I consider month of interview session and weekday of interview session. The months included in the models are from April through July, as those are the only months during which respondents were surveyed about COVID specifically. Meanwhile, a weekday adjustment can help account for daily differences in work exposure or social routines which may influence respondent anxiety.

Analytic Strategy

To assess associations between COVID anxiety and racial bias, I implement a series of full information maximum likelihood (FIML) regression analyses with linearized standard errors. FIML regression addresses missing data on control variables (<10% for any demographic variable) and is asymptotically equivalent to multiple imputation methods (Allison 2002).

For the first research question ("Is racial bias associated with anxiety about the pandemic within the public?"), I use two models. The first is for implicit racial bias, using the IAT D score as key independent variable. The second instead utilizes explicit racial bias. Across these models, coefficient tests for bias parameters establish the nature and significance of the bias-anxiety relationship.

The additional research questions are answered by use of additional regression models, involving occupational and then racial/ethnic two-way interaction terms with the bias parameter. In particular, the second question ("Does the relationship between anxiety and bias significantly differ among American healthcare workers compared to the public?") is answered by specifying a statistical interaction term (Bias × Healthcare Worker) allowing the bias parameter to vary in magnitude by occupational subsample. Finally, my third research question ("Does the bias-anxiety relationship differ by racial background?") is answered by estimating racial and ethnic adjustments (Bias × Racial/Ethnic Category) to the non-white Hispanic reference slope.

Unstandardized parameter estimates are presented, to enable interpretation of indicator term coefficients. Meanwhile, control variables of race/ethnicity, gender, education, age, and interview time (month and weekday) are entered into all regression models, to allow for the interpretation of bias parameters net of basic demographic background and possible, short-term changes in macrosocial context, daily work exposure, or pandemic conditions or intensity.

CHAPTER FOUR

Results

Table 1 overviews descriptive statistics for the obtained Harvard Implicit Bias Project sample. Of 139,568 total respondents, 10.9% worked in healthcare in some capacity (n = 15,261); other respondents are classified as public (non-healthcare) respondents (n = 124,307).

COVID anxiety averaged 29.95 (SD = 5.96) in the public and 30.00 among healthcare workers (SD = 5.81) (p = .34). Healthcare workers showed somewhat higher implicit racial bias in favor of white people relative to the public (0.230 vs. 0.256, p < .001), while no difference in explicit racial bias emerged across the two subsamples (30.57 vs. 30.86, p = .20). Implicit and explicit bias are significantly though weakly correlated among public respondents (r = .173, p < .001) and among healthcare workers (r = .238, p < .001). These weak correlations are consistent with other research into implicit and explicit bias measurement using IAT methods (e.g., Srivastava and Banaji 2011). COVID anxiety correlates less strongly with implicit bias (r = -0.060 in public, -0.035 among healthcare workers, ps < .001) compared to explicit bias (r = -0.082 in public, -0.204 among healthcare workers, ps < .001).

Both samples are majority non-Hispanic white (71.8% in public and 71.9% in healthcare). Black respondents are similarly present across subsamples (5.9% and 6.5%) although quite underrepresented relative to the U.S. population. Hispanic or Latino respondents are somewhat more common in the public sample (11.7%) compared to

healthcare workers (9.1%), while Asians are somewhat less represented within the public sample (6.2%) compared to the healthcare sample (8.4%). Women are more common in the healthcare worker sample (76.6%) relative to the public sample (67.5%), as are those with higher educational credentials. Meanwhile, the recruited healthcare worker respondents (mean age = 38.04 years) are slightly older than the public respondents (35.51 years). From here Table 2 and Table 3 display the outcomes for implicit and explicit bias, respectively.

Research Question 1: Is Racial Bias Associated with Anxiety About the Pandemic?

Table 2 displays results from multiple regression models involving the implicit bias measure. All regressions adjust for demographic background, as shown. Model 1 shows that the estimated multivariate relationship between COVID anxiety and implicit bias is negative (b = -0.627, $p < 0.001$). Alternatively, the standardized estimate of this parameter (β = -0.047) signifies that a one-standard deviation increase in implicit racial bias towards white people is linked to a 0.047-standard deviation decrease in COVID-related anxiety symptoms.

Here, healthcare workers are estimated to be somewhat *less* likely than the public to suffer COVID anxiety (b = -0.398, $p < .001$), conditional on their demographic characteristics. Compared to non-Hispanic white people, all other racial and ethnic groups report greater levels of COVID anxiety (bs = .507 to 1.902, ps < .001). For instance, Asians report the highest expected difference in COVID-related anxiety (b = 1.902), amounting to more than one-third of a standard deviation in the anxiety measure (SD = 5.94). Women show higher levels of COVID anxiety relative to men (b = .840, p

< .001), and COVID anxiety is higher with greater levels of education (*b*s = .250 to 2.048, *p*s < .001) and among older individuals (age $b = 0.012$, $p < .001$).

Table 3 displays a parallel set of model results, obtained from multiple regression models using the explicit racial bias measure. Model 1 shows the estimated multivariate relationship between COVID anxiety and explicit bias is negative ($b = -0.094$, $p < 0.001$). The standardized bias estimate ($\beta = -0.084$) — which is quantitatively larger than the estimate obtained for the implicit bias — denotes that a one-standard deviation increase in explicit racial bias is linked to a 0.084-standard deviation decrease in COVID-related anxiety symptoms.

Table 1. Descriptive Statistics, 2020 Project Implicit Data

Variables	Analytic Subsample									
	Public (n=124,307)			Healthcare Workers (n=15,261)	*p*			Total (n=139,568)		
	M(SD) or %	Min	Max	M(SD) or %		Min	Max	M(SD) or %	Min	Max
Covid Anxiety	29.95 (5.96)	8	40	30.00 (5.81)	0.34	8	40	29.96 (5.94)	8	40
Implicit Racial Bias	0.230 (0.444)	-1.869	1.732	0.256 (0.438)	<0.001	-1.730	1.543	0.233 (0.443)	-1.869	1.732
Explicit Racial Bias	30.57 (5.19)	6	42	30.86 (5.39)	0.20	11	42	30.61 (5.21)	6	42
Race/Ethnicity					<0.001					
Non-Hispanic White	71.8%	0	1	71.9%		0	1	71.8%	0	1
Non-Hispanic Black	5.9%	0	1	6.5%		0	1	5.9%	0	1
Hispanic	11.7%	0	1	9.1%		0	1	11.5%	0	1
Asian	6.2%	0	1	8.4%		0	1	6.4%	0	1
Multiracial or Other	4.4%	0	1	4.1%		0	1	4.4%	0	1
Gender					<0.001					
Male	32.5%	0	1	23.4%		0	1	31.5%	0	1
Female	67.5%	0	1	76.6%		0	1	68.5%	0	1
Education					<0.001					
High School or less	11.6%	0	1	2.4%		0	1	10.6%	0	1
Some College	20.4%	0	1	15.8%		0	1	19.9%	0	1
College Graduate	29.6%	0	1	23.1%		0	1	28.8%	0	1
Postgraduate Education	38.4%	0	1	58.8%		0	1	40.7%	0	1
Age	35.51 (14.44)	11	110	38.04 (13.99)	<0.001	11	110	35.79 (14.41)	11	110

Table 2. Linear Regressions of COVID-19 Anxiety on Implicit Racial Bias
(2020 Project Implicit Data; n=139,568)

Variables	Model 1	Model 2	Model 3
	b	*b*	*b*
Implicit Racial Bias	-0.627***	-0.658***	-0.685***
Healthcare Worker (HCW)	-0.398***	-0.403***	-0.398***
Race (Reference: Non-Hispanic White)			
Non-Hispanic Black	0.507***	0.507***	0.685***
Hispanic	0.804***	0.803***	0.791***
Asian	1.902***	1.903***	1.907***
Multiracial or Other	0.622***	0.621***	0.617***
Female	0.840***	0.839***	0.838***
Education (Reference: ≤ High School)			
Some College	0.250***	0.251***	0.251***
College Graduate	1.547***	1.547***	1.548***
Postgraduate Education	2.048***	2.049***	2.049***
Age	0.012***	0.012***	0.012**
Bias × HCW		0.288*	
Bias × Black			0.719***
Bias × Hispanic			-0.089
Bias × Asian			0.389*
Bias × Multiracial/Other			0.033
Intercept	27.173***	27.174***	27.175***

Note. Unstandardized estimates presented. Parameters estimated using full-information maximum likelihood. Month and weekday of bias testing controlled (not shown).
+ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed)

Table 3. Linear Regressions of COVID-19 Anxiety on Explicit Racial Bias
(2020 Project Implicit Data; n=4,901)

Variables	Model 1	Model 2	Model 3
	b	*b*	*b*
Explicit Racial Bias	-0.094***	-0.081***	-0.132***
Healthcare Worker (HCW)	-0.156	-0.127	-0.139
Race (Reference: Non-Hispanic White)			
Non-Hispanic Black	0.821*	0.823*	0.842*
Hispanic	0.153	0.156	0.179
Asian	0.789*	0.736*	0.852*
Multiracial or Other	0.489	0.520	0.549
Female	0.825***	0.823***	0.844***
Education (Reference: ≤ High School)			
Some College	0.229	0.222	0.224
College Graduate	1.764***	1.759***	1.775***
Postgraduate Education	2.278***	2.287***	2.267***
Age	0.002	0.001	0.000
Bias × HCW		-0.111*	
Bias × Black			0.120+
Bias × Hispanic			0.082+
Bias × Asian			0.112+
Bias × Multiracial/Other			0.131
Intercept	27.392***	27.433***	27.380***

Note. Unstandardized estimates presented. Parameters estimated using full-information maximum likelihood. Month and weekday of bias testing controlled (not shown).
+ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed)

In contrast to the results obtained for the implicit measure, healthcare workers show no significant difference in expected anxiety relative to the public (b = -0.156, p > .10). While the confidence interval of this coefficient overlaps with the interval for the implicit bias sample, a nonsignificant result here perhaps reflects the smaller sample available for this analysis. Results for race and ethnicity are relatively more mixed, as well, with non-Hispanic Black (b = 0.821, p < .05) and Asian (b = 0.789, p < .05) respondents evidencing more anxiety relative to non-Hispanic White people, but other racial and ethnic groups showing no significant difference. In contrast, the estimate for women remains similar (b = 0.825, p < .001), as do the estimates for educational differences in COVID-related anxiety (bs = 0.229 to 2.278). No age differences in COVID-related anxiety emerge in this sample (b = 0.002).

Overall, results obtained for Research Question 1 across implicit and explicit bias measures point to an inverse relationship between racial bias and COVID-related anxiety.

Research Question 2: Does the Bias-Anxiety Link Differ Among American Healthcare Workers?

In Model 2 (presented in Tables 2 and 3), the bias parameter is allowed to vary by healthcare worker (HCW) status. A significant two-way interaction is observed for the implicit bias measure (Bias × HCW b = 0.288, p < .05). According to this result, the bias-anxiety relationship is significantly weaker, by 43.8%, among healthcare workers when compared to public (100% * 1-(.658-.288)/.658)).

Turning to Table 3, a significant two-way interaction likewise is obtained for the explicit bias measure (Bias × HCW b = -0.111, p < .05). However, given the negative

directionality of this estimate, the bias-anxiety relationship is 137.0% *stronger* among healthcare workers as compared to the public (100% * 1+(.111-.081)/.081).

Thus, findings for this research question differ fundamentally according to bias measure: healthcare respondents show a comparatively weakened relationship between COVID anxiety and implicit bias relative to public respondents, whereas they show a much stronger relationship between COVID anxiety and *explicit* bias compared to the public.

Research Question 3: Does the Bias-Anxiety Relationship Differ by Racial Background?

Finally, I turn to a third regression model (presented in Tables 2 and 3), which allows the bias coefficient to differ by race/ethnicity. For the explicit and implicit bias measures, I find that bias is estimated to be unrelated to COVID anxiety among Black respondents (implicit Bias × Black $b = 0.719$, $p < .001$; explicit Bias × Black $b = 0.120$, $p < .10$). I also find attenuated relations between bias and COVID anxiety among Asian respondents (implicit Bias × Asian $b = 0.389$, $p < .05$; explicit Bias × Asian $b = 0.112$, $p < .10$). Interaction term results for Hispanic and multiracial/other respondents are nonsignificant for the explicit and implicit bias measures.

CHAPTER FIVE

Discussion

In this study, I find a significant, negative association between racial bias and anxiety related to COVID-19. This supports my key contention that racism perpetuates pandemic inequality through increased apathy toward pandemic-related risks in both everyday and clinical settings. While this association is more modest in magnitude compared to demographic differences in anxiety, the differences are not negligible. In fact, the clinical and pandemic implications of the bias-anxiety link still could be outsized due to viral spread and treatment outcomes, which I elaborate on momentarily.

American healthcare workers showed somewhat differing results depending on which bias measure is considered. While associations between implicit bias and COVID-related anxiety are weaker for healthcare workers compared to the public, associations between explicit bias and anxiety are stronger among healthcare workers. Healthcare workers and the public report similar levels of racial bias and anxiety about COVID, although implicit bias is slightly higher among healthcare workers. Meanwhile, an examination of racial/ethnic differences in these patterns found that bias-anxiety relationships are not observed among Black respondents and are substantially weakened among Asian-Americans.

Contrary to my initial expectations, as racial bias in favor of white people increases, anxieties or fears surrounding COVID-19 are lessened. This association, while it varies by healthcare worker status, still remains negative and significant across

healthcare workers and the public alike, suggesting that this counterintuitive finding is not specific to certain segments of the population or to being on "ground zero" of the pandemic. Thus, it should be taken as a departure point for rethinking how racial attitudes and the pandemic response are related.

While it is well-known that vulnerable population groups have suffered the greatest health, social, and economic tolls of the pandemic (Dolan and Carroll 2021), the fact that racism and lessened pandemic anxiety seem to go hand-in-hand would suggest that individuals who are less concerned about or empathic toward African-Americans also are less concerned about the pandemic in general. This finding is consistent with the "syndemic" interweaving of systemic racism and global virus spread. In particular, an inverse relationship between pandemic anxiety and racial bias suggests that as individuals associate Black people with worse moral or social goodness, they also see the pandemic as less relevant to their own personal well-being. A notable exception to this dynamic is, fittingly, Black respondents themselves, who show no statistical relation whatsoever between bias and pandemic anxiety. Conversely, those who score low on measures of racism are more concerned with how the pandemic affects them. In other words, they view it as more of a pertinent, and likely shared, threat. For Asian-Americans in particular, weakened relations between anxiety and bias could speak to the particular forms of viral prevalence and anti-Asian violence that this group has experienced during the course of pandemic.

The present findings also contribute to larger discussions on politics and race. Much research has shown that the pandemic is a shared threat but also one that is experienced along partisan lines: conservatives are experiencing a different pandemic

than liberals, in terms of perceived threat as well as objective levels of virus-related as well as economic and social hardships. Given how this is the case, racial attitudes represent a concrete process by which political groups may position or construct their perceived vulnerability to the pandemic. Specifically, theories of racial hierarchy posit that white people perceive and experience a set of social privileges that can enable them to navigate times of upheaval or unrest more easily (Bonilla-Silva 2018). Racism is a personal, internalized endorsement of these hierarchies, which may lead to less cause for anxiety amid the uncertainties of the pandemic if one's hierarchical position in society is perceived as deserved, not disputable, or safe.

Reflecting on these results more generally, findings regarding demographic differences in COVID anxiety often were stronger in magnitude than those linked to bias. For instance, greater anxiety among women relative to men is consistent with known gender differences in care work and general anxiety. Meanwhile, greater anxiety among highly educated individuals could speak to greater awareness or caring about pandemic outcomes, since structural vulnerability to viral infection due to frontline work or neighborhood contagion generally is lower among those with college or graduate educations (Anderson et al. 2021). As expected, age differences in covid anxiety were present within the larger implicit bias sample, consistent with increases in health and social vulnerability with age and perhaps also with greater levels of ageism during times of economic or social upheaval (Garcia, Homan, Garcia and Brown 2021).

While these results add in valuable ways to ongoing discussions about racism during the pandemic, one important limitation is the timing of data collection. Results presented in this study are based on survey data fielded during 2020. Because viral

prevalence and public anxiety fluctuated during this time, I adjusted for survey month and weekday in all analyses. Still, future research focused on how particular phases inflect the bias-anxiety relationship and its healthcare contingencies would be quite valuable to conduct. Meanwhile, the Harvard Implicit Project data draw on a more educated and younger sample compared to the U.S. population, leading to a potential underestimation of bias levels as well as any effects of bias on anxiety.

Additionally, the measure of explicit bias used in this study, while significantly associated with COVID anxiety, is an imperfect measure. First, due to the administration of the survey, self-report questions on explicit bias were only given to a small percentage of those who took the initial implicit association test. The explicit attitude questions only reached 3-4% of the sample population at all. This also explains the sharp decrease in the number of observations in Table 3: relatively few respondents would have received and answered those six questions specifically. Second, the explicit bias measure only includes questions that measure explicit bias regarding white people. I initially did so with the intent to be thematically consistent with the implicit bias measure. However, the implicit bias measure also considers bias for/against Black people. The implication for the implicit bias measure that as bias in favor of White people is also bias against Black people. The explicit bias measure in this study does not capture that same range or quality. Future studies would benefit from a more expansive and robust measure of explicit bias.

Another key limitation stems from the cross-sectional nature of the Project Implicit data. Due to their point-in-time nature, these data cannot establish definitive causal ordering between COVID-19 anxiety and implicit or explicit racial bias. If

syndemic theory is correct, then associations between structural health inequities and cultural biases entrenching and reflecting these inequities are, in some ways, reciprocal and mutually reinforcing (Willen et al. 2017). More important, I argue, is the overall, estimated directionality and strength of this observed relationship. Because I did not find a positive association between racial bias and COVID-19 anxiety, my findings are *not* consistent with the argument that racism and anxiety simply are joint manifestations of pandemic spread. If this was the case, then the role of racism in pandemic inequalities might be relegated to a passive one of historical continuity of structural racism. Alternatively, I find a negative, robust association between implicit and explicit racism across healthcare workers and the public alike, pointing to an apathy of slightly lowered anxiety that may then escalate and worsen the course of the pandemic for the entire population, while entrenching and deepening systemic health inequities. Equally important, this negative correlation also implies that lower levels of racial bias are consistent with greater concern about the pandemic.

From the standpoint of unknown time ordering, this negative correlation would possibly seem to suggest that COVID-related anxiety, when experienced, could actually improve racial and ethnic attitudes. However, that explanation seems far less plausible given theories of structural and cultural bias, all of which focus on the relatively stable nature of bias. It seems much more likely following existing research that relatively stable bias would be activated within and across situational contexts in ways that then are reflected in emotional or anxiety states (Williams 2018; Williams and Sternhal 2010), thus aligning with my substantive interpretation of bias influencing anxiety rather than vice-versa.

While my literature background is based largely in history, public health, and sociology, the results on the whole do not contradict the literature. In their work on the concept of the syndemic, Singer and Clair (2004) used the example of the HIV/AIDS epidemic. They illustrate how a disease being culturally and epidemiologically linked to marginalized segments of the population can negatively impact the overall public response to that disease in a way that ends up undermining public health for all. Put more simply, a cultural association of viral disease with Black or other marginalized populations effectively means that other groups view themselves as "naturally" less susceptible. In the 1980s and 1990s, the association of HIV/AIDS with gay and/or Black men resulted in the general population presuming they would not or could not be affected (Watkins-Hayes 2020). This cultural bias or negligence spread to public institutions, up to and including government bodies and healthcare systems, thus constructing less public urgency with lives hanging delicately in the balance.

A similar response arose as the COVID-19 pandemic stretched beyond mid-2020, around when these data were collected. In a March 2022 article, Allison Skinner-Dorkenoo and colleagues found that mere awareness about racial disparities in COVID health outcomes reduced both fear of COVID and subsequent support of COVID preventative measures among White respondents. These dynamics are consistent with the bias-anxiety findings presented here.

As these authors keenly note, when a pandemic once thought to be universal began to disproportionately impact vulnerable populations predictably due to structural vulnerabilities, attitudes about COVID began to shift in a way that continued to harm these same populations disproportionately while also taking an elevated toll on the public

health of all segments of the population. *Thus, when it comes to pandemic coping, structural and individual racism harm minoritized groups the most, while also harming everyone in the population far more than would occur in the absence of racism*. In this way, even relatively small associations between racial bias and pandemic anxiety still can have cascading and enormous costs for society.

As Washington (2006) and Skinner-Dorkenoo et al. (2022) have illustrated, it does not take much for the public to assume that a disease more severely impacting a community is due to some inherent flaw, whether biological or cultural, of those groups. Hence, group prevalence differences are reified as inherent group differences, contributing to the larger reification project involved in the social hierarchization of race. Another, related interpretation is scapegoating of vulnerable groups, which could lead to the same pattern of results, while also intensifying apathy or even violence toward these groups. Further research focused on anti-Asian implicit and explicit bias would help to develop the conceptual framework developed in this study.

A relation between bias and anxiety among healthcare workers has vital and practical significance. While Fitzgerald and Hurst (2017) find that racial bias among healthcare workers occurs at levels comparable to those found in the general population, frontline exposure to COVID may be changing both their biases and anxiety levels. Namely, healthcare workers, while they may see COVID more negatively impacting certain groups, may also witness — and care for — persons outside those groups also being affected severely. Thus, healthcare worker racial bias in favor of white people may not have as strong an association with COVID anxiety as it does for the general population. While again the estimated associations between COVID anxiety and racial

bias are small, they could still have practical consequences for patient or clinical outcomes, according to an extensive body of research linking clinical bias to patient outcomes. Moreover, the explicit bias result obtained in this study indicates increased anxiety linked bias among healthcare workers, perhaps speaking to selectivity in the expression or form of this bias within this occupational group. This serves as a useful reminder that conclusions regarding bias can be sensitive to how that bias is assessed or measured. Future, applied research should draw a distinction between COVID- and non-COVID related patient care, to see how COVID-related anxiety among healthcare workers matters differently across these clinical situations.

Later in the COVID-19 pandemic, when Omicron was first discovered, the person who first named the variant as such, Sikhulile Moyo, was based in Botswana (Schreiber 2021). An immediate response from Global North nations was to place several African nations on a no-fly list. Many of these same African countries had been denied access to vaccine patents from those same Global North countries. However, once it was discovered that not only had Omicron originated in a European setting but was already present all over Europe and had likely been brought to South Africa by European tourists, the narrative of perceived threat changed quite noticeably – *even though the virus threat was by definition and literally* "*closer to home*."

This cultural racism manifest in disease narrative in turn reinforced racial inequities in health, since those in the United States who are most vulnerable to the disease are people of color, due to their more limited resources, neighborhood situations, work exposures, and greater rates of complicating health issues. The systemic globalized

racism had now been turned against domestic, U.S.-based populations of color, while also worsening public health for all.

CHAPTER SIX

Conclusion

When populations biased in favor of white people express less anxiety around COVID-19, this alters responses to the pandemic outside as well as inside healthcare systems, in ways that carry cascading or outsized consequences for population health. This is apparent in the contemporary times, such as in mass rejections of COVID-19 restrictions and precautions. When focusing on American healthcare workers specifically, racial bias maintains a negative link with COVID anxiety. Wherever the bias-anxiety interaction persists, how individuals think about race will influence how they think about the pandemic and its resolution.

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