2018

INVESTIGATING RACIAL BIAS IN PERCEPTIONS OF FREE WILL

Courtney J. Alderson
Virginia Commonwealth University

INVESTIGATING RACIAL BIAS IN PERCEPTIONS OF FREE WILL

A thesis submitted in partial fulfillment of the requirements for the degree Master of Science in Psychology at Virginia Commonwealth University.

By

Courtney Jay Alderson

Director: Nao Hagiwara,
Assistant Professor, Psychology

Virginia Commonwealth University
Richmond, Virginia
August, 2018

List of Tables

List of Figures

Abstract

INVESTIGATING RACIAL BIAS IN PERCEPTIONS OF FREE WILL

By Courtney Jay Alderson

A thesis submitted in partial fulfillment of the requirements for the degree Master of Science in Psychology at Virginia Commonwealth University.

Virginia Commonwealth University, 2018

Major Director: Nao Hagiwara, Assistant Professor, Psychology

The overarching goal of this study was to examine whether perceptions of others' free will would differ depending on perceiver race as well as target race. The current study proposed that such a racial bias may be one mechanism by which racial disparities in medical treatment recommendations arise. By bridging findings from four different lines of research (i.e., the literatures on racial health and medical treatment disparities, racial bias, free will beliefs, and social identity), it was hypothesized that: (1) participants would perceive greater amounts of free will for a hypothetical racial ingroup patient than an outgroup patient; (2) such effect would be moderated by participant racial identity and/or racial bias, such that greater racial identity and/or ingroup racial bias would result in greater differences in racial ingroup vs. racial outgroup members' free will; and (3) greater perception of the patient free will would indirectly affect treatment recommendation for the patient through increased perceived patient self-control. In order to test these hypotheses, the study used a 2 (Participant race: Black vs. White) x 2 (Target race: Black vs. White) x Continuous (Racial Identity/Racial Attitudes) between-subjects design, in which target race was manipulated experimentally. The results indicated that Black participants' perceptions of patient free will was moderated by both racial identity and racial bias. Specifically, those who weakly identified with their racial group perceived a greater amount

of free will in the White target patient than the Black target patient. Also, Black participants who

displayed pro-White racial bias, a greater amount of free in the White target patient than the

Black target patient. These moderating effects of racial identity/racial bias were not found for the

White participants. Also, patient free will had an indirect effect on treatment recommendation by

way of perceived patient self-control, such that perceived free positively predicted the more

rigorous of two treatments. Limitations of the current research include the undergraduate college

student sample, the use of a general measure of racial identity, and the use of the old IAT

algorithm. Future work should examine empirically whether findings from the present study can

be generalized to provider samples.

Investigating Racial Bias in Perceptions of Free Will

Despite public health and public policy efforts aimed at making healthcare more equitable across all races, racial health disparities in the United States persist. For example, the Centers for Disease Control (CHDIR, 2013) reports that Black Americans have the largest all-cause mortality rate across nearly all diseases, including, but not limited to, heart disease, diabetes, and cancer. Although there are multiple causes for these racial health disparities, mounting evidence suggests that one important contributing factor is racial bias on behalf of physicians and its consequences on both diagnostic decisions and treatment recommendations (van Ryn & Burke, 2000; Geiger, 2003; Penner, Blair, Albrecht, & Dovidio, 2014). More specifically, research has shown that physicians with higher, as opposed to lower, levels of racial bias were more likely to make sub-optimal treatment recommendations for Black patients (Green et al., 2007; van Ryn & Burke, 2000; van Ryn, Burgess, Malat, & Griffin, 2006) because they often associated Black patients with negative stereotypes (van Ryn & Burke, 2000; Penner et al., 2014).

Patient stereotypes that have previously been identified as adversely impacting physicians' treatment recommendations for Black patients include lower levels of adherence, intelligence, and education (van Ryn & Burke, 2000; van Ryn et al., 2006). The proposed research postulates the existence of another stereotype that may also be contributing to physicians' racially biased treatment recommendations; perceived free will. Specifically, the proposed research posits that physicians are less likely to recommend certain types of treatments to Black patients because Black patients are perceived as having less free will to follow-through with treatment regimens—especially the more rigorous treatment regimens. To date, no study has investigated whether perceptions of free will ascribed to Whites vs. Blacks would be

1

different. Thus, the purpose of the present study is to investigate whether or not people's

perceptions of others' free will are moderated by target race in the general population (as

opposed to the physician population) by conducting an experimental study. This work will

provide a foundation for future applied health research seeking to assess how physician treatment

recommendations might differ due to racially biased perceptions of patient free will.

The Current State of Racial Health Disparities in the US

The last half-century of medicine has seen great advancements in disease prevention, the

accuracy of disease diagnosis, and the quality disease treatment (Cutler & Miller, 2005; Stewart,

Cutler, & Rosen, 2013; Rothstein, 1992). However, while the absolute health status of

individuals across all races has improved, the disparity between the health status of Whites and

Blacks has remained relatively constant for nearly 100 years (Nelson, Smedley, & Stith, 2002;

Sankar et al., 2004). For example, a review of the longevity gap between Blacks and Whites

from the early to late 20th century found that the all-cause mortality rate in the United States is

17% higher for Blacks than it is for Whites; a rate that has only decreased 1% since 1914 (Sloan,

Ayyagari, Salm, & Grossman, 2010). Data from the National Center for Health Statistics in their

National Vital Statistics Report shows other worrying heath disparities. From 1999 to 2011,

Black men lived an average of five years fewer than White men, while Black women lived an

average of three years fewer than White women. With such longstanding racial disparities in the

United States, increasing numbers of researchers are working to identify factors that contribute to

the cause, persistence, intensity, and remediation of such disparities (van Ryn & Burke, 2000;

Bloche, 2005, Gonzalez, Kim, & Marantz, 2014; Kirby & Kaneda, 2013; Penner et al., 2013;

Penner et al., 2014; Koh, Graham, & Glied, 2011). The causes of racial health disparities are

complex and multifaceted; and several major contributing factors have been identified, such as

SES, insurance coverage, access to care, patient-provider communication quality, patient's level

of trust in the provider, and the geographic distance between patients and their providers

(Williams & Jackson, 2005; Kirby & Kaneda, 2013; Lasser, Himmelstein, & Woolhandler, 2006;

Johnson, Roter, Powe, & Cooper, 2004; Doescher, Saver, Franks, & Fiscella, 2000; Bennett,

Olatosi, & Probst, 2008). There is also growing evidence that suggests physician racial bias and

its consequences on differential treatment recommendations for Black vs. White patients is

important factor contributing racial health disparities in the United States.

Provider Racial Bias, Treatment Recommendation, and Health Disparities

The Institute of Medicine at the National Academy of Sciences published a detailed

report on the state and impact of racial health disparities in the United States (Smedley, Stith, &

Nelson, 2003). In this 738-page report titled *Unequal Treatment*, a sobering account of physician

racial bias (both explicit and implicit forms) was discussed. Specifically, the report highlighted

studies showing that provider racial bias not only negatively impacts the quality of the medical

consult (Oliver, et al., 2001; Cooper, et al., 2003; Koerber et al., 2004; Johnson, et al., 2004;

Gordon, et al., 2006; Siminoff, Grahm, & Gordon, 2006; Penner, et al., 2007; Dovidio et al.,

2008; Cuevas, O'Brien, & Saha, 2016) but also providers' treatment recommendations across a

wide range of diseases (Katz et al., 2004; Gordon et al., 2006; Nam et al., 2011; Schoenthaler et

al., 2014; Makris et al., 2015; Kurek, Teevan, Zlateva, & Anderson, 2016). The impact of

provider racial bias on treatment recommendations and its importance to the discussion of racial

health disparities in the United States is bolstered by the fact that the majority of Black patients

receive their medical care from White providers (Chen, Fryer, Phillips, Wilson, & Pathman,

2005). Since the publishing of the IOM report, a number of researchers have added to the

literature on the association between provider bias and racial disparities by investigating the

multifaceted processes of the medical consultation (Penner et al., 2013; Penner, Blair, Albrecht, & Dovidio, 2014; Penner & Hagiwara, 2014) and medical decision-making (Peek et al., 2010; Chapman, Kaatz, & Carnes, 2013; Hall, et al., 2015), as well as the underlying mechanisms of the provider racial bias and racial health disparities association within several areas of disease care.

One route that health providers' racial biases impact the medical consult is stereotyping. At least 13 studies have assessed the effects of minority patient stereotypes on the medical consult in samples of healthcare providers (see: Cook & Stoecker, 2014). Moreover, the social psychological literature of racial stereotypes has shown that negative Black stereotypes that are held amongst the general population (Devine, 1988; Devine, 1989; Wittenbrink, 1994; Wittenbrink & Henly, 1996) are also held by healthcare providers to equal degrees (Najman, Klein, & Munro, 1982; Groman, & Ginsburg, 2004; Snyder, 2012 Hoffman, Trawalter, Axt, & Oliver, 2016; Goyal, Kuppermann, Cleary, Teach, & Chamberlain, 2015).

It is important to note that the literature of medical decision-making, as well as patient-centered healthcare, have come to recognize two important distinctions within the medical consult: (1) provider treatment recommendations and (2) patient treatment decisions (Woolf et al., 2005; Makoul & Clayman, 2006; Kiesler & Auerbach, 2006; Koster, 2014; Barrett et al., 2016; Gulbrandsen et al., 2016). The term *recommendation* denotes a treatment relevant aspect of *clinical judgment* on part of the provider. Whereas, the term *decision* denotes the final treatment *choice* and/or *consent* of the patient (Charles, Gafni, & Whelan, 1999; Barry & Edgman-Levitan, 2012). The current research focuses exclusively on the literature regarding the role of provider racial bias within treatment recommendations. That is, the provider segment of the medical decision-making process.

Disparities in treatment recommendation for coronary artery disease. In a study using hypothetical clinical scenarios, Schulman and colleagues (1999) assessed physician treatment recommendations for patients presenting with chest pain. The physicians watched videos of hypothetical patients (played by actors) presenting with anginal or nonanginal pain who were either male or female and Black or White. After viewing the videos, physicians were given information about the patients' blood pressure, blood cholesterol levels, smoking history, and stress test results. The physicians then completed a survey that assessed their perceptions of the patients' personal characteristics and probable health behaviors, as well as their treatment recommendations. Results indicated that women were less likely than men, and Blacks were less likely than Whites, to be referred for cardiac catheterization. A sex by race interaction was also found, such that Black women were far less likely than White men to be referred for catheterization procedures. Importantly, the study also found that physicians, in general, tended to perceive Blacks to be more indifferent towards their health, more likely to miss appointments, less likely to be compliant, and less likely to benefit from an invasive procedure.

van Ryn and Burke (2000) replicated these findings in a different sample of physicians. In a survey of physicians' treatment recommendations concerning coronary revascularization procedures, they found that Black patients were less likely than Whites to be recommended for coronary artery bypass graft surgery (CABG). In addition, physicians were more likely to report Black patients as less compliant, less intelligent, less educated, less rational, less physically active, less pleasant to interact with, more likely to engage in substance abuse, and more likely to lack social support systems than White patients. Further, these findings remained significant even after controlling for patient SES, sex, age, and health risk status, as well as the demographic characteristics of the physician.

5

Building on the previous studies, van Ryn and colleagues (2006) further examined the

association between physicians' beliefs in negative stereotypes about Black patients and their

treatment recommendations. Once again, they found that Blacks were less likely to be

recommended for CABG than Whites. The study also found that physicians perceived Black

patients as less compliant, less intelligent, less educated, less physically active, more likely to

engage in substance abuse, and more likely to lack social support systems than Whites. More

importantly, the researchers showed that the physicians' perceptions of patient activity level and

education were significant predictors of treatment recommendations for CABG.

Research by Green and colleagues (2007) shows that the level of physicians' implicit

racial bias is a significant predictor of their deciding to recommend thrombolysis for White vs.

Black patients suffering from myocardial infarction. While explicit racial bias refers to

prejudicial beliefs and attitudes that people are aware of or have direct expressive control over,

implicit racial bias refers to prejudiced attitudes and stereotypes that are activated automatically

and/or unintentionally (Fazio, 1995; Greenwald & Banji, 1995; Davidio, Hewstone, Glick, &

Esses, 2010). In this study, physician implicit bias was assessed using the Implicit Association

Test (IAT, Greenwald, McGhee, & Schwartz, 1998), which is one of the most widely-used

measures of implicit racial bias in social psychological research. The IAT revealed a pro-White

implicit bias among physicians, as well as implicit stereotypes of Blacks as less cooperative with

procedures and less compliant with treatment regimen. The most notable finding of this study

was that as the pro-White bias of physicians increased, the decision to treat Black patients with

thrombolysis decreased.

Finally, Stepankova (2012) has demonstrated a causal association between patient race

and physicians' biased treatment recommendations by using a priming technique. Using a

sample of physicians specializing in either family or internal medicine, researchers experimentally primed physicians with certain racial groups and then had them read a clinical scenario involving a patient without any racial descriptors. The priming was done by asking physicians to pay attention to a series of 65 words that quickly appear on the computer screen one by one. Of importance, 57 of the 65 words were varied to reflect one of four experimental conditions to temporarily activate a certain race in physicians' memory: Black (e.g., Black, Afro, African, rap), White (e.g., White, European, Anglo, Caucasian), Hispanic (e.g., Hispanic, Latina, Spanish, Chicana, Mexican) and race neutral (e.g., map, block, test, percent). Immediately following the priming task, physicians were asked to read a clinical vignette depicting a 62 year-old, female patient presenting with chest pain and complete a survey that assessed their diagnostic, treatment, and referral recommendations. The researchers found that physicians were less likely to diagnose the patient in the clinical vignette with CAD when they were primed with Black or Hispanic than when they were primed with White or control conditions. Furthermore, in the same study, the researchers also examined whether the effects of racial priming on physicians' treatment recommendations would be moderated by how much time pressure the physicians are currently experiencing. Using the same study design one group of physicians were asked to read the vignette and complete the survey without time pressure while another group of physicians were asked to complete the task with time pressure. Results indicated that, when under high time pressure the physicians were even more unlikely to diagnose the patient with CAD after the Black and Hispanic priming conditions.

Disparities in treatment recommendation for pain management. Disparate treatment practices have also been found in the area of pain management. A systematic review of the literature on treatment disparities for pain that reviewed studies from 1989 through 2011

revealed that the treatment gap between Whites and racial minorities remained constant throughout this time period, regardless of any policy initiatives enacted to reduce this gap (Meghani, Byun, & Gallagher, 2012). For example, compared to Whites, Blacks receive less empathy from providers regarding their experience of pain (Contreras-Huerta, Baker, Reynolds, Batalha, & Cunnington, 2013, Mathur, Richeson, Paice, Muzyka, & Chiao, 2014), are more likely to have their providers underestimate their pain (Staton et al., 2007; Cintron & Morrison, 2006), are perceived as having a higher potential for drug abuse (Becker et al., 2011), and are 10% less likely to be prescribed opiates (Mills, Shofer, Boulis, Holena, & Abbuhl, 2011). A strong body of research indicates that racial biases are indeed playing a significant role in providers' treatment of pain patients (Aberegg & Terry, 2004; Burgess et al., 2008; Dovidio & Fiske, 2012; Tait & Chibnall, 2014).

A study conducted by Contreras-Huerta and colleagues (2013) provides strong evidence of racial bias in perceptions of others' pain. Researchers had an all White sample complete a bogus questionnaire that they were told assessed authoritarian attitudes and moral beliefs. The participants were then led to believe that they would be assigned to specific experimental groups based on their scores on these bogus measures, allowing the researchers to create an ingroup vs. outgroup mentality among the participants. The researchers then asked the participants to return to the lab 3-5 days later. When they returned, participants were asked to view and memorize two sets of photos: (1) photos of people whom they were told were in their assigned group (i.e., ingroup members) and (2) photos of people whom they were told were in a different group (i.e., outgroup members). While in an fMRI machine, participants then viewed videos of White and non-White ingroup members, as well as White and non-White outgroup members being poked in the face with either a cotton-tip (no pain condition) or a syringe (pain condition). The

participants were then asked to rate how painful they inferred each face poking to be. Results

indicated that when participants viewed videos of non-Whites being poked with a syringe,

regions associated with the neural pain matrix for empathy (e.g., anterior cingulate cortex, insula

cortex, and somatosensory areas) showed significantly less activation than when participants

viewed videos of Whites being poked with a syringe. This effect was present regardless of

participants viewing the bogus ingroup vs. outgroup members, suggesting that the experience of

empathy is affected by racial bias. These results have been replicated using EEG methods in lieu

of fMRI (Contreras-Huerta, Hielscher, Sherwell, Rens, & Cunnington, 2014).

Disparities in treatment recommendation for sexual and reproductive health.

Research on disparities in sexual and reproductive health have also shown a pattern of

differential physician treatment recommendations for White vs. Black patients. For example,

data from the 2002 National Survey of Family Growth showed that while access to family

planning care did not differ due to patient race, the type of care provided did. Blacks were nearly

10% more likely to be counseled to initiate birth control than Whites (Borrero et al., 2009).

Similarly, research also indicates that Blacks as nearly 18% more likely to be counseled on the

practices of safe sex than Whites (D'Amore et al., 2012). Studies have also shown that Blacks

are less likely than Whites to receive antiretroviral pre-exposure prophylaxis (PrEP) for the

treatment of HIV risk (Easterbrook et al., 1991; Calabrese et al., 2014). In studies looking at

samples of HIV positive persons, Black patients were approximately 40 percent less likely to

receive antiretroviral drug treatments than Whites patients (Graham et al., 1994; Moore et al.,

1994).

Of particular importance, recent work by Calabrese and colleagues (2014) has shown that

medical students perceive Black patients as more sexually promiscuous than White patients. This

is consistent with prior research showing that, in general, Blacks are stereotyped as having an 'uncontrolled sexuality' (Weitz, & Gordon, 1993; Valentine, 2008; Bowleg et al., 2011; Davis & Tucker-Brown, 2013; Bowleg, 2013). In this study, Calabrese et al. asked medical students to read a vignette of either a White or Black patient requesting PrEP treatment. In both vignettes, the hypothetical patient was presented as HIV negative and in a monogamous relationship with a partner whose HIV status was positive. The medical students then filled out a clinical judgment questionnaire assessing perceived patient characteristics and perceptions regarding the patient's likelihood of sexual risk compensation (e.g., increased risky sex due to PrEP treatment). The amount of importance that the medical students perceived of the patient's request for PrEP, as well as their feelings towards White vs. Black patients were assessed and conceptualized as the measures of racial bias. Although no explicit pro-White or anti-Black bias was found, results indicated that the Black patient was perceived as more likely to engage in risky sexual behavior if PrEP treatment were to be prescribed. Further, this perception of sexual risk compensation predicted differential treatment, such that the hypothetical Black patient was less likely to be prescribed PrEP.

Taken together, an increasing number of studies provide evidence that physicians' biased perceptions of Black patients contribute to their biased treatment of patients, which in turn result in maintenance (or even facilitation) of racial health disparities in the United States (van Ryn & Burke, 2000; Green et al., 2007; van Ryn et al., 2006; Penner et al., 2014). The negative stereotypes of Black patients that have been identified in past research as affecting physicians' treatment recommendations are those of Blacks as less compliant, less intelligent, less educated, less physically active, unpleasant, have an uncontrolled sexuality, and likely to engage in substance abuse(Green et al., 2007; Schulman et al., 1999; Ryn & Burke, 2000; van Ryn et al.,

2006; D'Amore., 2012; Calabrese et al., 2014; Borrero et al., 2009). The proposed research

postulates the existence of another stereotype that may bias physicians' perceptions of patients

and possibly lead to suboptimal treatment decisions—lower levels of *free will* ascribed to Black

patients as compared to White patients.

The Definition of Free Will in Psychological Research

While the specific definition of free will differs between distinct philosophical schools of

thought, it is near universally agreed upon that free will is to be thought of as a metaphysical

condition applying to all persons who are endowed with reasonable cognitive faculties (James,

1899/2014; Van Inwagen, 1975, Dennett, 1984, Kane, 1998, Baumeister, 2008). The

psychological definition of free will that is used in the present research is provided by an

interdisciplinary group of researchers who define the construct as *the capacity for free action*

(Haggard, Mele, O'Connor, & Vohs, 2010). Bringing more conceptual clarity to this definition

for the purpose of scientific operationalization, Baumeister and Monroe (2014) further define

free action with two separate and distinct themes: (1) the possibility of multiple courses of action

stemming from the same present, and (2) an intentional action based on informed, rational

deliberation by an agent who is not externally coerced or irrationally compelled to make a

particular choice. The first theme is referred to as *the ability to do otherwise* while the second is

referred to as *volition* (James, 1899/2014; Van Inwagen, 1983; Dennett, 1984, Kane, 1998;

Sartorio, 2015). As such, any psychological study of free will must assess peoples' beliefs and/or

perceptions regarding one or both aspects of the free will construct (i.e., the *ability to do*

otherwise and/or *volition*).

One may wonder how free will is conceptually different from the causal attribution

process and locus of control. Attribution theory states that people have a deep motivation to

understand and explain their own and others behavior. Put simply, attributions are the explanations that people offer for why people (self and others) do what they do. One important dimension people generally consider when making attributions is whether the behaviors in consideration are due to internal/dispositional or external/situational factors (Heider, 1944, 1958; Jones, 1979; Kelly, 1967, 1973). An *internal* attribution is made when one perceives an action as the outcome of antecedents belonging to the characteristics of an individual, whereas an *external* attribution is made when one perceives an action as the outcome of situational antecedents (Heider & Simmel, 1944; Michotte, 1963; Kelley & Michela, 1980).

Relatedly, the construct of Locus of Control (LOC) refers to one's perceptions regarding the controlling factors that govern their behavior. As conceptualized by Rotter (1966, 1975, 1990), perceptions of control are classified by where they fall on a continuum of reinforcement contingencies. These reinforcement contingencies are either between the self and reinforcers or between external forces and reinforcers. An internal LOC perceives a causal link between the self and the reinforcement and is therefore thought to be contingent upon one's behavior. In contrast, an external LOC perceives a causal link between peripheral forces and rewards.

Theoretically, both attribution theory and LOC are concerned with the internal vs. external causal distinction. In contrast, the construct of free will—while involving the internal/external distinction—revolves around one's belief in the notion of counterfactuals of past behavior and of multiple courses of action in the future (i.e., the ability to do otherwise), as well as the capacity for uncoerced and rational deliberation (i.e., volition) when choosing a course of action. It is therefore theoretically possible for an individual to believe in free will and yet have an external locus of control, or vise versa believe in determinism and have an internal locus of control. The distinctiveness of free will from LOC has also been statistically validated.

For example, in a study reporting the internal validity of the Free Will and Determinism Scale (FAD-Plus), Paulhus & Carey (2011) also confirmed the scale's construct validity against Levenson's (1973) Multidimensional Locus of Control inventory (MDLC). Though the FAD-Plus subscales (free will, scientific determinism, fatalistic determinism, unpredictability) did correlate with those of the MDLC, none were high enough to indicate redundancy between the free will and LOC constructs.

Free Will Beliefs and Their Effects on Perceptions of Responsibility

Throughout time, many philosophers have held that free will (be it either *the ability to do otherwise* or *volition*) is a necessary antecedent condition for moral responsibility (Aristotle,1979; Hume, 1739/2012; Kant, 1781/2005; James, 1884/2005, 1899/2014; Nietzsche, 1889/1954; Ayer, 1972; Van Inwagen, 1975, 1983, 2008; Kane, 1998, Nichols, 2011). Modern social psychological research has substantiated the testable aspects of this metaphysical assumption, showing that free will beliefs are indeed predictive of one's moral judgments (Nahmias, Morris, Nadelhoffer, & Turner, 2005; Nahmias, Coates, & Kvaran, 2007, Nichols & Knobe 2007; Clark et al., 2014). The proposed research then posits that because the psychological construct of free will is an important factor for attributing behavioral responsibility in others that it might also influence physician beliefs about patients and their ability to adhere to treatment recommendations.

One study conducted by Rakos and colleagues (2008) showed that the belief in free will significantly predicted attitudes towards punishment. The researchers had participants complete two questionnaires, one assessing beliefs in free will and determinism, the other assessing attitudes towards punishing a moral wrongdoer. The results indicated that as one's endorsement of free will increased, the more punitive and/or retributive were their proposed punishments for

13

the moral wrongdoer. Conversely, as one's endorsement of determinism (i.e., the rejection of free will) increased the more rehabilitative were their suggested punishments for the moral wrongdoers.

Research by Carey and Paulhus (2011) found this same association between free will, responsibility, and punishment. After assessing the participants' beliefs in free will/determinism, the researchers had them read a vignette that described the actions of a child molester. Upon completing the vignette, participants were asked to report their recommendations for the perpetrator's prison sentence. After the participants made their judgments, they were informed that the perpetrator had been abused as a child and suffered from legitimate psychopathological impediments and were given the opportunity to change their prison recommendations. Both participant endorsement of the free will belief and the amount of free will ascribable to the perpetrator were significant predictors of the prison sentence recommendations. The results indicated that as the personal endorsement of free will increased, so too did the length of the prison sentence. However, the overall length of the prison sentence decreased as the amount of responsibility attributable to the perpetrator was thought to decrease.

Other research by Shariff and colleagues (2014) found similar results using a priming technique. Participants either read an anti-free will statement or a pro-free will statement and were then asked to complete a vignette task. In the anti-free will priming condition, participants read an essay arguing for the reality of determinism and how this reality results in the inability to hold people responsible for their wrongdoings. In the pro-free will priming condition participants read an essay arguing for the reality of free will and emphasized its relation to moral responsibility. In the vignette task, participants read about the actions of a perpetrator who beat someone to death and were then asked to imagine that they were the jurors who were tasked with

assigning a prison sentence. However, the participants were asked to assign the prison sentence under the knowledge that the perpetrator would be starting this sentence *after* completing a 2-year rehabilitation intervention that had been shown to be nearly 100% in its effectiveness. The results indicated that participants who were primed with the anti-free will essay assigned lighter prison sentences to the perpetrator than did those who were primed with the pro-free will essay.

Other social psychological research has used similar priming techniques, showing that the denial of free will (as induced by anti-free will primes) results in other important psychosocial consequences. Experimentally manipulating participants to disbelieve in free will has been shown to lead to increased dishonesty and cheating behavior (Vohs & Schooler, 2008), increased social conformity (Alquist, Ainsworth, & Baumeister, 2013), and a decreased ability to feel gratitude towards the undeserved benevolence of others (MacKenzie, Vohs, & Baumeister, 2014). Also, research by Baumeister, Masicampo, and DeWall (2009) established a causal link between the disbelief in free will and reduced helping behavior, as well as increased aggression.

The results of the research reviewed above provide strong evidence in support of the age old philosophical assumption that the construct of free will is in important factor when considering issues relevant to behavioral responsibility, moral judgments, and the performance of moral actions. Therefore, and as previously stated, this research posits that the construct of free will serves to be of promise to researchers interested in psychosocial variables that influence health disparities. Particularly, if the endorsement of free will results in more punitive judgments of moral wrongdoers would patients who are viewed as engaging in unhealthy behaviors and/or perceived as responsible for their condition receive more punitive judgments from their physicians? Also, if a physician were to view a patient in more deterministic terms, would the physician doubt the patient's resolve and ability to adhere to treatment recommendations?

Free Will for the Self vs. Other

Prior research has demonstrated that people tend to perceive greater amounts of free will in the self while also perceiving lesser amounts of free will in others. For example, Pronin and Kugler (2010) evidenced such bias in people's perceptions of free will with a series of studies. In the first study, college students were asked to report the degree to which they felt that past and future events in their lives or their roommates' lives were predictable a priori. The results indicated that people were less likely to report their own lives as predictable than were the lives of their roommates.

In the second and third studies, restaurant workers were asked to report what they and a coworker of their choosing would be each doing over the next ten years by using a list of pre-determined options. Results indicated that participants selected more possibilities for the self than they did for their coworkers. These results remained even when controlling for self-enhancement motives.

In the last study, college students were asked to draw a set of four different conceptual models for predicting: (1) their own behavior on a Saturday night, (2) their own behavior after finishing college, (3) a friend's behavior on a Saturday night, and (4) a friend's behavior after finishing college. For each model, participants were instructed to draw boxes to represent the situation, past behavior, personality, and desires/intentions as the predictors and to assign different sizes to each box to indicate the amount of weight assigned to each predictor. Results indicated that when assessing their own futures, participants assigned significantly more predictive weight to their desires/intentions than to their personality, past behavior, or situation. In contrast, when assessing their friend's futures, participants assigned more predictive weight to his/her personality, past behavior, or the situation than to the desires and intentions.

Taken together, prior research on how the psychological construct of free will is perceived and understood provides strong evidence that it plays an important role in determining how we perceive, evaluate, and respond to others. Unless we assume that physicians are somehow immune to these biased psychological processes, physicians' perceptions of their patients free will are likely to influence how they perceive, evaluate, and respond toward patients, which may ultimately impact their treatment decisions.

The Differential Amount of Free Will Ascribed to Self vs. Others Extended to Us vs. Them

Drawing on social identity theory, this research posits that the bias found in peoples' perceptions of free will within the "self vs. other" framework can be extended to the "us vs. them" framework. According to social identity theory (Tajfel & Tuner, 1979), one's sense of self is largely constructed around one's group memberships and that positive self-identity is attained by perceiving that one is a member of a valued social group. Consequently, people are often motivated to defend, maintain, and enhance collective self-esteem by engaging in ingroup favoritism and/or outgroup derogation (Tajfel & Turner, 1979; Hogg & Abrams, 1988, Abrams & Hogg, 1990, 2010; Houston & Andreopoulou, 2003). This suggests that people may also perceive a greater degree of free will in ingroup members than in outgroup members in general. This may be particularly true for individuals who are strongly, as opposed to weakly, identified with their social group (Crocker & Luhtanen, 1990; Branscombe & Wann, 1994; Hewstone, Rubin, & Willis 2002; Voci, 2006). Another important psychological factor that may affect the degree of people's tendency to engage in ingroup favoritism and/or outgroup derogation is racial attitudes. For example, research has shown that people with higher levels of racial bias show greater amounts of ingroup favoritism and/or outgoup derogation (Fazio, Jackson, Dunton, & Williams, 1995; Hewstone, Rubin, & Willis 2002; Dasgupta, 2004; Gaertner & Dovidio, 2014).

This suggests then that individuals with higher levels of racial bias are more likely than those with lower levels of racial bias to have biased perceptions of free will within racial ingroup vs. outgroup contexts.

The Present Study

The present research integrates the literatures of perceived free will, social identity, and racial attitudes reviewed above to address novel research questions: (1) whether there is an asymmetry in perceived free will based on racial concordance/discordance between the self and the others, (2) whether the degree of asymmetry would be different based on perceivers' levels of racial identity and racial bias, and (3) whether people's perceptions of a hypothetical patient's free will would predict their treatment recommendation for the hypothetical patient. The ultimate goal of this research program is to assess if providers' biased perceptions of patient free will based on patient race serve to be another mechanism underlying treatment disparities between Blacks and Whites. However, no study to date, to my knowledge, has investigated the presence/absence of biased perceptions of target free will based on target race. Thus, the first critical step in this research program is to conduct basic research to document such biased perceptions so that applied research into provider treatment recommendations can investigate the presence of this social-cognitive bias within racially discordant medical interactions. The present study is then only able to speak to the first step of this goal. Through the use of an undergraduate college student sample, the present study provides the foundational information for future applied health research with providers.

Specifically, this research tested the following hypotheses driven by the previous literatures of free will, social identity, and racial attitudes:

1. Participants would perceive greater amounts of free will for racial ingroup members than for racial outgroup members.

2. The difference in perceived free will for racial ingroup vs. racial outgroup members will be moderated by participants' racial identity and/or racial bias. Specifically,

19

participants who more strongly identify with their racial group or have higher levels

of racial bias will show greater discrepancy in the perceived free will of racial

ingroup vs. racial outgroup members.

3. Participants' perceptions of a hypothetical patient's free will would predict

participants' treatment recommendations for the patient, such that, when deciding

between two treatment regimens of lesser vs. greater intensity/rigor, participants'

perceptions of the patient's free will is predicted to have an indirect effect on

participants' treatment recommendations by way of participants' perceptions of the

patient's self-control. Specifically, greater perceived patient free will is predicted to

be associated with greater perceived patient self-control which will in turn predict

greater preference for recommending a more rigorous treatment over a less rigorous

treatment.

Participants

The present study used a convenience sample of undergraduate college students enrolled

in SONA Systems, an online research participant registry that is managed by the Department of

Psychology at Virginia Commonwealth University (VCU). To be eligible to participate in this

study, participants had to be at least 18 years of age and self-identify as either a White or Black

American. This racial criterion for participation was enforced for two reasons. First, this is the

first study, to our knowledge, to examine the possible effects of race on peoples' perceptions of

another person's free will and so it was important to keep the comparison simple so as to reduce

the amount of noise in the data. Second, there is a relatively small number of Latinx and Asian

Americans in the SONA participant pool, so it was not feasible, logistically speaking, to recruit

enough Latinx and Asian Americans to compare across four different racial groups.

An a priori power analysis was conducted using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) to determine the sample size necessary for the proposed 2 (Participant race: Black vs. White) x 2 (Target race: Black vs. White) x Continuous (Racial Identity/Racial Attitudes) between-subjects design. The analysis indicated that a minimum of 57 participants were required in each of the four groups to detect a small to moderate effect size ($f^2 = .075$) at .80 power. Thus, the present study sought to recruit at least 114 Black and 114 White participants (target $N = 228$). However, I was unable to recruit this target sample size due to slow participant enrollment. Taken together, I recruited a total of 56 Black participants and 105 White participants ($N = 161$, age $M = 19.04$, $SD = 1.55$, Women = 82%). The data for the present study was collected between October 2016 and June 2017.

Procedure

The study was posted on SONA and interested individuals were able to read a description of the study (Appendix A) and then sign up for a two-part (i.e., pre-laboratory online survey and laboratory session) study that awarded a total of 1 research credit. After they were screened by age participants were then asked to read an information sheet (Appendix B) and then directed to an online survey. The online survey (Appendix C) consisted of a series of measures that were aimed to assess their beliefs regarding their own free will, locus of control, racial identity, explicit racial attitudes, and demographic characteristics (e.g., race, religious and political affiliation). Only those who identified as being White or Black on the survey were told that they were eligible to participate in the laboratory portion of the study. All others were informed of their ineligibility. Upon completing the online survey, participants were then asked to schedule a time to come into the laboratory to complete the rest of the study.

When arriving to the laboratory, participates were first greeted by a same-race experimenter (i.e., undergraduate research assistant or myself), led to a computer terminal, and then asked to sign an informed consent form for the "first study" (Appendix B) within the laboratory portion of the study. After agreeing to participate, participants were asked to complete a computer task which they were told assessed executive functioning and multi-tasking ability. However, in reality this computer task was the Race Implicit Association Test (IAT), which is designed to assess implicit pro-White/anti-Black attitudes (Greenwald, McGhee, & Schwartz, 1998). After completing the IAT, participants then underwent the bogus debriefing (Appendix G) process for the "first study." Upon completion of the "first study," a second undergraduate research assistant entered the room and initiated the consent process for the "second study" and asked the participants to sign yet another informed consent form (as part of the cover story; see Appendix B) before they continued on with the rest of the laboratory portion of the study. The reason for presenting the present study as two unrelated studies was to assuage participant reactance to the Race IAT measure while also allowing the study to keep the relevant temporal relationship between the two assessments intact. This allowed for a more fidelitous data collection process when considering the nature of the hypotheses.

In the "second study," participants read a few paragraphs communicating issues relevant to coronary artery disease (Appendix D) to prepare them for a vignette task that followed. In this learning phase, participants were informed on what coronary artery disease is, as well as how/why it is treated with angioplasty and stent (a less aggressive procedure, hereafter A&S) or coronary artery bypass graft surgery (a more aggressive procedure, hereafter GABG). The learning phase also informed participants of important patient characteristics that are usually taken into account by medical providers when making treatment recommendations for A&S vs.

GABG. After this short educational process, the participants were then asked to read and respond to one of two clinical vignettes. Both vignettes were identical to one another and varied only by patient race. The vignette (Appendix E) described a scenario that involved either a Black or White patient engaging in a treatment consultation with their doctor regarding the possibility of surgery for coronary artery disease. The race of the patient in this scenario was made salient through the use of racially salient names (White patient = Jake Miller, Black patient = DeShawn Washington) along with an explicit statement of the hypothetical patient's race. After reading the clinical vignette, participants were then asked to answer a series of questions (Appendix F) aimed at assessing their perceptions of the patient's free will (the primary outcome), as well as their perceptions of the patient's self-control in reference to complying with possible treatments (a secondary outcome), and finally their treatment recommendation preference for the patient, A&S vs. GABG (another secondary outcome). Upon completing the laboratory portion of the study, participants were fully debriefed (Appendix G) and received 1 research credit for compensation.

Measures

Dependent Variables

Perceived patient free will. To assess the amount of free will that participants perceived in the patient described within the clinical vignette, participants were asked to report their level of agreement (1 = *strongly disagree*, 7 = *strongly agree*) to 14 statements that were specifically created for this study to capture their perceptions regarding patient free will. Replacing ellipses with racially salient names, example items include: "I think… has free will;" "I think… is in control of their behavior;" "I think… future is full of possibilities;" "I think… past could have worked out differently;" and "I think… controls their behavioral intentions." Two of the 14 items were dropped from the measure due to factor loadings < 3.5. The resulting 12 item measure was produced an acceptable level of internal reliability ($\alpha = .74$). See Appendix F for the complete list of items.

Perceived patient self-control. To assess the amount of treatment relevant self-control that participants perceived in the patient described within the clinical vignette, participants were asked to report their level of agreement (1 = *strongly disagree*, 7 = *strongly agree*) to 5 statements that were specifically created for this study to capture their perceptions regarding patient free will. Replacing ellipses with racially salient names, example items include: "I think… will be able to follow the strict behavioral requirements for Procedure 2;" and "I think… will obey all treatment recommendations". This 5-item measure produced a high level of internal reliability ($\alpha = .86$). See Appendix F for the complete list items.

Treatment recommendation preference. To assess participants' preference for recommending A&S vs. CABG to the target patient, participants were asked to report their level of agreement (1 = *strongly disagree*, 7 = *strongly agree*) to two statements that were created to

assess their treatment decisions. Replacing ellipses with racially salient names, the two items were: "I think that *procedure 1* is best for…" (skewness = -.12, kurtosis = -1.28) and "I think that *procedure 2* is best for…" (skewness = -.04, kurtosis = -1.11). In order to create a single score for the treatment preference measures, the treatment 1 (i.e., A&S) score was then subtracted from the treatment 2 (i.e., GABG) score, resulting in positive values for GABG preference and negative values for A&S preference. The difference score was normally distributed (skewness = -.13, kurtosis = -.19). It should be reminded that this is not the primary outcome of the present study as I acknowledge the limitations of this measure with college students' understanding of coronary artery disease. This measure was included to assess the approximate relevance of free will perceptions for subsequent treatment recommendations and to serve as a template for future use with provider samples.

Moderating Variables

Racial identity. The racial identity subscale of the Collective Self-Esteem Scale (Luhtanene & Crocker, 1992) was used to assess the degree to which participants view their racial group as an important part of their personal identity. This four-item measure was rated on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*) and included questions like "the racial group I belong to is an important reflection of who I am." The racial identity subscale is not tailored to one specific racial group and is therefore useful when comparing levels of racial identity across differing racial groups. The scale's internal reliability in this sample was high (α = .80). See Appendix C for the complete list of racial identity items.

Explicit racial attitudes. Feeling thermometers (Alwin, 2007; Nelson, 2008) were used to assess participants' explicit racial attitudes. Participants rated the amount of warmth/favorability they feel towards different social groups on a scale ranging from 0°

(extremely unfavorable) to 100° (extremely favorable). A value representing explicit racial bias was calculated by subtracting participant responses for the Black feeling thermometer from those of the White feeling thermometer. With positive values indicating racial preference for Whites and negative values indicating racial preference for Black Americans. Nonracial social groups were also used to keep participants from guessing the study's purpose. Examples of the types of groups to be assessed by participants include the following: "Black Americans," "White Americans," "Christians," and "Atheists." See Appendix C for a complete list the social groups that were assessed by participants.

Implicit racial attitudes. Participants' implicit racial attitudes were assessed by the computerized Race Implicit Association Test (IAT, Greenwald, McGhee, & Schwartz, 1998). The IAT is a widely-used measure of implicit racial attitudes that has been shown to be a valid tool for assessing racial bias (Nosek, Greenwald, & Banaji, 2007; Greenwald, Poehlman, Uhlmann, & Banaji, 2009). This computer-based cognitive task is designed to measure the relative strength between valence and social group. This is done over a series of trials wherein participants are seated in front of a computer screen and shown multiple pictures of faces one-at-a-time. Each face is then paired with either a positive or negative word and the participant is asked to indicate a specific type of response on the computer keyboard. After training participants to use one side of the keyboard for positive words and the other side for negative words, two trial blocks that are of focal interest were presented: (1) an ingroup face paired with positive words, combined with an outgroup face paired with negative words; and (2) an ingroup face paired with negative words, combined with an outgroup face paired with positive words. The presentation order of the pairs was randomized across participants.

It is important to note that a programming error was present in the IAT's data collection file which made it impossible to compute participants' IAT scores with the correct algorithm. Over the years of the IAT's development, the algorithm for computing the IAT score has changed. The old algorithm (Greenwald, McGhee, & Schwartz, 1998) computed an IAT score by log-transforming the response times from two of the seven trial blocks. An average score for each of the two blocks is computed from its corresponding transformed values and then a difference score is calculated. The current and more valid algorithm (Greenwald, Nosek, & Banaji, 2003) computes an IAT score by taking the mean reaction times for each trial block and dividing it by the pooled standard deviation to produce a *d* score (i.e., measure of effect size). The *d* score for each block are then analyzed for statistical significance.

The specific programming error was such that the IAT data collection file was set to record the response times from only two of the seven trial blocks. This resulted in my being unable to use the current IAT algorithm. Therefore, the old algorithm was used instead. The process of computing IAT scores according to the old algorithm is as follows: (1) the first two trials of each block were dropped; (2) all latencies outside the boundary values (i.e., fast $\leq$ 300 ms; slow $\geq$ 3,000 ms) were recoded to the nearer boundary values; (3) the resulting values were then log-transformed; (4) the transformed values were then averaged; (5) and finally, the difference score was computed (i.e., block 4 from block 7). For these data, if response times for the ingroup + positive word/outgroup + negative word trial block are significantly shorter than the response times for the ingroup + negative word/outgroup + positive word trial block, a measurable amount of racial bias is thought to have been present.

Control Variables

Locus of control. Participants' trait level locus of control beliefs were assessed by the Multidimensional Locus of Control scale (MDLC, Levenson, 1973; 1974). This measure assesses 24 items across three subscales and was implemented using a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). The internal locus of control subscale ($\alpha = .62$) is exampled by questions like, "whether or not I get to be a leader depends mostly on my ability." The powerful others external locus subscale ($\alpha = .81$) is exampled by questions like, "I feel like what happens in my life is mostly determined by powerful people." The chance external locus subscale ($\alpha = .80$) is exampled by questions like, "to a great extent my life is controlled by accidental happenings." Participants were measured on the MDLC so that the independence/non-independence of the locus of control and free will constructs could be assessed and controlled for. See Appendix C for a complete list of the MDLC items.

Free will belief. Three subscales from three different inventories were used to achieve a more robust measure for assessing participants' pre-existing free will beliefs. These measures were assessed to see if participants' general belief in free will predicted perceptions of target free will (i.e., the patient in the vignette) and then used as a control. All of the items from the three subscales were assessed on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). The first was the free will subscale from the Free Will and Determinism Questionnaire (Rakos, Laurene, Skala, & Slane, 2008). A total of four items from this measure (published $\alpha = .59$) were used and are exampled by: "people have free will regardless of wealth or life circumstances;" and "life's experiences cannot eliminate a person's free will." The second free will subscale was taken from the Free Will Inventory (Nadelhoffer, Shepard, Nahmias, Sripada, & Ross, 2014). Again, a total of four items from this measure (published $\alpha = .83$) were used and are exampled by: "people

always have the ability to do otherwise;" and "people have free will even when their choices are completely limited by external circumstances." The third free will subscale was taken from the Free Will and Determinism Scale (FAD-Plus, Paulhus & Carey, 2011). The seven items from this free will subscale (published $\alpha = .69$) were used and are exampled by: "people have complete control over the decisions they make;" and "strength of mind can always overcome the body's desires." The internal reliability of the combined free will belief measure was high ($\alpha = .89$), indeed higher than each respective scale's published values.

The remaining subscales from the FAD-Plus were also assessed so that the related constructs of determinism, fatalism, and indeterminacy/unpredictability could be used as control variables if necessary. These three factors were also assessed on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). The scientific determinism subscale ($\alpha = .69$) is exampled by, "people's biological makeup determines their talents and personality." The fatalistic determinism subscale ($\alpha = .82$) is exampled by, "I believe that the future has already been determined by fate." Finally, the indeterminacy/unpredictability subscale ($\alpha = .72$) is exampled by questions like, "chance events seem to be the major cause of human history." See Appendix C for a complete list of the FAD-Plus, FWD, and FWI items.

Attention checks. A total of three fidelity of response questions taken from Meade and Craig (2012) were used to check participant attention and assess the accuracy of participant responding and engagement within the online survey portion of the present study. These "bogus" items were worded such that each contained an obviously correct answer, and thus reflects careless responding when answered incorrectly. The three items that were used were assessed on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*) and were the following: "I do not understand a word of English;" "I am paid biweekly by leprechauns;" and "all my friends are

space aliens." Each item was dispersed randomly in the online portion of the survey to aid the data screening process. Cases with incorrect responses to these questions were excluded from the analysis.

Four attention check questions were also used to screen inattentive participants from the laboratory portion of the study as well. These items were True/False style questions that were in reference to and immediately followed the educational reading of coronary artery disease. These items and are exampled by, "procedure 1 is less demanding of the participant than procedure 2;" and "procedure 1 has a shorter recovery time than procedure 2." Wherein procedure 1 is the angioplasty and stent option, and procedure 2 is the bypass graft surgery option. While these items aimed to merely probe participant understanding of the CAD educational material and screen participants for the secondary outcomes (i.e., patient treatment related self-control, and participant treatment recommendations), these items were also found to be more general in their identifying inattentive laboratory participants. Hence, these items were used to screen inattentive persons from all analyses.

Data Analysis

The data was screened for inattentive participants resulting in the exclusion of 28

participants. The final sample consisted of 133 participants who were 18 to 26 years of age ($M =$

19.07, $SD = 1.53$) and largely made up of White women (66.4% White, 81.8% women). Because

the present study used multiple linear regression models to test the stated hypotheses, the data

was checked for violations to the assumptions of the general linear model prior to conducting

any inferential test statistics. Descriptive statistics were conducted for all measures and

satisfactory levels of normality were found. Linearity and homoscedasticity were also found to

satisfy the assumptions of GLM. A series of bivariate correlations were also conducted to assess

the nature of the relationships between all measures.

A total of three hierarchical multiple regression models were conducted to assess the

effects of participant race and target race on perceived patient free will, with each of the three

potential moderating factors (i.e., participant racial identity, explicit racial attitudes, and implicit

racial attitudes). Due to multiple hypothesis testing, the Bonferroni correction was used to

correct for familywise error (i.e., $\alpha' = .017$). The same three regression models were also

conducted with perceived patient self-control as the DV.

Before being entered into the model, both participant race and experimental condition

were dummy-coded (i.e., 0 = Black vs. 1 = White participant, and 0 = Black vs. 1 = White

patient, respectively), and all continuous variables were grand-mean-centered. For each model

predicting the primary outcome (i.e., perceived patient free will), the steps for variable inclusion

followed this sequence: Step 1) all control variables identified by the bivariate correlations as

related to the outcome (i.e., personal belief in free will and internal locus of control); Step 2) the

main effects of participant race, patient race, and the moderator of interest; Step 3) all possible

two-way interaction terms among participant race, patient race, and the moderator of interest;

Step 4) the three-way interaction term for participant race, patient race, and the moderator of

interest. Regarding the secondary outcome (i.e., perceived patient self-control), the full model

included only three steps as none of the anticipated control measures were significantly

correlated with the outcome.

Significant two-way and/or three-way interactions were further probed by simple slopes

analyses using the common *pick-a-point* method at +/- 1 *SD* from the mean, an approach

recommended by Aiken and West (1991). More specifically, I examined the simple slopes of

participant race and/or target race at the ± 1 standard deviation from mean on the moderator of

interest. Finally, an indirect effect analysis (e.g., Preacher & Hayes, 2004, Hayes, 2009) was

conducted to examine the exploratory outcome (i.e., treatment recommendations preference). It

was hypothesized that greater perceived patient free will would predict greater perceived patient

self-control which, in turn, would predict greater preference among participants for

recommending the more rigorous treatment option (i.e., GABG over angioplasty and stent). The

indirect effect analysis was conducted using the PROCESS macro for SPSS 24 (Hayes, 2018; v

3.0). The simple mediation model (i.e., PROCESS model 4) was conducted with 5,000 bootstrap

samples to construct a 95% bootstrap confidence interval (here after, bootCI). Statistical

significance is then inferred if the bootCI does not include zero. A Sobel test was also selected

from the PROCESS macro options which conducts a significance test for the indirect effect and

produces a *z*-value along with a corresponding *p*-value.

Results

The descriptive statistics can be found below in Table 1. Correlation coefficients for all outcomes, predictor variables, moderator variables, as well as all possible control variables can be found below in Table 2. Perceived patient self-control was positively associated with perceived patient free will for Black participants but not for White participants while regardless of participant race perceived patient self-control was positively associated with treatment recommendation preference (i.e., GABG over angioplasty and stent). However, perceived patient free will was not associated with participants' treatment recommendation preferences.

Of the proposed control variables, the aggregate free will belief score was significantly and positively associated with perceived patient free will only among White participants. While the aggregate free will belief score was not significantly associated with perceived patient free will among Black participants, the nature of the relationship was in the same direction. Similar patterns were also found for the relationship between internal locus of control and perceived patient self-control, as well as internal locus of control and participant treatment recommendations. Specifically, the internal locus of control subscale was significantly and inversely associated with perceived patient self-control and treatment recommendation preferences only among White participants. Again, while these associations were not significant for the Black participants the nature of the relationships were in the same direction. Due to theses associations, models predicting perceived patient free will only controlled for participants' aggregate free will belief scores while the models predicting either perceived patient self-control or treatment recommendation preferences only controlled for the internal locus of control subscale.

Table 1
Sample Demographics and Descriptive Statistics (*N* = 133)

Variable	*M* or frequency	*SD* or proportion
Participant Demographics		
Women	108	81.20%
White	88	66.16%
Age	19.08	1.54
Dependent Variables		
Perceived Patient Free Will	5.16	0.69
Perceived Patient Self-Control	4.54	1.06
Treatment Rec Preference	-0.13	1.20
Independent Variables		
Black Target Patient	73	53.30%
Moderator Variables		
Racial Identity	3.44	1.59
Explicit Racial Bias	7.03	24.42
Implicit Racial Bias	-0.16	0.20
Control Variables		
Free Will Belief	4.99	0.96
LOC Internal	4.63	0.72
LOC Chance	3.10	0.94
LOC Powerful Others	3.24	0.97

Note. Treatment Rec = Participant Treatment Recommendation Preference, IAT = Implicit Association Test, LOC = Locus of Control. Participant Treatment Recommendation Preference calculated by subtracting Angioplasty & Stent from CABG. Explicit Racial Bias calculated by subtracting Black racialattitudes from White racial attitudes.

Table 2

Correlations Among Major Variables

| | | | | | Black Participants | | | | | | |
Variable	1	2	3	4	5	6	7	8	9	10	11
White Participants											
Dependent Variables											
1. Perceived Patient Free Will	—	.40**	.27	-.03	.17	-.27	.01	.18	.12	-.12	-.06
2. Perceived Patient Self-Control	.18	—	.58**	-.11	-.04	-.16	.16	-.05	-.03	-.09	-.23
3. Treatment Rec Preference	.09	.68**	—	-.18	-.19	-.09	-.06	-.04	-.06	.17	-.01
Independent Variables											
4. Target Patient Race	-.23*	-.26*	-.16	—	.03	.08	-.17	.13	-.02	-.23	-.09
Moderator Variables											
5. Racial Identity	-.19	-.16	-.13	.06	—	.33*	.21	-.08	-.19	-.03	-.02
6. Explicit Racial Bias	-.15	.00	.08	-.03	-.04	—	.26	-.19	-.17	.00	.28
7. Implicit Racial Bias IAT	-.23*	-.10	-.08	-.20	.18	.16	—	-.14	-.18	-.18	-.30*
Control Variables											
8. Free Will Belief	.27*	-.11	-.13	-.14	-.18	-.18	-.09	—	.46**	-.09	-.16
9. LOC Internal	.11	-.25*	-.29**	.04	-.13	-.22*	-.06	.56**	—	-.08	.03
10. LOC Chance	.14	-.02	.01	.07	.01	.06	-.12	-.04	.02	—	.54**
11. LOC Powerful Others	-.03	-.08	-.05	.06	.05	.12	-.08	-.20	-.01	.68**	—

Note. *indicates p < .05, **indicates p < .01. Participants' Treatment Recommendation Preference constructed by subtracting CABG from Angioplasty & Stent. Participant race and patient race coded Black = 0, White = 1. Explicit Racial Bias constructed by subtracting White attitudes from Black Attitudes.

Perceived patient free will

  Model 1: An inclusion of racial identity as a moderator. The overall model was

significant, $F(8,124) = 2.59$, $MSE = .43$ $p = .012$, $R^2 = .14$. A significant main effect was found

for racial identity ($b = .30$, $SE = .11$, $p < .01$), such that greater amounts of participant racial

identity predicted greater amounts of free will perceived of the target patients. No main effects

were found for participant race or target patient race ($b = .44$ $SE = .23$, $p = .06$ and $b = .44$, SE

$= .30$, $p = .14$), providing no evidence that the race of participants or the race of the target patient

differentially affect perceptions of others free will. An examination of the coefficients also

revealed that the two-way interaction between participant race and target patient race was not

significant ($b = -.56$, $SE = .34$, $p = .10$), suggesting that there is no evidence for participant bias

that attributed greater free will to racial ingroup members. In contrast, the two-way interaction

between participant race and racial identity, as well as the two-way interaction between target

patient race and racial identity were significant ($b = -.43$, $SE = .14$, $p < .01$ and $b = -.43$, $SE =$

$.14$, $p < .01$; respectively). However, these main effects and two-way interactions were qualified

by a significant three-way interaction between participant race, target patient race, and racial

identity ($b = .50$, $SE = .19$, $p = .011$), see Table 3 below.

  The simple slopes analysis of target patient race for White vs. Black participants at lower

levels of racial identity (see Figure 1, top plot) revealed that Black participants perceived

significantly greater free will for the White target patient than they did for the Black target

patient ($b = 1.03$, $SE = .50$, $p = .04$), while the White participants' free will ascriptions trended

toward significance, such that, greater free will was perceived on behalf of the Black target

patient than the White target patient ($b = -.33$, $SE = .18$, $p = .07$). The simple slopes analysis of

target patient race for White vs. Black participants at higher levels of racial identity (see Figure

1, top plot) revealed that neither White participants nor Black participants perceived different amounts of free will between the White and Black target patients ($b = .09$, $SE = .31$, $p = .77$; $b = -.15$, $SE = .20$, $p = .46$; respectively). Taken together, these findings provide partial support of the hypothesis.

Table 3

Model 1: Participant Race by Patient Race by Racial Identity

Variable	b	SE	t	p
Intercept	4.743	.201	23.623	.000
Free Will Belief	.158	.063	2.522	.013
Participant Race	.438	.233	1.877	.063
Patient Race	.440	.295	1.491	.139
Racial Identity	.304	.108	2.814	.006
Participant Race × Patient Race	-.559	.338	-1.652	.101
Participant Race × Racial Identity	-.432	.136	-3.179	.002
Patient Race × Racial Identity	-.371	.153	-2.425	.017
Participant Race × Patient Race × Racial Identity	.503	.194	2.588	.011

Note. $F(8,124) = 2.59$, $MSE = .43$, $p = .012$, $R^2 = .143$, $SE = .66$, $\Delta F = 6.70$, $\Delta R^2 = .046$, $p = .011$.

Figure 1: Target Patient Race coded Black = 0, White = 1. Participant Race coded Black = 0, White = 1. Positive *b* value indicates grater free will for White patient. Negative *b* value indicates greater free will for Black patient. Low Racial Identity probed at -1 *SD* below the mean. High Racial Identity probed at +1 *SD*

Model 2: An inclusion of explicit racial bias as a moderator. The overall model was significant, $F(8,124) = 2.99$, $MSE = .42$, $p < .01$, $R^2 = 16$. None of the main effects was significant (participant race: $b = .18$ $SE = .19$, $p = .33$; patient race: $b = .30$, $SE = .23$, $p = .20$; explicit racial bias: $b = .01$ $SE = .01$, $p = .30$). Further examination of the coefficients revealed significant two-way interactions between participant race and target patient race ($b = -.56$, $SE = .28$, $p = .046$) as well as between target patient race and explicit racial bias ($b = -.02$, $SE = .01$, $p < .01$). The interaction between participant race and explicit racial bias was not significant ($b = -.01$, $SE = .01$, $p = .294$). However, these significant two-way interactions were qualified by the significant three-way interaction between participant race, target patient race, and explicit racial bias ($b = .02$, $SE = .01$, $p = .048$; see Table 4 below).

The simple slopes analysis of participant race at high levels of explicit racial bias (i.e., pro-White bias) revealed the Black participants perceived significantly greater free will on behalf of the White target patient than the Black target patient ($b = .88$, $SE = 38$, $p = .02$; see Figure 2 top plot). However, the White participants did not perceive significantly different amounts of free will between the White and Black target patients ($b = -.19$, $SE = 19$, $p = .318$). The simple slopes analysis at high levels of explicit bias (i.e., pro-Black bias: see Figure 2, top plot) found that neither White participants nor Black participants perceived different amounts of free will between the White and Black target patients ($b = -.33$, $SE = .26$, $p = .209$; $b = -.29$, $SE = .22$, $p = .182$; respectively). Taken together, these findings provide partial support of the hypothesis.

Table 4

Model 2: Participant Race by Patient Race by Explicit Racial Bias

Variable	b	SE	t	p
Intercept	5.087	.155	32.828	.000
Free Will Belief	.110	.063	1.765	.080
Participant Race	.182	.186	.979	.329
Patient Race	.298	.229	1.298	.197
Explicit Racial Bias	.007	.007	1.039	.301
Participant Race × Patient Race	-.557	.276	-2.017	.046
Participant Race × Explicit Racial Bias	-.009	.008	-1.054	.294
Patient Race × Explicit Racial Bias	-.024	.008	-2.900	.004
Participant Race × Patient Race × Explicit Racial Bias	.021	.011	1.998	.048

Note. $F(8,124) = 2.989$, $MSE = .42$, $p = .004$, $R^2 = .162$, $SE = .65$, $\Delta F = 3.99$, $\Delta R^2 = .027$, $p = .048$.
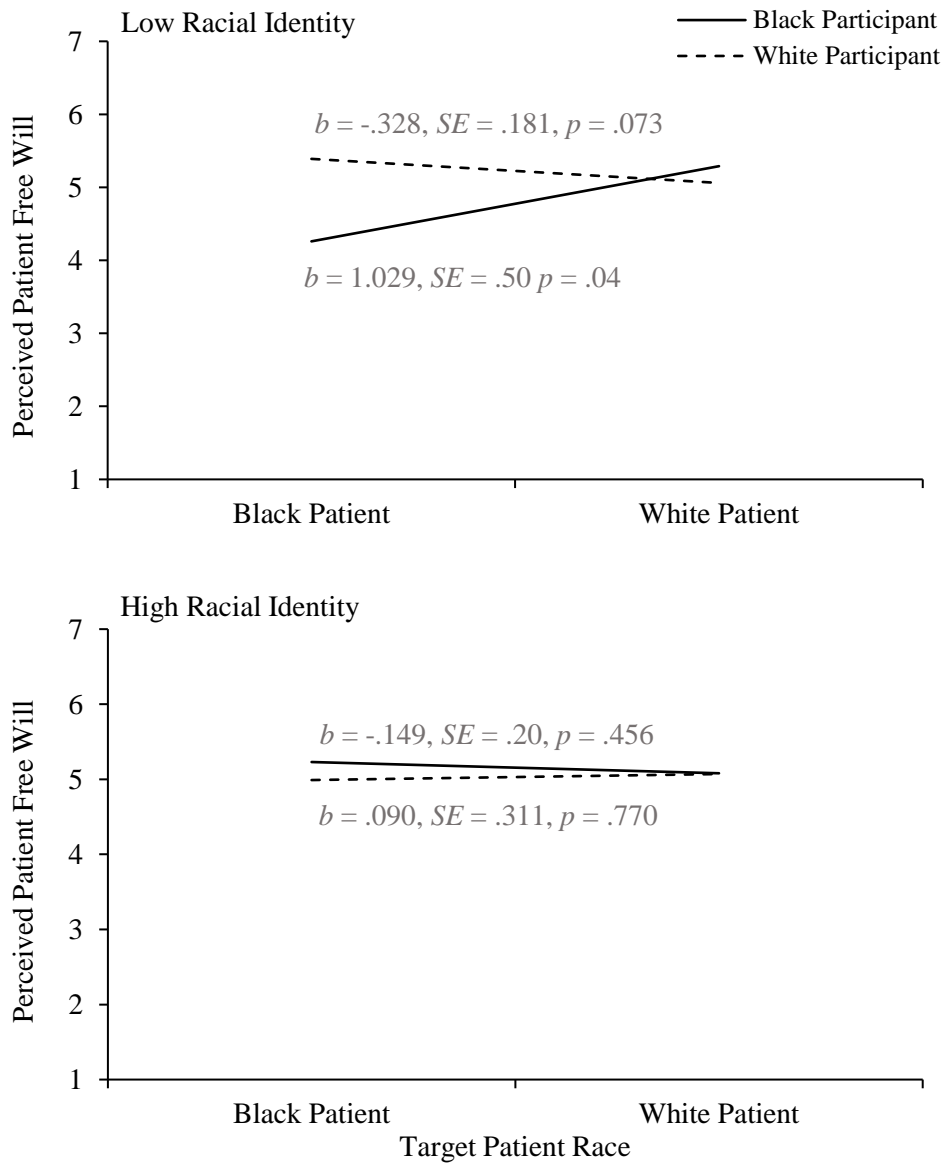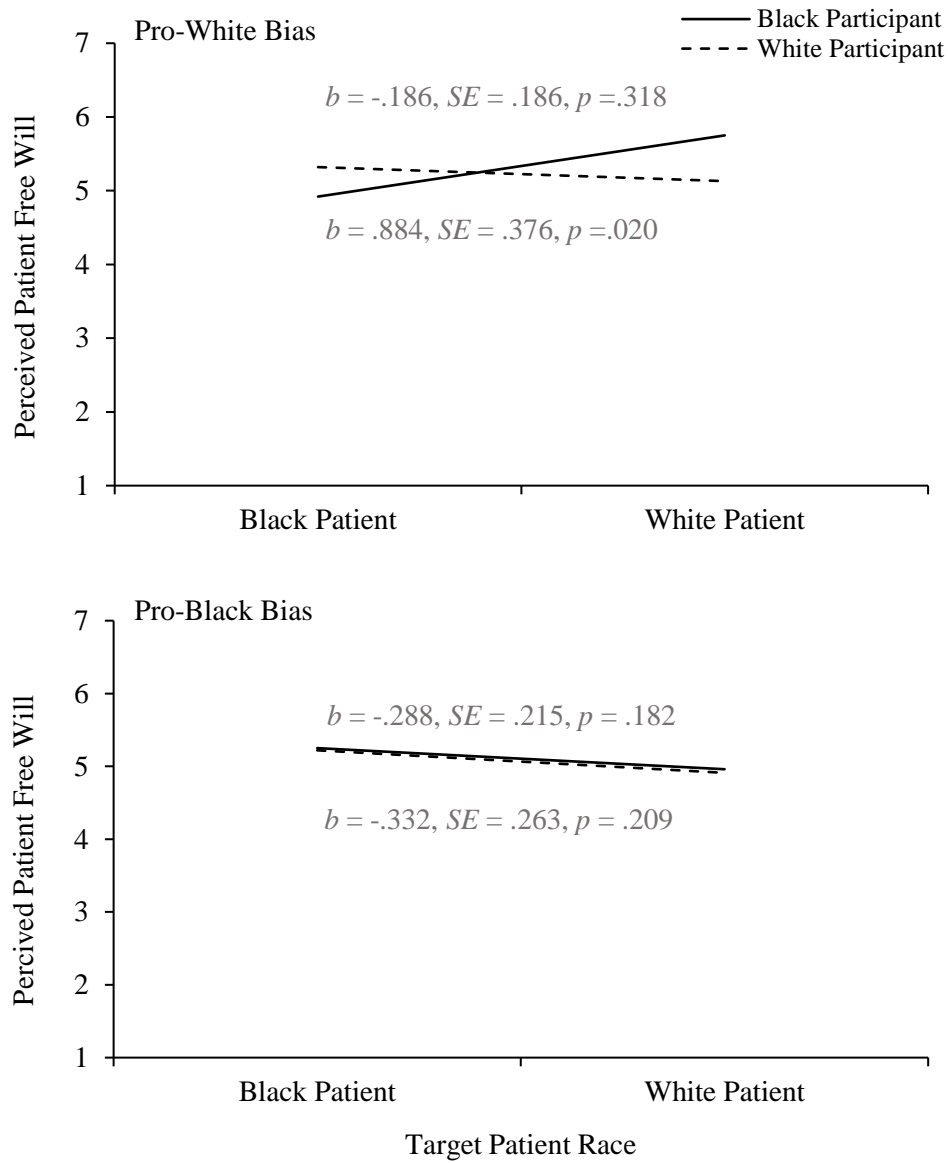
Figure 2: Target Patient Race coded Black = 0, White = 1. Participant Race coded Black = 0, White = 1. Positive *b* value indicates grater free will for White patient. Negative *b* value indicates greater free will for Black patient. Pro-Black Bias at -1 *SD* below the mean. Pro-White Bias probed at +1 *SD* above the mean.

Model 3: An inclusion of implicit racial bias as a moderator. The overall model was not significant $F(8,124) = 1.75$, $MSE = .46$, $p = .094$, and only the main effect of participant free will was significant ($b = .14$, $SE = 06$, $p = .03$), indicating again that greater participant free will belief is associated with participants perceiving greater amounts of free will on behalf of the target patients (Table 5). The main effect for participant free will remained significant in a reduced model that removed all higher-order terms. These results suggest that, within this sample, there was no evidence to support the claim that implicit racial attitudes moderate participants' perceptions of ingroup vs. outgroup racial members' free will. Nor was there any evidence to support the claim that such a bias was moderated by levels of implicit racial bias. It is important to note the programming error that occurred. It is possible that the IAT's null result in this research was due to the aforementioned programming error and therefore not a reliable guide for inferring information regarding the nature of the truth value of this null hypothesis. See the discussion section for an in-depth treatment regarding the programing error and the resulting data collection failure.

Table 5

Model 3: Participant Race by Patient Race by Implicit Racial Bias

Variable	b	SE	t	p
Intercept	5.141	.175	29.305	.000
Free Will Belief	.141	.064	.210	.029
Participant Race	.122	.202	.604	.547
Patient Race	-.050	.236	-.211	.833
Implicit Racial Bias	.202	.798	.253	.800
Participant Race × Patient Race	-.256	.286	-.895	.373
Participant Race × Implicit Racial Bias	-1.057	.983	-1.075	.284
Patient Race × Implicit Racial Bias	-.213	1.026	-.207	.836
Participant Race × Patient Race × Implicit Racial Bias	-.015	1.380	-.011	.991

Note. $F(8,124) = 1.75$, $MSE = .46$, $p = .094$, $R^2 = .101$, $SE = .68$, $\Delta F = .00$, $\Delta R^2 = .00$, $p = .991$.

Perceived patient self-control

      Model 4: An inclusion of racial identity as a moderator. The overall model did not

reach significance, $F(8,124) = 1.82$, $MSE = 1.06$, $p = .08$, and only the main effect of participant

local of control was significant ($b = -.30$, $SE = 13$, $p = .02$), indicating that greater participant

internal locus of control scores predicted lesser perceived amounts of patient self-control (Table

6). The main effect for participant locus of control remained significant in a reduced model that

removed all higher-order terms. Thus, there was no evidence to support the claim that

participants displayed a racial bias that attributed greater levels of self-control to racial ingroup

vs. outgroup members. Nor was there any evidence to support the claim that such a bias was

moderated by levels of racial identity. However, the direction of the relationships incorporating

racial identity as a moderator were examined to see if they were consistent with the hypothesis.

Table 6

Model 4: Participant Race by Patient Race by Racial Identity

Variable	*b*	*SE*	*t*	*p*
Intercept	4.777	.312	15.300	.000
LOC Internal	-.297	.128	-2.325	.022
Participant Race	-.033	.362	-.091	.928
Patient Race	-.617	.462	-1.337	.184
Racial Identity	-.189	.169	-1.118	.266
Participant Race × Patient Race	.119	.531	.224	.823
Participant Race × Racial Identity	.065	.213	.303	.762
Patient Race × Racial Identity	.267	.239	1.115	.267
Participant Race × Patient Race × Racial Identity	-.261	.304	-.858	.393

Note. $F(8,124) = 1.82$, $MSE = 1.06$, $p = .08$, $R^2 = .105$, $SE = 1.03$, $\Delta F = .736$, $\Delta R^2 = .005$, $p = .393$.

Model 5: An inclusion of explicit racial bias as a moderator. The overall model was not significant $F(8,124) = 1.76$, $MSE = 1.07$, $p = .09$, and only the main effect of participant locus of control was significant ($b = -.30$, $SE = 13$, $p = .02$), once again indicating that greater participant internal locus of control predicted lesser perceived amounts of patient self-control (Table 7). As before, the main effect for participant locus of control remained significant in a reduced model that removed all higher-order terms. Thus, there was no evidence to support the claim that participants displayed a racial bias that attributed greater levels of self-control to racial ingroup vs. outgroup members. Nor was there any evidence to support the claim that such a bias was moderated by levels of explicit racial bias. However, the direction of the relationships incorporating explicit racial bias as a moderator were examined to see if they were consistent with the hypothesis.

Table 7

Model 5: Participant Race by Patient Race by Explicit Racial Bias

Variable	b	SE	t	p
Intercept	4.668	.246	19.014	.000
LOC Internal	-.293	.129	-2.272	.025
Participant Race	.121	.294	.414	.680
Patient Race	-.307	.361	-.851	.396
Explicit Racial Bias	-.012	.010	-1.168	.245
Participant Race × Patient Race	-.152	.430	-.353	.725
Participant Race × Explicit Racial Bias	-.004	.013	-.318	.751
Patient Race × Explicit Racial Bias	-.007	.013	-.526	.600
Participant Race × Patient Race × Explicit Racial Bias	-.002	.017	-.122	.903

Note. $F(8,124) = 1.76$, $MSE = 1.07$, $p = .09$, $R^2 = .102$, $SE = 1.03$, $\Delta F = .015$, $\Delta R^2 = .000$, $p = .903$.

Model 6: An inclusion of implicit racial bias as a moderator. Similar to the models 4 and 5, the overall model was not significant $F(8,124) = 2.23$, $MSE = 1.04$, $p = .03$, and only the main effect of participant locus of control was significant ($b = -.26$, $SE = 13$, $p = .04$), showing that participant internal locus of control scores negatively predicted the amount of self-control they perceived on behalf of the target patient (Table 8). Again, the main effect for participant locus of control remained significant in a reduced model that removed all higher-order terms. As was true of models 4 and 5, these results do not provide evidence to support the hypothesis that participants would display a racial bias that would attribute more self-control to racial ingroup vs. outgroup members.

Table 8

Model 6: Participant Race by Patient Race by Implicit Racial Bias

Variable	b	SE	t	p
Intercept	4.644	.264	17.572	.000
LOC Internal	-.256	.125	-2.046	.043
Participant Race	.165	.304	.542	.589
Patient Race	-.475	.355	-1.337	.184
Implicit Racial Bias	-.897	1.205	-.744	.458
Participant Race × Patient Race	-.078	.428	-.182	.856
Participant Race × Implicit Racial Bias	-.451	1.483	-.304	.762
Patient Race × Implicit Racial Bias	2.518	1.549	1.625	.107
Participant Race × Patient Race × Implicit Racial Bias	-1.863	2.083	-.895	.373

Note. $F(8, 124) = 2.23$, $MSE = 1.04$, $p = .03$, $R^2 = .126$, $SE = 1.02$, $\Delta F = .80$, $\Delta R^2 = .006$, $p = .373$.

Treatment recommendation preference

   Indirect effect model: predicting treatment recommendation preference. A mediation analysis revealed that while the direct effect (path '*c*') was not significant (*b* = .02, *SE* = .12, *CI* = -.22 to .26), both the indirect effect and the total effect (path *c*) were significant(*b* = .31, *SE* = .10, *CI* =.13 to .50 and *b* = .33, *SE* = .15, *CI* =.04 to .62; see Figure 3). Specifically, perceived patient free will was significantly associated with perceived patient self-control (path *a*; with *b* = .44, *SE* = .13, *CI* = .19 to .69). The positive coefficient for this association indicates that greater perceived amounts of patient free will predicted greater perceived amounts of patient self-control. Furthermore, perceived patient self-control was significantly associated with treatment recommendation preference (path *b*; with *b* = .71, *SE* = .08, *CI* = .55 to .86). The positive coefficient for this association indicates that greater perceived amounts of patient self-control resulted in greater preference for the more rigorous of the two treatment options (i.e., GABG over angioplasty and stent). Lastly, the indirect effect (path *ab*) was significant. The positive coefficient for this association indicates that greater perceived amounts of patient free will predicted greater preference for the rigorous treatment recommendation through increased perceived patient self-control.

ab: $b = .31*$

Perceived Patient
Self-Control

a: $b = .44**$

b: $b = .71**$

Perceived Patient
Free Will

c: $b = .33*$

$\left[c\text{'}: \ b = .02 \right]$

Treatment
Recommendation
Preference
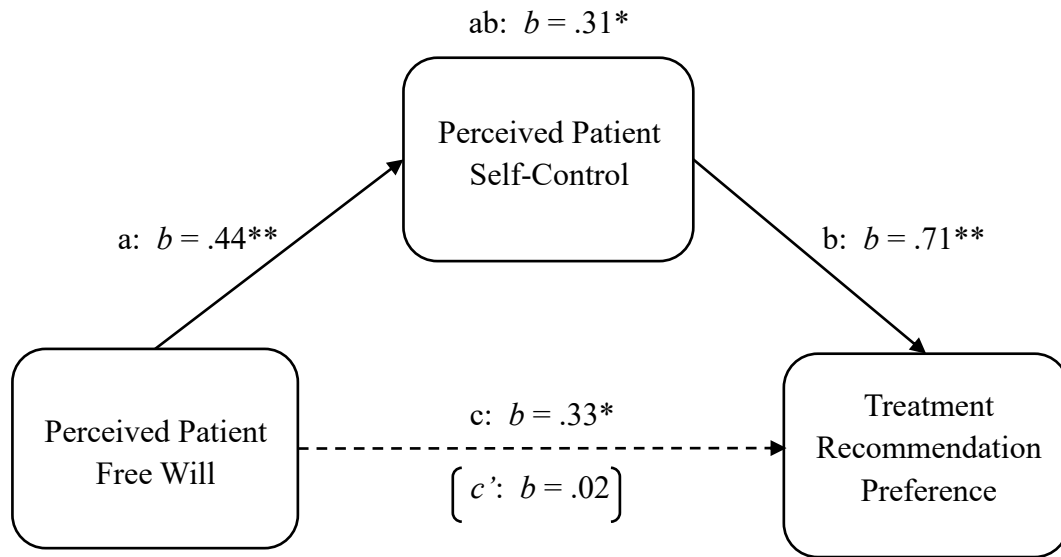
Figure 3: Indirect effect of Perceived Patient Free Will on Treatment Recommendation
Preference through Perceived Patient Self-Control.
Note. * indicates $p < .05$, ** indicates $p < .01$. The Sobel test for the indirect effect path
The bootstrap confidence interval for path ab = .13 to .50.

Discussion

The present research sought to answer the overarching question: does racial group membership impacts people's perceptions of others' free will? Two specific hypotheses were formulated by drawing on social identity theory and free will belief theory. First, it was hypothesized that participants would perceive greater amounts of free will for racial ingroup members than for racial outgroup members. Second, it was hypothesized the difference in perceived free will for racial ingroup vs. racial outgroup members would be moderated by participant racial identity and/or racial bias. Specifically, it was hypothesized that participants who were more strongly identified with their racial group or had higher levels of racial bias would show greater discrepancy in the perceived free will of racial ingroup vs. racial outgroup members.

The findings of the present research did not provide empirical support for the first hypothesis but provided partial support for the second hypothesis. Specifically, racial identity moderated the biased perceptions of others' free will. However, the direction of the moderation was opposite from the prediction. Among Black participants who weakly, but not strongly, identified with their racial group, a greater amount of free will was perceived in the White target patient than was perceived in the Black target patient. There was also a trend in White participants who weakly, but not strongly, identified with their racial group (although the association did not reach significance) such that a greater amount of free will was perceived in the Black target patient than was perceived in the White target patient. Thus, this work suggests that perceptions of others' free will may be biased in favor of racial outgroup members among participants who weakly identified with their racial group, which was inconsistent with our

53

prediction that racial identity exacerbates the expected effect for participant race by target patient race on one's perception of a racial ingroup vs. racial outgroup members free will.

Evidence supporting racial bias as a potential moderating factor was weak. Among Black participants who displayed pro-White racial bias, but not pro-Black racial bias, a greater amount of free will was perceived in the White target patient than in the Black target patient. As for the White participants, no effect on target patient free will was found for either pro-White or pro-Black racial bias. However, this lack of supporting evidence might be explained by the methodical error in the present study. This limitation will be discussed further below.

An exploratory third research hypothesis was formulated and tested as a proxy indication of the pragmatic value of researching peoples' perceptions of others' free will within the context of medical treatment recommendations. It was hypothesized that greater perceived patient free will would predict greater perceived patient self-control, which would, in turn, predict greater preference for recommending a more rigorous treatment over a less rigorous treatment. Consistent with the prediction, perceived patient free will was positively associated with perceived patient self-control, and perceived patient self-control was further associated with preference for recommending GABG (the more rigorous treatment) to the hypothetical patient.

Limitations and future directions

The use of undergraduate college students in the current study provides critical information about how racial group membership impacts social-cognitive processes that are relatively more common across the general population. Specifically, past research suggests that college student samples do not meaningfully differ in many attitudes and behaviors compared to non-college student samples (Wiecko, 2010; Peterson & Merunka, 2014). However, while the generalizability of the current findings for the primary and secondary outcomes (i.e., perceived

patient free will and perceived patient self-control; respectively) is relatively high, the

generalizability for the exploratory outcome (i.e., treatment recommendation preference) is

limited in two distinct ways. First, past research has shown patient health insurance status to be a

predictor of provider treatment recommendations as well as patient treatment decisions (Hadley,

2003; Higgs, 2008). As the present study did not assess participants' health insurance statuses,

the effect of the participant health insurance status on their treatment recommendation preference

for the hypothetical vignette patient is unknown. Second, generalizability is limited by the

clinical accuracy at which undergraduate college students were able to decide between

recommending one treatment over the other (i.e. CABG or Angioplasty and stent). Thus, steps

were taken to mitigate this concern, such as educational material and quality control questions

intended to test participants understanding of the two treatments. However, the present study was

unable to confidently match participant treatment recommendation preference for the less

rigorous treatment (i.e., Angioplasty and stent) to the notion of suboptimal treatment.

Specifically, 23 participants (60.9% White, $n = 14$) did not pass the four true/false CAD

educational materials attention check questions, and their treatment recommendation preferences

was not significantly different from those of the participants who passed the attention check

questions ($b = -.26$, $SE = .26$, $p = .31$). Future research should seek to replicate the current

findings in medical student or physician samples as well as more accurately assess the distinction

between optimal/suboptimal treatment recommendation preference. Additionally, future research

should investigate the perception of free will as a potential mediator of healthcare providers'

racial stereotypes and their effects on treatment recommendations for minority patients.

　　　　The use of a general (i.e., not race specific) measure of racial identity in the current study

allowed for comparisons between White and Black participants' racial identity and provides

critical information about how racial group membership impacts social-cognitive processes related to perceiving free will and self-control in others. However, the lack of support for the hypotheses on behalf of the White participants may be due to the well-known difficulty concerning the conceptualization and measurement of Whiteness (i.e., White racial identity) in general. The measurement of Whiteness, or "the attribute of being recognized and treated as a White person in society" (Knowles, 2014, p. 594), has been regarded by many as an identity of very low salience and therefore difficult to measure (Helms, 1990; Perry, 2001, 2002, Knowles, Lowery, Hogan, & Chow, 2009; Payne et al., 2009; Knowles, Lowery, & Schaumberg, 2010; Knowles, Lowery, Chow, & Unzueta, 2014). These previous findings suggest that the construct validity of racial identity in White participants in the present study could be questionable. Future research may use other measures, such as the White Identity Centrality Implicit Association Test (Knowles & Peng, 2005), to better capture and should empirically examine whether findings from the current study can be replicated.

A most regretful limitation of this study is the IAT programming error. The data file was improperly programed and did not collect the response times from all seven IAT trial blocks. Because data from only two trial blocks were collected, the older IAT algorithm (Greenwald, McGhee, & Schwartz, 1998), as opposed to commonly used newer algorithm (Greenwald, Nosek, & Banaji, 2003), was used for computing participant IAT scores. Thus, it remains unknown whether the null findings reported in the present study was due to true effect or to methodological error. Therefore, research is still needed to test the possible influence that implicit racial bias might have on differential perceptions of ingroup vs. outgroup members' free will.

Finally, the current study exclusively focused on recruitment of Black and White participants. Although, this is a good starting point and provides critical information about how racial group membership impacts social-cognitive processes related to perceiving free will and self-control in others, future research should test the current hypotheses in more racially and ethnically diverse samples. Future research investigating ingroup-outgroup biases within peoples' perceptions of others' free will should also investigate the boundary by including other potentially important identity, such as heterosexual vs. lesbian, gay or bisexual persons, cisgendered vs. transgendered identities, non-substance users vs. addicts, normative mental health persons vs. those with mental illnesses.

Conclusion

Using an experimental research design the present research sought to answer the overarching question: does racial group membership impact people's perceptions of others' free will? While the findings from the present research did not provide empirical support for the first hypothesis, but they provided partial and full support for the second hypothesis and the third hypothesis, respectively. This work suggests that one's racial identity may play an important role in perceived ingroup vs. outgroup member's free will and that perceptions of others' free will may be of some importance to the literature of medical treatment recommendations.

References

Aberegg, S. K., & Terry, P. B. (2004). Medical decision-making and healthcare disparities: the physician's role. *Journal of Laboratory and Clinical Medicine*, *144*(1), 11-17.

Abrams, D., & Hogg, M. A. (1988). Comments on the motivational status of self-esteem in social identity and intergroup discrimination. *European Journal of Social Psychology*, *18*(4), 317-334.

Abrams, D., & Hogg, M. A. (2010). Social identity and self-categorization. *The SAGE handbook of prejudice, stereotyping and discrimination*, 179-193.

Aiken, L. S., West, S. G., & Reno, R. R. (1991). *Multiple regression: Testing and interpreting interactions*. Sage.

Alquist, J. L., Ainsworth, S. E., & Baumeister, R. F. (2013). Determined to conform: Disbelief in free will increases conformity. *Journal of Experimental Social Psychology*, *49*(1), 80-86.

Alwin, D. F. (2007). *Margins of error: A study of reliability in survey measurement* (Vol. 547). John Wiley & Sons.

Ayer, A. J. (1972). Freedom and necessity. In *Philosophical essays* (pp. 271-284). Palgrave Macmillan UK.

Baumeister, R. F. (2008). Free will in scientific psychology. *Perspectives on psychological science*, *3*(1), 14-19.

Baumeister, R. F., & Monroe, A. E. (2014). Recent research on free will: Conceptualizations, beliefs, and processes. *Advances in Experimental Social Psychology*, *50*, 1-52.

Baumeister, R. F., Masicampo, E. J., & DeWall, C. N. (2009). Prosocial benefits of feeling free: Disbelief in free will increases aggression and reduces helpfulness. *Personality and Social Psychology Bulletin*, *35*(2), 260-268.

Becker, W. C., Starrels, J. L., Heo, M., Li, X., Weiner, M. G., & Turner, B. J. (2011). Racial differences in primary care opioid risk reduction strategies. *The Annals of Family Medicine*, *9*(3), 219-225.

Bennett, K.J., Olatosi, B., Probst, J.C., 2008. Health disparities: A rural – urban chartbook. South Carolina Rural Health Research Center, Columbia, South Carolina.

Bloche, M. G. (2005). American medicine and the politics of race. *Perspectives in biology and medicine*, *48*(1), 54-S67.

Borrero, S., Schwarz, E. B., Creinin, M., & Ibrahim, S. (2009). The impact of race and ethnicity on receipt of family planning services in the United States. *Journal of Women's Health*, *18*(1), 91-96.

Bowleg, L., Burkholder, G. J., Massie, J. S., Wahome, R., Teti, M., Malebranche, D. J., & Tschann, J. M. (2013). Racial discrimination, social support, and sexual HIV risk among Black heterosexual men. *AIDS and Behavior*, *17*(1), 407-418.

Bowleg, L., Teti, M., Massie, J. S., Patel, A., Malebranche, D. J., & Tschann, J. M. (2011). 'What does it take to be a man? What is a real man?': ideologies of masculinity and HIV sexual risk among Black heterosexual men. *Culture, Health & Sexuality*, *13*(05), 545-559.

Branscombe, N. R., & Wann, D. L. (1994). Collective self-esteem consequences of outgroup derogation when a valued social identity is on trial. *European Journal of Social Psychology*, *24*(6), 641-657.

Burgess, D. J., Crowley-Matoka, M., Phelan, S., Dovidio, J. F., Kerns, R., Roth, C., ... & van Ryn, M. (2008). Patient race and physicians' decisions to prescribe opioids for chronic low back pain. *Social science & medicine*, *67*(11), 1852-1860.

Calabrese, S. K., Earnshaw, V. A., Underhill, K., Hansen, N. B., & Dovidio, J. F. (2014). The impact of patient race on clinical decisions related to prescribing HIV pre-exposure prophylaxis (PrEP): assumptions about sexual risk compensation and implications for access. *AIDS and Behavior*, *18*(2), 226-240.

Centers for Disease Control (2013). CDC Health Disparities and Inequalities Report-United States, 2013. *Morbidity and mortality weekly report. Surveillance summaries (Washington, DC: 2002)*, *62*.

Cintron, A., & Morrison, R. S. (2006). Pain and ethnicity in the United States: A systematic review. *Journal of palliative medicine*, *9*(6), 1454-1473.

Clark, C. J., Luguri, J. B., Ditto, P. H., Knobe, J., Shariff, A. F., & Baumeister, R. F. (2014). Free to punish: A motivated account of free will belief. Journal of personality and social psychology, 106(4), 501.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2013). *Applied multiple regression/correlation analysis for the behavioral sciences*. Routledge.

Contreras-Huerta, L. S., Baker, K. S., Reynolds, K. J., Batalha, L., & Cunnington, R. (2013). Racial bias in neural empathic responses to pain. *PloS one*, *8*(12), e84001.

Contreras-Huerta, L. S., Hielscher, E., Sherwell, C. S., Rens, N., & Cunnington, R. (2014). Intergroup relationships do not reduce racial bias in empathic neural responses to pain. *Neuropsychologia*, *64*, 263-270.

Cook, K., & Stoecker, J. (2014). Healthcare student stereotypes: A systematic review with implications for interprofessional collaboration. *Journal of research in Interprofessional Practice and education*, *4*(2).

Crocker, J., & Luhtanen, R. (1990). Collective self-esteem and ingroup bias. *Journal of personality and social psychology*, *58*(1), 60.

Cutler, D., & Miller, G. (2005). The role of public health improvements in health advances: the twentieth-century United States. *Demography*, *42*(1), 1-22.

D'Amore, M. M., Cheng, D. M., Allensworth-Davies, D., Samet, J. H., & Saitz, R. (2012). Disparities in safe sex counseling & behavior among individuals with substance dependence: a cross-sectional study. *Reprod Health*, *9*, 35.

Dasgupta, N. (2004). Implicit ingroup favoritism, outgroup favoritism, and their behavioral manifestations. *Social Justice Research*, *17*(2), 143-169.

Davis, S., & Tucker-Brown, A. (2013). Effects of black sexual stereotypes on sexual decision making among African American women. *Journal of Pan African Studies*, *5*(9), 111-129.

Dennett, D. C. (1984). I Could not have Done Otherwise—So What? *The Journal of Philosophy*, *81*(10), 553-565.

Devine, P. G. (1988). Stereotype assessment: Theoretical and methodological issues. *Unpublished manuscript, university of wisconsin-madison*.

Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of personality and social psychology*, *56*(1), 5.

Doescher, M. P., Saver, B. G., Franks, P., & Fiscella, K. (2000). Racial and ethnic disparities in perceptions of physician style and trust. *Archives of Family Medicine*, *9*(10), 1156.

Dovidio, J. F., & Fiske, S. T. (2012). Under the radar: how unexamined biases in decision-making processes in clinical interactions can contribute to health care disparities. *American journal of public health*, *102*(5), 945-952.

Dovidio, J. F., Hewstone, M., Glick, P., & Esses, V. M. (2010). Prejudice, stereotyping and discrimination: theoretical and empirical overview. *The SAGE handbook of prejudice, stereotyping and discrimination*.

Easterbrook, P. J., Keruly, J. C., Creagh-Kirk, T., Richman, D. D., Chaisson, R. E., Moore, R. D., ... & Cohen, H. (1991). Racial and ethnic differences in outcome in zidovudine-treated patients with advanced HIV disease. *Jama*,*266*(19), 2713-2718.

Elwyn, G., Frosch, D., Thomson, R., Joseph-Williams, N., Lloyd, A., Kinnersley, P., ... & Edwards, A. (2012). Shared decision making: a model for clinical practice. *Journal of general internal medicine*, *27*(10), 1361-1367.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior research methods*, *39*(2), 175-191.

Fazio, R. H. (1995). Attitudes as object-evaluation associations: Determinants, consequences, and correlates of attitude accessibility. *Attitude strength: Antecedents and consequences*, *4*, 247-282.

Fazio, R. H., Jackson, J. R., Dunton, B. C., & Williams, C. J. (1995). Variability in automatic activation as an unobtrusive measure of racial attitudes: a bona fide pipeline? *Journal of personality and social psychology*,*69*(6), 1013.

Gaertner, S. L., & Dovidio, J. F. (2014). *Reducing intergroup bias: The common ingroup identity model*. Psychology Press.

Geiger, H. J. (2003). Racial and ethnic disparities in diagnosis and treatment: a review of the evidence and a consideration of causes. *Unequal treatment: Confronting racial and ethnic disparities in health care*, 415-54.

Gonzalez, C. M., Kim, M. Y., & Marantz, P. R. (2014). Implicit bias and its relation to health disparities: A teaching program and survey of medical students. *Teaching and learning in medicine*, *26*(1), 64-71.

Goyal, M. K., Kuppermann, N., Cleary, S. D., Teach, S. J., & Chamberlain, J. M. (2015). Racial disparities in pain management of children with appendicitis in emergency departments. *JAMA pediatrics*, *169*(11), 996-1002.

Graham, N. M., Jacobson, L. P., Kuo, V., Chmiel, J. S., Morgenstern, H., & Zucconi, S. L. (1994). Access to therapy in the Multicenter AIDS Cohort Study, 1989–1992. *Journal of clinical epidemiology*, *47*(9), 1003-1012.

Green, A. R., Carney, D. R., Pallin, D. J., Ngo, L. H., Raymond, K. L., Iezzoni, L. I., & Banaji, M. R. (2007). Implicit bias among physicians and its prediction of thrombolysis decisions for black and white patients. *Journal of general internal medicine*, *22*(9), 1231-1238.

Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: attitudes, self-esteem, and stereotypes. *Psychological review*, *102*(1), 4.

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual differences in implicit cognition: the implicit association test. *Journal of personality and social psychology*, *74*(6), 1464.

Greenwald, A. G., Poehlman, T. A., Uhlmann, E. L., & Banaji, M. R. (2009). Understanding and using the Implicit Association Test: III. Meta-analysis of predictive validity. *Journal of personality and social psychology*, *97*(1), 17.

Groman, R., & Ginsburg, J. (2004). Racial and ethnic disparities in health care: a position paper of the American College of Physicians. *Annals of Internal Medicine*, *141*(3), 226.

Gutiérrez, A. S., & Unzueta, M. M. (2010). The effect of interethnic ideologies on the

perceptions of stereotypic vs. counter stereotypic minority targets. *Journal of Experimental Social Psychology*, 46, 743-752.

Hadley, J. (2003). Sicker and poorer—The consequences of being uninsured: A review of the research on the relationship between health insurance, medical care use, health, work, and income. Medical Care Research and Review, 60(2_suppl), 3S-75S.

Haggard, P., Mele, A., O'Connor, T., & Vohs, K. D. (2010). Lexicon of key terms. Retrieved from, http://wwsw.freewillandscience.com/FW_Lexicon.doc.

Heider, F. (1944). Social perception and phenomenal causality. *Psychological review*, *51*(6), 358.

Heider, F. (1958). The naive analysis of action.

Heider, F., & Simmel, M. (1944). An experimental study of apparent behavior. The American Journal of Psychology, 243-259.

Helms, J. E. (1990). Black and white racial identity: Theory, research, and practice. Greenwood Press.

Hewstone, M., Rubin, M., & Willis, H. (2002). Intergroup bias. *Annual review of psychology*, *53*(1), 575-604.

Higgs, J. (2008). *Clinical reasoning in the health professions*. Elsevier Health Sciences.

Hoffman, K. M., Trawalter, S., Axt, J. R., & Oliver, M. N. (2016). Racial bias in pain assessment and treatment recommendations, and false beliefs about biological differences between blacks and whites. *Proceedings of the National Academy of Sciences*, *113*(16), 4296-4301.

Hogg, M. A., & Abrams, D. (1988). Social identifications.

Hogg, M. A., Terry, D. J., & White, K. M. (1995). A tale of two theories: A critical comparison of identity theory with social identity theory. *Social psychology quarterly*, 255-269.

Houston, D. M., & Andreopoulou, A. (2003). Tests of both corollaries of social identity theory's self-esteem hypothesis in real group settings. *British Journal of Social Psychology*, *42*(3), 357-370.

Hume, D. (1739/2012). A treatise of human nature. *Courier Corporation.*

James, W. (1884, 2005). *The dilemma of determinism*. Whitefish: Kessinger Publishing.

James, W. (1899, 2014). *The will to believe*. Cambridge University Press.

Johnson, R. L., Roter, D., Powe, N. R., & Cooper, L. A. (2004). Patient race/ethnicity and quality of patient-physician communication during medical visits. *American journal of public health*, *94*(12), 2084-2090.

Jones, E. E. The rocky road from acts to dispositions. American Psychologist, 1979, 34, 107-117.

Joosten, E. A., DeFuentes-Merillas, L., De Weert, G. H., Sensky, T., Van Der Staak, C. P. F., & de Jong, C. A. (2008). Systematic review of the effects of shared decision-making on patient satisfaction, treatment adherence and health status. *Psychotherapy and psychosomatics*, *77*(4), 219-226.

Kane, R. (1998). *The significance of free will*. Oxford University Press.

Kant, I. (1781/1998). Critique of pure reason (P. Guyer & AW Wood, Trans.). *Cambridge University Press.*

Kelley, H. H. (1967). Attribution theory in social psychology. In *Nebraska symposium on motivation*. University of Nebraska Press.

Kelley, H. H. (1973). The processes of causal attribution. American psychologist, 28(2), 107.

Kelley, H. H., & Michela, J. L. (1980). Attribution theory and research. *Annual review of psychology*, *31*(1), 457-501.

Kenny, A. (1979). Aristotle's Theory of the Will.

Kirby, J. B., & Kaneda, T. (2013). 'Double jeopardy' measure suggests Blacks and Hispanics face more severe disparities than previously indicated. *Health Affairs*, *32*(10), 1766-1772.

Koh, H. K., Graham, G., & Glied, S. A. (2011). Reducing racial and ethnic disparities: the action plan from the Department of Health and Human Services. *Health Affairs*, *30*(10), 1822-1829.

Lasser, K. E., Himmelstein, D. U., & Woolhandler, S. (2006). Access to care, health status, and health disparities in the United States and Canada: results of a cross-national population-based survey. *American journal of public health*, *96*(7), 1300-1307.

Légaré, F., Ratté, S., Stacey, D., Kryworuchko, J., Gravel, K., Graham, I. D., & Turcotte, S. (2010). Interventions for improving the adoption of shared decision making by healthcare professionals. *The Cochrane Library*.

Lemons, J. S. (1977). Black stereotypes as reflected in popular culture, 1880-1920. American Quarterly, 29(1), 102-116.

Levenson, H. (1973). Multidimensional locus of control in psychiatric patients. *Journal of Consulting and Clinical Psychology, 41,* 397–404.

Levenson, H. (1974). Activism and powerful others: Distinctions within the concept of internal-external control. *Journal of personality assessment*, *38*(4), 377-383.

MacKenzie, M. J., Vohs, K. D., & Baumeister, R. F. (2014). You Didn't Have to Do That Belief in Free Will Promotes Gratitude. *Personality and Social Psychology Bulletin*, 0146167214549322.

Mathur, V. A., Richeson, J. A., Paice, J. A., Muzyka, M., & Chiao, J. Y. (2014). Racial bias in pain perception and response: experimental examination of automatic and deliberate processes. *The Journal of Pain*, *15*(5), 476-484.

McIntosh, P. (1988). White privilege: Unpacking the invisible knapsack.

Meade, A. W., & Craig, S. B. (2012). Identifying careless responses in survey data. *Psychological methods*, *17*(3), 437.

Meghani, S. H., Byun, E., & Gallagher, R. M. (2012). Time to Take Stock: A Meta-Analysis and Systematic Review of Analgesic Treatment Disparities for Pain in the United States. *Pain Medicine*, *13*(2), 150-174.

Michotte, A. (1963). The perception of causality.

Mills, A. M., Shofer, F. S., Boulis, A. K., Holena, D. N., & Abbuhl, S. B. (2011). Racial disparity in analgesic treatment for ED patients with abdominal or back pain. *The American journal of emergency medicine*, *29*(7), 752-756.

Montague, P. R. (2008). Free will. *Current Biology*, *18*(14), R584-R585.

Moore, R. D., Stanton, D., Gopalan, R., & Chaisson, R. E. (1994). Racial differences in the use of drug therapy for HIV disease in an urban community.*New England Journal of Medicine*, *330*(11), 763-768.

Nahmias, E., Coates, D. J., & Kvaran, T. (2007). Free will, moral responsibility, and mechanism: Experiments on folk intuitions. *Midwest studies in Philosophy*,*31*(1), 214-242.

Nahmias, E., Morris, S., Nadelhoffer, T., & Turner 1, J. (2005). Surveying freedom: Folk intuitions about free will and moral responsibility. Philosophical Psychology, 18(5), 561-584.

Najman, J. M., Klein, D., & Munro, C. (1982). Patient characteristics negatively stereotyped by doctors. *Social Science & Medicine*, *16*(20), 1781-1789.

Neitzsche, F. (1889/1954). Twilight of the idols. *Walter Kaufmann (Trans.), The portable Nietzsche. New York: Viking Press.*

Nelson, S. C. (2008). Feeling thermometer. *Encyclopedia of survey research methods*, 277.

Nichols, S. (2011). Experimental philosophy and the problem of free will. *science*, *331* (6023), 1401-1403.

Nichols, S., & Knobe, J. (2007). Moral responsibility and determinism: The cognitive science of folk intuitions. *Nous*, *41*(4), 663-685.

Nosek, B. A., Greenwald, A. G., & Banaji, M. R. (2007). The Implicit Association Test at age 7: A methodological and conceptual review. *Automatic processes in social thinking and behavior*, 265-292.

Oliver, M. N., Goodwin, M. A., Gotler, R. S., Gregory, P. M., & Stange, K. C. (2001). Time use in clinical encounters: are African-American patients treated differently? *Journal of the National Medical Association*, *93*(10), 380.

Oliver, M. N., Wells, K. M., Joy-Gaba, J. A., Hawkins, C. B., & Nosek, B. A. (2014). Do physicians' implicit views of African Americans affect clinical decision making? *The Journal of the American Board of Family Medicine*, *27*(2), 177-188.

Paulhus, D. L., & Carey, J. M. (2011). The FAD–Plus: Measuring lay beliefs regarding free will and related constructs. *Journal of personality assessment*,*93*(1), 96-104.

Peek, M. E., Odoms-Young, A., Quinn, M. T., Gorawara-Bhat, R., Wilson, S. C., & Chin, M. H. (2010). Race and shared decision-making: perspectives of African-Americans with diabetes. *Social science & medicine*, *71*(1), 1-9.

Penner, L. A., & Hagiwara, N. (2014). Racism and health. *The Wiley Blackwell Encyclopedia of Health, Illness, Behavior, and Society*.

Penner, L. A., Blair, I. V., Albrecht, T. L., & Dovidio, J. F. (2014). Reducing Racial Health Care Disparities A Social Psychological Analysis. *Policy insights from the behavioral and brain sciences*, *1*(1), 204-212.

Penner, L. A., Dovidio, J. F., Edmondson, D., Dailey, R. K., Markova, T., Albrecht, T. L., & Gaertner, S. L. (2009). The experience of discrimination and Black-White health disparities in medical care. *Journal of Black Psychology*, *35*(2), 180-203.

Penner, L. A., Gaertner, S., Dovidio, J. F., Hagiwara, N., Porcerelli, J., Markova, T., & Albrecht, T. L. (2013). A social psychological approach to improving the outcomes of racially discordant medical interactions. *Journal of general internal medicine*, *28*(9), 1143-1149.

Penner, L. A., Hagiwara, N., Eggly, S., Gaertner, S. L., Albrecht, T. L., & Dovidio, J. F. (2013). Racial healthcare disparities: A social psychological analysis. *European review of social psychology*, *24*(1), 70-122.

Perry, P. (2001). White means never having to say you're ethnic: White youth and the construction of "cultureless" identities. Journal of Contemporary Ethnography, 30(1), 56-91.

Perry, P. (2002). *Shades of white: White kids and racial identities in high school*. Duke University Press.

Pronin, E., & Kugler, M. B. (2010). People believe they have more free will than others. Proceedings of the National Academy of Sciences, 107(52), 22469-22474.

Rakos, R. F., Laurene, K. R., Skala, S., & Slane, S. (2008). Belief in free will: Measurement and conceptualization innovations. *Behavior and Social Issues*,*17*(1), 20.

Rothenberg, P. S. (2008). *White privilege*. Macmillan.

Rothstein, W. G. (1992). *American physicians in the nineteenth century: from sects to science*. JHU Press.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs*, 80(1)

Rotter, J. B. (1975). Some problems and misconceptions related to the construct of internal versus external control of reinforcement. *Journal of consulting and clinical psychology*, *43*(1), 56.

Rotter, J. B. (1990). Internal versus external control of reinforcement: A case history of a variable. *American psychologist*, 45(4), 489.

Sankar, P., Cho, M. K., Condit, C. M., Hunt, L. M., Koenig, B., Marshall, P., ... & Spicer, P. (2004). Genetic research and health disparities. *Jama*, *291*(24), 2985-2989.

Sartorio, C. (2016). Causation and Free Will.

Schulman, K. A., Berlin, J. A., Harless, W., Kerner, J. F., Sistrunk, S., Gersh, B. J., ... & Eisenberg, J. M. (1999). The effect of race and sex on physicians' recommendations for cardiac catheterization. *New England Journal of Medicine*, *340*(8), 618-626.

Sellers, R. M., Rowley, S. A., Chavous, T. M., Shelton, J. N., & Smith, M. A. (1997). Multidimensional Inventory of Black Identity: A preliminary investigation of reliability and constuct validity. *Journal of personality and social psychology*, *73*(4), 805.

Shariff, A. F., Greene, J. D., Karremans, J. C., Luguri, J. B., Clark, C. J., Schooler, J. W., ... & Vohs, K. D. (2014). Free Will and Punishment A Mechanistic View of Human Nature Reduces Retribution. *Psychological science*, 0956797614534693.

Sloan, F. A., Ayyagari, P., Salm, M., & Grossman, D. (2010). The longevity gap between black

and white men in the United States at the beginning and end of the 20th

century. *American Journal of Public Health*, *100*(2), 357-363.

Smedley, B. D., Stith, A. Y., & Nelson, A. R. (2003). Institute of Medicine, Committee on

Understanding and Eliminating Racial and Ethnic Disparities in Health Care. Unequal

treatment: confronting racial and ethnic disparities in health care.

Smedley, B. D., Stith, A. Y., & Nelson, A. R. (2003). Patient-provider communication: the effect

of race and ethnicity on process and outcomes of healthcare.

Snyder, L. (2012). American College of Physicians ethics manual. *Annals of Internal

Medicine*, *156*(1_Part_2), 73-104.

Staton, L. J., Panda, M., Chen, I., Genao, I., Kurz, J., Pasanen, M., ... & Rosenberg, E. (2007).

When race matters: disagreement in pain perception between patients and their

physicians in primary care. *Journal of the National Medical Association*, *99*(5), 532.

Steck, L. W., Heckert, D. M., & Heckert, D. A. (2003). The salience of racial identity among

African-American and white students. Race and Society, 6(1), 57-73.

Stepanikova, I. (2012). Racial-ethnic biases, time pressure, and medical decisions. *Journal of

health and social behavior*, *53*(3), 329-343.

Stewart, S. T., Cutler, D. M., & Rosen, A. B. (2013). US trends in quality-adjusted life

expectancy from 1987 to 2008: combining national surveys to more broadly track the

health of the nation. *American journal of public health*,*103*(11), 1-10.

Tait, R. C., & Chibnall, J. T. (2014). Racial/ethnic disparities in the assessment and treatment of

pain: psychosocial perspectives. *American Psychologist*, *69*(2), 131.

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. *The social psychology of intergroup relations*, *33*(47), 74.

Valentine, J. A. (2008). Impact of attitudes and beliefs regarding African American sexual behavior on STD prevention and control in African American communities: unintended consequences. *Sexually transmitted diseases*, *35*(12), S23-S29.

Van Inwagen, P. (1975). The incompatibility of free will and determinism. *Philosophical studies*, *27*(3), 185-199.

Van Inwagen, P. (1983). An essay on free will.

Van Inwagen, P. (2008). How to think about the problem of free will. *The Journal of ethics*, *12*(3-4), 327-341.

Van Ryn, M., & Burke, J. (2000). The effect of patient race and socio-economic status on physicians' perceptions of patients. *Social science & medicine*, *50*(6), 813-828.

Van Ryn, M., Burgess, D., Malat, J., & Griffin, J. (2006). Physicians' perceptions of patients' social and behavioral characteristics and race disparities in treatment recommendations for men with coronary artery disease. *American Journal of Public Health*, *96*(2), 351-357.

Van Ryn, M., Burgess, D., Malat, J., & Griffin, J. (2006). Physicians' perceptions of patients' social and behavioral characteristics and race disparities in treatment recommendations for men with coronary artery disease. *American Journal of Public Health*, *96*(2), 351-357.

Voci, A. (2006). The link between identification and in-group favouritism: Effects of threat to social identity and trust-related emotions. *British Journal of Social Psychology*, *45*(2), 265-284.

Vohs, K. D., & Schooler, J. W. (2008). The value of believing in free will encouraging a belief in determinism increases cheating. *Psychological science*, *19*(1), 49-54.

Weitz, R., & Gordon, L. (1993). Images of Black women among Anglo college students. *Sex Roles*, *28*(1-2), 19-34.

Williams, D. R., & Jackson, P. B. (2005). Social sources of racial disparities in health. *Health Affairs*, *24*(2), 325-334.

Wittenbrink, B. (1994). *Stereotypes as social concepts in a knowledge-based approach to categorization* (Doctoral dissertation).

Wittenbrink, B., & Henly, J. R. (1996). Creating social reality: Informational social influence and the content of stereotypic beliefs. *Personality and social psychology bulletin*, *22*(6), 598-610.

Appendix A: Study Description

Study Name: Perceptions of personal control decision-making

Study Type: Hybrid—part online survey part laboratory study

Credits: 1

Duration: 1 hour

Sign-Up Restrictions: None

Abstract: This study examines how perceptions of personal control might influence medical decisions making.

Description: If you decide to be in this study you will be asked to fill out a series of questionnaires assessing personal control beliefs and attitudes towards social groups.

Eligibility Requirements: You must be at least 18 years of age and self-identify as White/European American or Black/African American.

Appendix B: Consent information

Consent Form A (Real Consent Form)

Title: Perceptions of Free Will and Health Care Related Decision Making

VCU IRB NO:

If any information contained in this consent form is not clear, please contact the study staff to explain any information that you do not fully understand. You may take as much time as you need to answer any and all questions asked in this survey.

PURPOSE OF THE STUDY
The purpose of this hybrid online/laboratory based study is to examine how perceptions personal control might effect medically relevant decisions. You are being asked to participate in this study because you have registered on SONA.

DESCRIPTION OF THE STUDY AND YOUR INVOLVEMENT
If you agree to take part in this research study, you will be asked to complete both an online survey and a laboratory session in which you will complete a series of computer survey that includes demographic information as well as questions regarding racial identity, racial perceptions, emotional judgments, and behavioral judgments of others. The survey should take approximately 45-60 minutes to complete. You will NOT be asked to provide any personal information (e.g., name, email, phone number).

RISKS AND DISCOMFORTS
The risk for participating in this research study is minimal. However, some questions may cause some people to feel uncomfortable. You are free to only answer questions that you want to answer. Additionally, taking part in this study is voluntary. You have the right to choose not to take part in this study. You are free to withdraw from participation in this study at any time. If you become upset, contact the study staff and they will give you names of counselors to contact so you can get help in dealing with these issues.

BENEFITS TO YOU AND OTHERS
As a participant in this research study, no direct benefits to you are expected. However, information from this study may be used to benefit other people in the future.

COSTS
There are no costs for participating in this study other than the time you will spend completing the online survey.

PAYMENT FOR PARTICIPATION
You will not be paid for taking part in this study. Instead, you will receive 1 research credits for your participation in this study toward your class requirement or extra credits.

ALTERNATIVES

The alternative is to not participate in the study.

CONFIDENTIALITY
No identifying information will be collected in the main survey. Additionally, once all data are collected, your responses will be reported in aggregate, and individual participants will never be identified.

Access to all data will be limited to study personnel, and data will be stored for five years after the possible publication of research coming from this project---as specified by the American Psychological Association.

We will not tell anyone the answers you give us; however, information from the study of the consent form signed by you may be looked at or copied for research or legal purposes by Virginia Commonwealth University.

What we find from the study maybe presented at meetings or published papers, but your name will never be used in these presentations or papers.

VOLUNTARY PARTICIPATION AND WITHDRAWAL
You do not have to participate in this study. If you choose to participate, you may stop at any time without any penalty. You may also choose not to answer particular questions that are asked in the study.

QUESTIONS
If you have any questions, complaints, or concerns about your participation in this research, contact:

> **Dr. Nao Hagiwara**
> **Department of Psychology**
> **808 West Franklin Street, Room 301**
> **804-828-6822**
> **nhagiwara@vcu.edu**
>
> OR
>
> **Courtney J Alderson**
> **Department of Psychology**
> **aldersoncj@vcu.edu**

The researcher/study staff named above is the best person(s) to call for questions about your participation in this study.

If you have any general questions about your rights as a participant in this or any other research, you may contact:

> Office of Research
> Virginia Commonwealth University

800 East Leigh Street, Suite 113
P.O. Box 980568
Richmond, VA 23298
Telephone: (804) 827-2157

Contact this number for general questions, concerns or complaints about research. You may also call this number if you cannot reach the research team or if you wish to talk with someone else. General information about participation in research studies can also be found at http://www.research.vcu.edu/irb/volunteers.htm.

CONSENT
I have been given the chance to read this consent form. I understand the information about this study. Questions that I wanted to ask about the study have been answered. My signature says that I am willing to participate in this study. I will receive a copy of the consent form once I have agreed to participate.

Printed name: _____   Date: _____

Signature: _____

Witness to consent: _____   Date: _____

Appendix B Cont.

Consent Form B (Bogus Consent Form)

Title: Perceptions of Free Will and Health Care Related Decision Making

VCU IRB NO:

If any information contained in this consent form is not clear, please contact the study staff to explain any information that you do not fully understand. You may take as much time as you need to answer any and all questions asked in this survey.

PURPOSE OF THE STUDY
The purpose of this hybrid online/laboratory based study is to examine how perceptions personal control might effect medically relevant decisions. You are being asked to participate in this study because you have registered on SONA.

DESCRIPTION OF THE STUDY AND YOUR INVOLVEMENT
If you agree to take part in this research study, you will be asked to complete both an online survey and a laboratory session in which you will complete a series of computer survey that includes demographic information as well as questions regarding racial identity, racial perceptions, emotional judgments, and behavioral judgments of others. The survey should take approximately 45-60 minutes to complete. You will NOT be asked to provide any personal information (e.g., name, email, phone number).

RISKS AND DISCOMFORTS
The risk for participating in this research study is minimal. However, some questions may cause some people to feel uncomfortable. You are free to only answer questions that you want to answer. Additionally, taking part in this study is voluntary. You have the right to choose not to take part in this study. You are free to withdraw from participation in this study at any time. If you become upset, contact the study staff and they will give you names of counselors to contact so you can get help in dealing with these issues.

BENEFITS TO YOU AND OTHERS
As a participant in this research study, no direct benefits to you are expected. However, information from this study may be used to benefit other people in the future.

COSTS
There are no costs for participating in this study other than the time you will spend completing the online survey.

PAYMENT FOR PARTICIPATION
You will not be paid for taking part in this study. Instead, you will receive 1 research credits for your participation in this study toward your class requirement or extra credits.

ALTERNATIVES

The alternative is to not participate in the study.

CONFIDENTIALITY
No identifying information will be collected in the main survey. Additionally, once all data are collected, your responses will be reported in aggregate, and individual participants will never be identified.

Access to all data will be limited to study personnel, and data will be stored for five years after the possible publication of research coming from this project---as specified by the American Psychological Association.

We will not tell anyone the answers you give us; however, information from the study of the consent form signed by you may be looked at or copied for research or legal purposes by Virginia Commonwealth University.

What we find from the study maybe presented at meetings or published papers, but your name will never be used in these presentations or papers.

VOLUNTARY PARTICIPATION AND WITHDRAWAL
You do not have to participate in this study. If you choose to participate, you may stop at any time without any penalty. You may also choose not to answer particular questions that are asked in the study.

QUESTIONS
If you have any questions, complaints, or concerns about your participation in this research, contact:

      Dr. Nao Hagiwara
      Department of Psychology
      808 West Franklin Street, Room 301
      804-828-6822
      nhagiwara@vcu.edu

      OR

      Courtney J Alderson
      Department of Psychology
      aldersoncj@vcu.edu

The researcher/study staff named above is the best person(s) to call for questions about your participation in this study.

If you have any general questions about your rights as a participant in this or any other research, you may contact:

      Office of Research
      Virginia Commonwealth University

800 East Leigh Street, Suite 113
P.O. Box 980568
Richmond, VA 23298
Telephone: (804) 827-2157

Contact this number for general questions, concerns or complaints about research. You may also call this number if you cannot reach the research team or if you wish to talk with someone else. General information about participation in research studies can also be found at http://www.research.vcu.edu/irb/volunteers.htm.

CONSENT
I have been given the chance to read this consent form. I understand the information about this study. Questions that I wanted to ask about the study have been answered. My signature says that I am willing to participate in this study. I will receive a copy of the consent form once I have agreed to participate.

Printed name: _____   Date: _____

Signature: _____

Witness to consent: _____   Date: _____

Appendix C: Online Survey Measures

Free Will and Determinism Scale, FAD-Plus (Paulhus & Carey, 2007)

1-----------2-----------3------------4------------5------------6------------7
Strongly agree   Strongly disagree

1. I believe that the future has already been determined by fate.
2. People's biological makeup determines their talents and personality.
3. Chance events seem to be the major cause of human history.
4. People have complete control over the decisions they make.
5. No matter how hard you try, you can't change your destiny.
6. Psychologists and psychiatrists will eventually figure out all human behavior.
7. No one can predict what will happen in this world.
8. People must take full responsibility for any bad choices they make.
9. Fate already has a plan for everyone.
10. Your genes determine your future.
11. Life seems unpredictable - just like throwing dice or flipping a coin.
12. People can overcome any obstacles if they truly want to.
13. Whether people like it or not, mysterious forces seem to move their lives.
14. Science has shown how your past environment created your current intelligence and personality.
15. People are unpredictable.
16. Criminals are totally responsible for the bad things they do.
17. Whatever will be, will be – there's not much you can do about it.
18. As with other animals, human behavior always follows the laws of nature.
19. Luck plays a big role in people's lives.
20. People have complete free will.
21. Parents' character will determine the character of their children.
22. What happens to people is a matter of chance.
23. People are always at fault for their bad behavior.
24. Childhood environment will determine your success as an adult.
25. Life is hard to predict because it is almost totally random.
26. Strength of mind can always overcome the body's desires.
27. People's futures cannot be predicted.

Free will subscale from the Free Will and Determinism Scale, (Rakos et al., 2008)

1-----------2-----------3------------4------------5------------6------------7
Strongly agree   Strongly disagree

1. Free will is a part of the human spirit.
2. Free will is a basic part of human nature
3. People have free will regardless of wealth or life circumstances.
4. Life's experiences cannot eliminate a person's free will.

Free Will Subscale from the Free Will Inventory, FWI (Nadelhoffer et al., 2014)

1-----------2-----------3------------4------------5------------6------------7
Strongly agree   Strongly disagree

1. People always have the ability to do otherwise.
2. People always have free will.
3. People ultimately have complete control over their decisions and their actions.
4. People have free will even when their choices are completely limited by external circumstances.

Multidimensional Locus of Control Scale (Levenson, 1973)

1-----------2-----------3------------4------------5------------6------------7
Strongly agree   Strongly disagree

1. Whether or not I get to be a leader depends mostly on my ability.
2. To a great extent my life is controlled by accidental happenings.
3. I feel like what happens in my life is mostly determined by powerful people.
4. Whether or not I get into a car accident depends mostly on how good a driver I am.
5. When I make plans, I am almost certain to make them work.
6. Often there is no chance of protecting my personal interests from bad luck.
7. When I get what I want, it's usually because I'm lucky.
8. Although I might have good ability, I will not be given leadership responsibility without appealing to those in positions of power.
9. How many friends I have depends on how nice a person I am.
10. I have often found that what is going to happen will happen.
11. My life is chiefly controlled by powerful others.
12. Whether or not I get into a car accident is mostly a matter of luck.
13. People like myself have very little chance of protecting our personal interests when they conflict with those of strong pressure groups.
14. It's not always wise for me to plan too far ahead because many things turn out to be a matter of good or bad fortune.
15. Getting what I want requires pleasing those people above me.
16. Whether or not I get to be a leader depends on whether I'm lucky enough to be in the right place at the right time.
17. If important people were to decide they didn't like me, I probably wouldn't make many friends.
18. I can pretty much determine what will happen in my life.
19. I am usually able to protect my personal interests.
20. Whether or not I get into a car accident depends mostly on the other driver.
21. When I get what I want, it's usually because I worked hard for it.
22. In order to have my plans work, I make sure that they fit in with the desires of people who have power over me.
23. My life is determined by my own actions.
    It's chiefly a matter of fate whether or not I have a few friends or many friends.

Racial Identity (Luhtanene & Crocker, 1992)

1-----------2-----------3-----------4-----------5-----------6-----------7
Strongly agree   Strongly disagree

1. Overall, my racial group membership has very little to do with how I feel about myself.
2. The racial group I belong to is an important reflection of who I am.
3. The racial group I belong to is unimportant to my sense of what kind of person I am.
4. In general, belonging to my racial group is an important part of my self-image.

Racial Attitudes Thermometer Scale

These next questions are about your feelings about some of the different groups in the United States. Please rate the group on a thermometer that runs from zero (0) to one hundred (100). The higher the number, the warmer or more favorable you feel toward that group. The lower the number, the colder or less favorable you feel toward that group. If you feel neither warm nor cold toward that group, rate it a fifty (50).

0—5—10—15—20—25—30—35—40—45—50—55—60—65—70—75—80—85—90—95—100
Very   Neither   Very
Cold   Warm nor Cold   Warm

African Americans
Asian Americans
Latinx Americans
Native Americans
Whites Americans
Teenagers
Muslims
Christians
Atheists
Lawyers
Doctors
Teachers
Immigrants

Demographics

1. How old are you (in years)
          ___ years
2. What is your gender
   - Male
   - Female
   - Transgender—identify as Male
   - Transgender—identify as Female
   - Would rather not say

3. With which race(s) do you most closely identify (Check all that apply)
   - White/Caucasian American
   - Black/African American
   - Asian American
   - Latinx American
   - Native American
   - International Student
   - Multiracial/Other
        If Multiracial/Other was chosen, please indicate here _____

4. What is your class standing?

   - Freshman (<24 credits)
   - Sophomore (24-53 credits)
   - Junior (54-84 credits)
   - Senior (>85 credits)
   - Other

5. What is your major?
   _____

6. What is your religious affiliation?
   - Christian
   - Jewish
   - Muslim
   - Buddhist
   - Hindu
   - Atheist
   - Agnostic
   - Unsure
   - Other
      - If Other was chosen, please indicate here _____

Appendix D: CAD education materials before vignette

In the following section, you will read about some information regarding medical procedures for patients with Coronary Heart Disease, please read carefully.

Coronary Heart Disease is a condition that results from the buildup of large amounts of plaque and fat in the heart's arteries. This plaque buildup then begins to destroy the arteries around the heart which serves to drastically increase the risk of heart attack. Two types of surgical procedures are available to help with coronary heart disease.

In *procedure 1*, the plaque is removed and a balloon like object is placed in the artery to open it up and support the damaged artery. This allows for improved blood flow to and from the heart. This process (*procedure 1*) is repeated for every blocked artery. This procedure is less intense than others. Patients are only mildly sedated for the procedure and rarely stay in the hospital long. This procedure is also less demanding of the patient because doctors' guidelines for recovering well from the procedure are easy to follow. Though this procedure works, it is considered by some medical professionals to be a less permanent or even less reliable fix than *procedure 2*.

In *procedure 2* the surgeon takes part of a 'healthy' blood vessel from a leg, chest, or arm to create a detour around the problem/damaged artery of the heart. This forms a new path for blood flow. This process is repeated for every blocked artery. *Procedure 2* is a much more invasive surgical procedure. It requires full anesthesia (being put to sleep) and up to 7 days in the hospital for recovery. A full recovery from *procedure 2* takes about 3 months. This procedure is much harder for the patient in terms of following the doctor's orders. Recovery from this procedure requires more of the patient because they have to follow through with taking more medications, exercising more, and eating healthier. Though this procedure is considered a permanent and more reliable fix than *procedure 1* serious health effects and complications could arise if the patient does not strictly follow doctor's orders.

Doctors' recommendations for *procedure 1* vs. *procedure 2* are based on the severity of the disease, as well as, specific characteristics of the patient. Important considerations for the doctor are the patient's previous and present health behaviors. These behaviors include smoking, diet, exercise habits, and if the patient has other health conditions under control (e.g. diabetes). One of the most important considerations for the doctor when considering *procedure 1* vs. *procedure 2* for a patient is the patient's ability and/or likelihood to follow what the doctor says and orders.

CAD education attention-check questions
The next set of questions will help us confirm that you were able to understand the difference between the two medical procedures. Please answer *True* or *False* to the following questions:
   1   *Procedure 1* is less demanding of the participant than *Procedure 2* _____
   2   *Procedure 1* has a shorter recovery time than *Procedure 2* _____
   3   *Procedure 1* is considered to be a more reliable fix than *Procedure 2* _____
   4   *Procedure 1* requires more exercising from the patient than *Procedure 2* _____

Appendix E: Vignette

In the following section, you will read a short description about an encounter between a doctor and a patient. Please IMAGINE THAT YOU ARE THE DOCTOR in the story. Try to think about how you would treat the patient.

White Patient:
Imagine that you are interacting with *Mr. Jake Miller*, a 55-year old, Caucasian Male, who may need to receive heart surgery. Although *Mr. Miller's* diet and exercise habits are not the best, they are not the worst you've seen. *Mr. Miller* is overweight (i.e., BMI = 30) and goes for a 30-minute evening walk once or twice a week. *Mr. Miller* also takes his heart medications regularly—as often as he remembers, but occasionally he forgets. Over the course of his struggle with heart disease, *Mr. Miller* ended up getting a heart attack. Mr. Miller is seeking your medical advice regarding the best outcome for his personal situation. *Mr. Miller's* condition might warrant Procedure 2 over Procedure 1, if you are convinced that he has the ability to follow the strict behavioral requirements that are needed to have a safe and successful outcome.

Black Patient:
Imagine that you are interacting with *Mr. DeShawn Washington*, a 55-year old, African American Male, who may need to receive heart surgery. Although *Mr. Washington's* diet and exercise habits are not the best, they are not the worst you've seen. *Mr. Washington* is overweight (i.e., BMI = 30) and goes for a 30-minute evening walk once or twice a week. *Mr. Washington* also takes his heart medications regularly—as often as he remembers, but occasionally he forgets. Over the course of his struggle with heart disease, *Mr. Washington* ended up getting a heart attack. Mr. Washington is seeking your medical advice regarding the best outcome for his personal situation. *Mr. Washington's* condition might warrant Procedure 2 over Procedure 1, if you are convinced that he has the ability to follow the strict behavioral requirements that are needed to have a safe and successful outcome.

Appendix F: Vignette response questions

Patient free will questions

1-----------2-----------3------------4------------5------------6------------7
Strongly agree   Strongly disagree

1. I think Mr. Miller/Washington has free will.
2. I think Mr. Miller/Washington is in control of his behavior.
3. I think Mr. Miller/Washington is weak willed.
4. I think Mr. Miller/Washington is in control of acting on his desires.
5. *I think Mr. Miller's/Washington's future is completely set.
6. I think Miller's/Washington's future is full of possibilities.
7. I think Mr. Miller's/Washington's past could have worked out differently.
8. I think Mr. Miller's/Washington's past behavior could have been different.
9. I think Mr. Miller/Washington is in control of his desires.
10. I think Mr. Miller/Washington controls his behavioral intentions.
11. I think Mr. Miller's/Washington's health related behavior before his heart attack could have been different.
12. I think Mr. Miller/Washington could have made different decisions that may have changed the nature of his heart attack.
13. I think there are many possibilities regarding Mr. Miller's/Washington's health related behavior after he gets treated.
14. *I think Mr. Miller/Washington can do good health behaviors or bad health behaviors after he gets treated---it's simply up to him.
   *indicates the item was dropped from the final measure due to a factor loading < 3.5.

Patient treatment related self-control questions

1-----------2-----------3------------4------------5------------6------------7
Strongly agree   Strongly disagree

1. I think Mr. Miller/Washington will be able to follow the strict behavioral requirements for Procedure 2.
2. I don't think that Mr. Miller/Washington has the kind of behavioral control that is required by Procedure 2.
3. I think Mr. Miller/Washington will obey all treatment recommendations.
4. I think Mr. Miller/Washington wants to be a good patient and will therefore be a good patient.
5. I think Mr. Miller/Washington wants to be healthy and will therefore be a good patient.

Treatment decision questions

1-----------2-----------3------------4------------5------------6------------7
Strongly agree   Strongly disagree

1. I think that *procedure 1* is best for Mr. Miller/Washington.
2. I think that *procedure 2* is best for Mr. Miller/Washington.

The following a priori scales were those that were originally proposed.

Target free will questions

1-----------2-----------3-----------4-----------5-----------6-----------7
Strongly agree   Strongly disagree

1 I think Mr. Miller/Washington has free will.
2 I think Mr. Miller/Washington is in control of their behavior.
3 I think Mr. Miller/Washington is weak willed.
4 I think Mr. Miller/Washington is in control of acting on their desires.
5 I think Mr. Miller/Washington's future is completely set.
6 I think Mr. Miller/Washington's future is full of possibilities.
7 I think Mr. Miller/Washington's past could have worked out differently.
8 I think Mr. Miller/Washington's past behavior could have been different.
9 I think Mr. Miller/Washington is in control of their desires.
10 I think Mr. Miller/Washington controls their behavioral intentions.

Treatment decision related free will questions

1-----------2-----------3-----------4-----------5-----------6-----------7
Strongly agree   Strongly disagree

1 I think Mr. Miller/Washington will be able to follow the strict behavioral requirements for *procedure 2*.
2 I don't think that Mr. Miller/Washington has the kind of behavioral control that is required by *procedure 2*.
3 I think Mr. Miller/Washington's health related behavior before their heart attack could have been different.
4 I think Mr. Miller/Washington could have made different decisions that may have changed the nature of their heart attack.
5 I think Mr. Miller/Washington will obey all treatment recommendations.
6 I think Mr. Miller/Washington wants to be a good patient and will therefore be a good patient.
7 I think Mr. Miller/Washington wants to be healthy and will therefore be a good patient.

Appendix G: Debriefing Information

Debriefing Form: Lab Study 1

Debriefing: Executive Functioning Study

Thank you for participating in this study. In our laboratory, we are examining how beliefs about personal control influence executive functioning. Prior research has shown that stronger beliefs in personal control result in increased stamina when performing difficult tasks. A particularly difficult task to perform is the implicit association test (IAT). While past research has shown that this test measures one's implicit prejudices, it has recently been shown to simply be measure of executive functioning (i.e., effortful thinking). Because the IAT is a difficult task to perform (as you may have realized) it is actually a better measure of concentration and mental stamina than it is of racial bias.

We are investigating what factors contribute to differences in the ability to perform mentally taxing tasks well over long periods of time. The study you just participated in attempts to address this issue. Specifically, we are interested in exploring whether people who have stronger beliefs in personal control would be able to perform the IAT more proficiently than those who have weaker beliefs in personal control.

Thank you again for taking part in this study. Your participation is extremely valuable in helping us make progress in the scientific study of effortful mental processes and functioning. The knowledge gained through studies such as this can help the scientific community better understand the non-pharmacological ways of stimulating attentional abilities. Again, this research mission would not be possible without your assistance.

Finally, if you would like more information about research on personal control and executive functioning or have further questions about the study, please feel free to contact the persons listed below.

Courtney J Alderson, Graduate Student in Psychology, Virginia Commonwealth University, e-mail: aldersoncj@vcu.edu

Dr. Nao Hagiwara at Department of Psychology, Virginia Commonwealth University, 808 West Franklin Street Room 301, Richmond, VA 23284
phone: 804-828-6822
e-mail: nhagiwara@vcu.edu.

Appendix G Cont.

Final Debriefing Form

Debriefing: Biased Perceptions of Free Will Study

Thank you for participating in this study. In our laboratory, we are examining the psychology of intergroup relations and health outcomes. Prior research has shown that implicit biases on behalf of physicians can affect treatment decisions. One of the goals of our research lab is to identify specific psychosocial mechanisms that cause physicians to make disparate treatment decisions for racial minority patients. Prior research indicates that our perceptions of free will are affected by a self-serving bias. Such that, people think they have more free will than others do. Using Social Identity Theory, the main goal in this research is to see if the self-serving free will bias can be extended to the us vs. them paradigm. Specifically, will people think that their ingroup members have more free will than their outgroup members? If the answer to this question is yes, then we hypothesize that this ingroup/outgroup free will bias functions in physicians and results racially biased treatment disparities. We posit that the ingroup/outgroup free will bias may be one reason that White physicians sometimes view their Black patients as less able to adhere to treatment recommendations than their White patients—a problem already identified in the health disparities literature.

In the present study you were asked to do the following: fill out an online survey assessing your free will beliefs and explicit racial attitudes, come into the lab to take the IAT (a measure of implicit racial attitudes), and then engage in a vignette task wherein you were to imagine that you were a physician making a treatment decision for a patient. That data you provided us with today will enable us to find out if there is indeed an ingroup/outgroup free will bias. If so, we will be able to use this knowledge in further research using physician samples.

It is important to note that **deception** *was used in this study*. The deception was our telling you that the laboratory session was for two different studies. To be clear, the previous debriefing form was a sham--we were indeed using the IAT to measure implicit racial attitudes, not executive functioning. We used deception because we felt that it was necessary for the attainment of accurate responses regarding the vignette task. You are reminded that you may withdraw your data from the study at anytime.

We recognize that questions addressed in this study are of a very sensitive nature, and that you may have felt uncomfortable answering some of our questions. However, we believe that the knowledge gained through studies such as this can help to better understand the mechanisms of intergroup bias and their discriminatory effects which will allow us to design interventions for people's health—a research mission that would not be possible without your help.

Thank you again for taking part in this study, your participation is extremely valuable. If you have lingering concerns or discomfort about participating in this experiment, please contact one of the experimenters listed below.

Courtney J Alderson, Graduate Student in Psychology, Virginia Commonwealth University,
e-mail: aldersoncj@vcu.edu

Dr. Nao Hagiwara at Department of Psychology, Virginia Commonwealth University, 808 West Franklin Street Room 301, Richmond, VA 23284
phone: 804-828-6822
e-mail: nhagiwara@vcu.edu.