CAN MINDFULNESS MEDITATION REDUCE IMPLICIT RACIAL BIAS?: BODY SCAN AND LOVINGKINDNESS PRACTICES

A Dissertation Presented to

the Faculty of John F. Kennedy University

PsyD Program

In Partial Fulfillment

of the Requirements for the Degree of

Doctor of Psychology

By

Benjamin Korsmo

JANUARY 2019

CAN MINDFULNESS MEDITATION REDUCE IMPLICIT RACIAL BIAS?: BODY SCAN AND LOVINGKINDNESS PRACTICES

This dissertation by Benjamin Korsmo has been approved by the committee members, who recommend that it be accepted by the faculty of John F. Kennedy University, Pleasant Hill, California, in partial fulfillment of the requirements for the degree of

DOCTOR OF PSYCHOLOGY

_____

David Henry Peterzell, PhD, PhD, Chair

_____

Alvin McLean, PhD, Reader

_____

Exact Date of Dissertation Defense

ABSTRACT

CAN MINDFULNESS MEDITATION REDUCE IMPLICIT RACIAL BIAS?: BODY SCAN AND LOVINGKINDNESS PRACTICES

BENJAMIN KORSMO

John F. Kennedy University
College of Psychology
Pleasant Hill, CA

Seventy to 80% of White Americans exhibit a strong implicit racial bias favoring Whites versus Blacks as measured by the Implicit Association Test (IAT). Individual differences in this bias sometimes predict discriminatory decision-making by police, judges, juries, and medical doctors. These undesirable biases are typically robust and resist modification.

Three recent studies of college undergraduates found that body scan (BSM) and loving-kindness (LKM) meditation can reduce implicit black/white racial bias compared to control conditions. The current study attempted to replicate and extend the results of the three prior studies by diversifying the sample of Whites and by attempting to match audio mindfulness interventions for voice quality, interestingness, and pace, across all experimental conditions.

In an online study, 82 white, non-Hispanic adults were randomized to one of six conditions including two meditation conditions and one control condition, each with 2 stimulus-ordering conditions (3x2 between-subjects factorial design). Conditions contained 6-minute audio interventions of either a lecture without meditation (control group), BSM, or LKM. In addition to completing the race IAT, participants reported their explicit racial bias using the Internal and External Motivation to Respond without Prejudice Scales (IMS & EMS).

As with previous studies, this one found that most white participants exhibit implicit racial bias, with 70% exhibiting a slight to moderate pro-white preference. A 3x2 ANOVA revealed that BSM and LKM did not reduce implicit bias, contrary to previous studies and this study's main hypotheses. However, a different pattern emerged from a specific comparison that

examined *absolute values* of implicit bias (/*D*/ the amount of bias regardless of white or black preference). This second analysis indicated that LKM participants' total IAT scores were significantly closer to zero bias than the control condition.

This study provides mixed results regarding the influence of mindfulness practices on implicit racial bias. Previous results were not replicated, however, a significant reduction of both pro-white and pro-black implicit bias was exhibited in the LKM condition compared to controls. To make strong claims about mindfulness meditation's ability to reduce bias, future studies must better control potentially confounding variables.

KEYWORDS: "Implicit memory," "Implicit attitudes," "Mindfulness," "Meditation," "Response bias," "Prejudice,"

DEDICATION

This dissertation is dedicated to the many faithful and encouraging supporters of my development to become a psychologist. First and foremost, my rock, love of my life, soul mate, best friend, my girlfriend, and partner in crime Danielle. My daughter: there is no limit to the inspiration, joy, love, and awe you bring to my life. To my parents: I am forever grateful for your love, nurturance, patience, and encouragement. To my wife's parents, Jeff and Diane: your encouragement, cheer, love, and commitment have been a precious gift.

ACKNOWLEDGEMENTS

Thank you Dr. Peterzell and Dr. McLean. I am very grateful for your faith in my ability to complete a complex and rich study. This project has impacted my development more than any other endeavor, and I believe it will be a vital contribution to the literature. Thanks to Dr. Marina Dorian for her contribution and interest in this topic.

Dr. Peterzell: It has been an honor and privilege to produce a dissertation with such an accomplished scientist, scholar, and clinician as yourself. Our work together was my baptism by fire in research methods, statistics, and scientific writing. Your encouragement has "*significantly*" contributed to my confidence as a researcher. I earnestly look forward to our continued efforts to conduct research and contribute publications.

Table of Contents

List of Tables

Page

List of Figures

Page

Chapter I

Introduction

Explicitly racist attitudes of white Americans toward black Americans have rapidly declined since the 1950s toward neutral, non-racist attitudes (Charlesworth & Banaji, 2019). Explicit racism and prejudice in Whites, while known to still exist, have become increasingly covert (Amodio, 2018). However, "implicit" racial biases favoring Whites over Blacks are found in 70-80% of Whites in North America (Charlesworth & Banaji, 2019; Nosek et al., 2007).

Implicit racial bias is a silent, invisible, and often unconscious source of racial prejudice and discrimination. Just as memories and learning can be inaccessible to awareness yet influence actions, as with “implicit memories,” so can biases regarding race be implicit (Greenwald & Banaji, 1995). Such implicit biases about race persist regardless of individuals’ level of awareness or the social undesirability of these biases. They are linked to discriminatory decisions, behavior, stereotypes, and attitudes, despite one's explicit egalitarian non-prejudiced principles (Greenwald & Krieger, 2006; Greenwald, Poehlman, Uhlmann, & Banaji, 2009).

Implicit racial bias has been implicated in high-stakes errors in decision making (Greenwald & Krieger, 2006; Dorian & Peterzell, 2016; Dorian, Humphery, Korsmo, & Peterzell, 2017; Oswald et al., 2013). Research implicates implicit racial bias in instances of police officers' use of lethal force (Hehman, Flake, & Calanchini, 2018), in plea deals and charge reductions in the criminal justice system (Metcalfe & Chiricos, 2018), and in medical doctors' making different medical decisions for Blacks and Whites (Green et al., 2007). Studies of mock juries and medical doctors have found implicit racial bias to be predictive of discriminatory decisions (Rachlinski et al., 2008; Green et al., 2007; Sabin, & Greenwald, 2012; Levinson, Cai, & Young, 2010).

Since the creation of the Implicit Association Test (IAT) for measuring implicit racial bias (Greenwald & Banaji, 1995) researchers have continued to find implicit racial biases to be robust and resistant to change (Marini, Banaji & Pascual-Leone, 2018). A diverse range of attempts have been made to lower IAT scores. Interventions varying from administering subjects with a drug (beta blocker), to applying non-invasive brain stimulation, to teaching test strategies. IAT scores are significantly reduced, however, only temporarily (Terbeck et al., 2012; Marini et al., 2018; Lai et al., 2016). Essentially, in the absence of the intervention, scores return to the pre-intervention levels in less than a few hours.

Recently, researchers have hypothesized that mindfulness and meditation practices can reduce implicit racial bias (Kang, Dovidio, & Gray, 2014; Lueke & Gibson, 2015; Dorian & Peterzell, 2016; Dorian et al., 2017; Stell & Farsides, 2016). Three studies have examined the hypothesis and are summarized here and in more detail in the next chapter. Lueke and Gibson (2015) randomized 72 white undergraduates to 10 minutes of listening to either a body scan meditation (BSM) or a recording with no meditation instructions (active control). Implicit racial bias, as measured using the race IAT, was significantly lower in the BSM condition than the control group (Figure 1A). Similarly, Stell and Farsides (2016) randomized 71 white undergraduates to 7 minutes of Lovingkindness meditation (LKM) or to a control presentation. Implicit racial bias, as measured using the race IAT, was significantly lower in the LKM condition than the control group (Figure 1B). Kang et al. (2014) randomized a diverse sample of 103 undergraduates (61% white) to six weeks of either LKM training plus LKM practice, or LKM discussion group without LKM practice (control), or a waitlist control condition. Although participants in all conditions, on average, did not show significant implicit racial bias on the IAT at baseline (i.e., the beginning of the study), participants in the experimental condition shifted their bias to a pro-black/anti-white bias (Figure 1C). Kang et al. (2014) and others have

misinterpreted their main result as a reduction in implicit racial bias toward Blacks (Parks, Birtel, & Crisp, 2014; Lueke & Gibson, 2015; Stell & Farsides, 2016). *This widely-cited interpretation, however, is clearly in error*. Technically, the reduction in bias toward Blacks became an increase in bias toward Whites.

In the current study, 82 white, non-Hispanic adults (ages 20-70) were randomized to one of three 6-minute audio interventions and completed the race IAT. Two experimental conditions included either a BSM or LKM, while the control condition included a lecture on mindfulness. After the six minutes, participants completed the race IAT, and then reported their explicit racial bias using the Internal and External Motivation to Respond without Prejudice Scales (IMS & EMS). Block randomization was used to assign each of the 82 participants into one of six conditions, including the three mindfulness conditions (control, BSM, LKM) and two counterbalanced orderings of the IAT (i.e., 3 X 2 between-subjects factorial design).

The current study attempted to replicate and extend the results of the three prior studies by diversifying the sample of Whites and by attempting to match voice quality, interestingness, and pace across recordings for all experimental conditions. Participants in all conditions listened to the same narrator (John Kabat-Zinn, a preeminent practitioner, teacher, and researcher of mindfulness and meditation). In the active control condition, participants heard a published lecture on mindfulness without meditation instructions, whereas the other recordings included edited segments of published BSM and LKM recordings (Segal, Williams, & Teasdale, 2018; Kabat-Zinn, 2012).

First, it was hypothesized (**Hypothesis 1**) that 70% to 80% of white participants would exhibit pro-white implicit racial bias, at least in the control condition, consistent with previous studies. Since the original studies on implicit racial bias in Whites (Greenwald & Banaji, 1995), this finding has been replicated frequently, including two of the meditation studies cited above.

More importantly, it was hypothesized that the BSM would reduce implicit racial bias compared to controls (**Hypothesis 2**) and that the LKM would reduce implicit racial bias compared to controls (**Hypothesis 3**). These findings would be consistent with the previous studies shown in the top two panels of Figure 1.

However, if mindfulness practices reduce any and all implicit racial biases (i.e., pro-black as well as pro-white), thereby producing neutral implicit attitudes (scores essentially 0), then two additional hypotheses emerge, and were tested. It was hypothesized that the BSM would reduce *any* implicit racial bias compared to controls (**Hypothesis 4**) and that the LKM would reduce *any* implicit racial bias compared to controls (**Hypothesis 5**).

Overall, this study demonstrated the need for tighter control of potentially confounding variables and will be a benchmark of findings that will guide future research of mindfulness and implicit racial bias and spark a deeper analysis of prior studies.

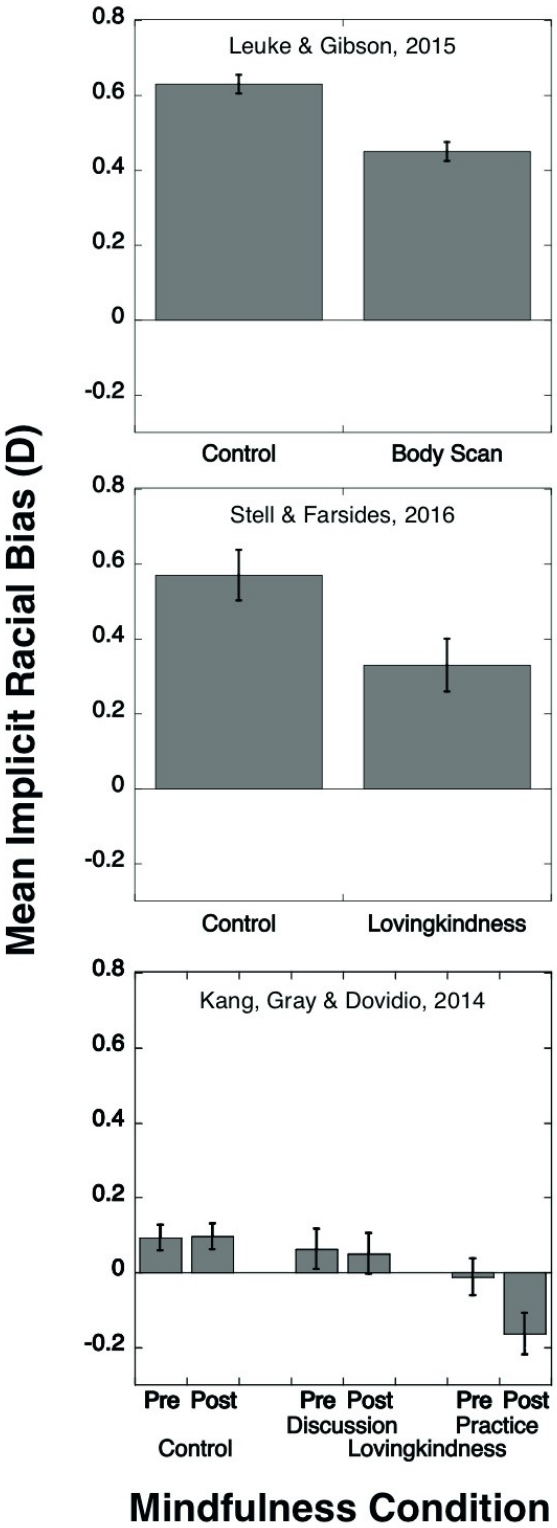


Figure 1. Mean implicit racial bias (*D*) scores from the Implicit Association Test (IAT) for individuals assigned to either a control condition or "mindfulness meditation" conditions from three studies. Bars denote +1 *SE*. Positive values denote a detection bias against blacks and favoring whites, whereas negative values denote a bias against whites and favoring blacks. For all conditions in all studies, *n* was between 33 and 37 participants.

Chapter II

Literature Review

Implicit and Explicit Memory

Implicit memory is the mental processes outside of one's awareness that are unavailable to report. A behavior, an attitude, or an action can be influenced by past experiences, yet the influential experience cannot necessarily be recalled or declared, thus, essentially unconscious (Greenwald & Banaji, 1995). Broadly speaking, memory affects performance, however, the entirety of memory is not fully accessible to the scope of our attention, even though it is influencing our behavior (Greenwald, 1992).

A precursor to the concept of implicit memory, was observations in the 1970s of Korsakoff Syndrome patients with amnesia that could be taught new tasks, however, had no recollection of being taught the task. Mainly, the observation was that practice improved performance, even though, there was no recall of practice (Greenwald & Banaji, 2017). These anecdotes led to the hallmark experiment by Graf and Schacter (1985) that demonstrated normal subjects and amnestic patients could successfully learn new associations between word pairs, independent of their ability to recall the words that they learned earlier. The normal subjects scored significantly higher on cued recall of the words they learned, compared to amnestic patients that scored significantly lower on cued recall, however, both conditions did not differ at demonstrating learned word pairs (Graf & Schacter, 1985).

The initial concept was that implicit memory was unconscious and explicit memory was conscious, however, more precisely and less Freudian, Greenwald and Banaji (2017) conceptualized implicit memory as an indirect process and explicit memory as a direct process. An indirect example would be to present some subjects the word SCRAPPLE on day 1 and to administer a timed word completion task on day 2, such as SCRA_ _ _ _. Subjects presented SCRAPPLE on day

1 would complete the task faster than subjects that were not presented SCRAPPLE on day 1. This is an indirect measure of an experience influencing present performance, therefore implicit. Asking, “did you see the word SCRAPPLE on day 1?” is a direct approach, and thus, explicit, since it is directed recall of the past experience that influenced a reaction time (Greenwald & Banaji, 2017).

Implicit Social Cognition

Our minds form representations of others and groups implicitly and explicitly. These representations are not necessarily objective, rather, they are working models of the social world that influence social perception, judgement, and behavior. Social cognition is "concerned with the mental processes through which we perceive, think about, and act toward other people and in response to situational factors" (Amodio, 2018, p. 23). Numerous mental operations in social cognition are implicit. Multiple disciplines have put forth dual process models that bifurcated mental operations into conscious, controlled, directable and explicit processes and unconscious, automatic, unknown, and implicit processes (Nosek, Hawkins, & Frazier, 2011). Stanovich, West, and Toplak (2014) listed 27 different dual process models in the literature regarding cognition. A step beyond dual process models, is a model of associated brain networks.

In addition to implicit and explicit learning and memory (dual process model), the more recent concept is that there are associated and dissociated networks of memory systems in social cognition. For example, implicit prejudice is thought to be a separate neural network than implicit stereotyping. Explicit prejudice is found in a system of declarative memory, however, potentially is utterly unassociated with implicit prejudice and stereotyping. For example, Gilbert, Swencionis, and Amodio, (2012) designed a study to examine the neural networks involved in a task of making racial stereotypical judgements while viewing white and black faces being scanned by fMRI. Then, subjects completed the race IAT and a race stereotyping IAT. Both

IATs were not correlated with each other, however, both were correlated with activations of specific neural networks. The findings were thought to demonstrate the tremendous complexities of social cognition and that it is malleable and highly context dependent when race is involved (Gilbert, Swencionis, & Amodio, 2012; Amodio, 2018).

Historically, social psychology studied constructs that were available via self-report and considered valid and measurable by quantitative measures. Greenwald and Banaji (1995) introduced the term implicit social cognition to describe the implicit processes that make up attitudes, stereotypes, social perceptions, judgments, and behavior that are unknown, unavailable, or inaccurate for self-report (Nosek, Hawkins, & Frazier, 2011).

Implicit Attitudes and Stereotypes

An attitude is a prevailing tendency to categorize a social object as positive or negative. It is a consistent judgement of 'good' or 'bad' upon a social perception. Missing from classic definitions of attitudes was the automatic and implicit qualities of them. Researchers sought to find predictive validity of quantitatively measured attitudes and correlations with behavior, however, only found weak relationships. In some cases, an explicit attitude predicted behavior, however, in other situations, behavior was contrary to the same explicit attitude (Greenwald & Banaji, 1995). Greenwald and Banaji (1995) defined implicit attitudes as "introspectively unidentified (or inaccurately identified) traces of past experience that mediate favorable or unfavorable feeling, thought, or action toward social objects" (p. 8).

Implicit stereotypes are "the introspectively unidentified (or inaccurately identified) traces of past experience that mediate attributions of qualities to members of a social category" (Greenwald & Banaji, 1995, p. 15). Greenwald and Banaji (1995) illustrated this definition using the category of cheerleaders. The category cheerleaders could have attributions of athletic (posi-

tive), extroverted (positive), and physically attractive (positive), as well as attributions of unintelligent (negative) and pretentious (negative). Thus, in the presence of a cheerleader, a person that held these attributions about cheerleaders (likely unconsciously), would behave as if these attributions of cheerleaders were true.

Implicit Racial Bias

Implicit stereotypes are unconscious representations of others that are not necessarily accurate, fair, or objective. Behavior is implicitly influenced by these representations outside of awareness. Bias, like an attitude, is persistent valence and tendency to operate prejudiciously. Greenwald and Krieger (2006) stated: "Implicit biases are discriminatory biases based on implicit attitudes or implicit stereotypes. Implicit biases are especially intriguing, and also especially problematic, because they can produce behavior that diverges from a person's avowed or endorsed beliefs or principles" (p. 951).

Old fashion racism is nearing extinction and explicit attitudes and stereotypes have rapidly changed in the last few decades, however, prejudice and discrimination continue to exist, especially towards Black Americans. Implicit racial bias is a silent and invisible influencer of racial prejudice and discrimination. On average, 70-80% of White Americans exhibit a strong, pro-white bias, more than any other race or ethnic group (Nosek, Banaji, & Greenwald, 2002).

Measurement of implicit social cognition

The weak correlations between explicit attitudes and behavior, and Greenwald and Banaji's (1995) theoretical contributions called for the creation of implicit measures of attitudes. A precursor to implicit measures was Bargh and Pietromonaco's (1982) landmark study, that found social judgements are influenced outside of awareness and affect behavior. Subjects that were exposed to 0%, 20%, or 80% of hostile words on a computer screen for 100 milliseconds at a

time. In a recognition test, all subjects virtually failed to recall words they were exposed to, regardless of the percentage of hostile words they were exposed to. A control condition tasked participants to only guess the same words on screen and they did not differ in recall performance from the test condition. Subjects were then asked to rate a stimulus person on positive and negative traits. Negative and hostile ratings of the stimulus person were directly related and proportional to the percentage of hostile words participants were exposed to.

Building on Bargh and Pietromonaco's (1982) findings, Fazio et al. (1986) tasked subjects to categorize words as pleasant or unpleasant on a computer keyboard. A prime word was presented for 300 ms immediately before a word categorization task. Subjects were asked to remember the prime word in order to repeat it out loud after the key press. The prime words had a positive or negative valence. It was hypothesized that performance could be influenced through priming. It was predicted that reaction times and accuracy would be affected by the valence and degree of valence of the prime word, thus affecting the performance. They found that pleasant words were categorized more accurately and faster if primed by a positive word. The effect of priming increased in proportion to the strength of valence of the prime word. Fazio et al.'s (1986) use of latencies (reaction times) became a mainstay in the measurement and research of automatic responses and prediction of behavior (Greenwald & Banaji, 2017).

Also using reaction times to measure behavior, Dovidio, Evans, and Tyler (1986) conducted a priming experiment using the racial categories black and white. Subjects were timed to respond via a response key whether a positive or negative stereotypic word describing a black or white person would "ever be true" or "always false." Prior to being presented stereotypic words, subjects were primed with either the category 'black' or 'white.' Their findings were that priming categories black and white facilitated significantly faster reaction times to categorizing stereotyp-

ical traits belonging to black and white. Additionally, there were stronger associations with positive characteristics and Whites, more so than Blacks, and stronger associations with negative characteristics and Blacks, more so than Whites. The use of reaction times and the findings of Fazio et al. (1986) and Dovidio et al. (1986) were the foundations for the Implicit Association Test (IAT).

The Implicit Association Test (IAT)

The IAT measures the difference in strength of associations between two concepts and an attribute by comparing reaction times in a categorization task. Prior research used priming to affect reaction times, however, using the IAT, without any priming, the strength of underlying attitudes, unavailable for self-report, could be measured.

The first IAT assigned the word "flowers" and pleasant words to one computer key and the word "insects" and unpleasant words to another key. Subjects categorized flowers and pleasant words, on average, 300 ms faster than insects and unpleasant words. It was assumed, that the differences in reaction times was a measure of the strength of the associations between flowers and good/bad, and insects and good/bad, thus, an indirect measure of an implicit attitude. (Greenwald, McGhee, & Schwartz, 1998; Greenwald & Banaji, 2017).

A revolutionary early finding was when stereotypical white names and pleasant words shared one key and stereotypical black names and unpleasant shared another key, self-proclaimed non-prejudiced white subjects reacted significantly faster to white names and pleasant words versus black names and unpleasant words. White subjects' preference for white names versus black names was stronger than results from the strength of preferences found in two earlier IAT experiments measuring strength of preferences for Japanese versus Korean, and flowers versus insects. Additionally, IAT scores and explicit measures of racial attitudes were weakly correlated (Greenwald et al, 1998).

In response to the findings of the first IAT study, alternative explanations were offered positing that white subjects are more familiar with stereotypical white names, thus, reactions are faster. To test the popular alternative explanation, Dasgupta, McGhee, Greenwald, and Banaji (2000) ran an experiment where subjects completed the black/white names IAT and a new IAT, one with photos of unfamiliar black and white faces. The results rejected the alternative explanation. Reaction times exhibited in the face IAT were virtually the same as the names IAT. Also, reaction times were faster for white/good versus black/good pairings. There was a significant relationship between the name IAT scores and the faces IAT scores (r=0.39), however, weak correlations with explicit measures of racism and prejudice (Dasgupta et al., 2000).

These early findings of the IAT began a massive rethinking of the validity of self-report measures, especially when measuring constructs where self-presentation strategies are employed (Greenwald et al., 1998; Greenwald & Banaji, 2017). Since its inception, the IAT has measured a plethora of constructs including many within social cognition and a wide-range of mental health topics, most famously self-esteem.

The IAT and implicit attitudes of race. In 1998 a website demonstrating IATs was developed and released to the public. Over 100,000 white participants completed IATs of black/white faces and black/white names and completed self-report measures of explicit racial attitudes. IAT results revealed that white participants exhibited an automatic preference for white versus black, measured by Cohen's d =0.83. White participants also exhibited a pro-white attitude on explicit measures, however, much weaker than implicit attitudes. These findings replicated earlier studies performed in laboratories (Nosek, Banaji, & Greenwald, 2002).

Like the earlier demonstration website, Project Implicit (2011) was a website created to allow the public to complete IATs from a wide range of topics. Approximately 2.5 million IATs

on 17 different topics were completed from 2000 to 2006. Three IATs measured attitudes towards Whites versus Blacks. A mixed sample of (72% white) participants categorized faces of white and black adults, light skin versus dark skin individuals, and black children versus white children. On all three IATs, participants exhibited, on average, faster responses (Cohen's d = 0.77) to categorize white paired with good / black paired with bad, compared to categorizing black paired with good / white paired with bad. Whites' explicit preferences were pro-white, however, much weaker than their demonstrated implicit pro-white preference on the IAT. This replicated earlier findings from laboratory studies. Native Americans, Asians, and Hispanics also showed a pro-white preference, yet, white participants demonstrated the strongest pro-white preference. This finding nullified the hypothesis that white participants simply prefer their own group (Nosek et al., 2007).

In a recent analysis of implicit attitudes of race (black and white), Charlesworth and Banaji (2019) analyzed 1,851,445 race IAT scores from Project Implicit (2011), from 2007 to 2016. Consistent with earlier analyses of Project Implicit's (2011) website data, respondents continued to exhibit significantly strong pro-white attitudes. Over 10 years, the scores were slowly trending towards neutral implicit bias. Pro-white explicit racial attitudes rapidly have changed by 37% towards neutral, while implicit racial attitudes have trended the same direction at a much slower rate, approximately 17%. Using the rate of change in implicit attitudes, the authors reported implicit attitudes would reach neutrality (equal preference for black and white) by August 2073 (Charlesworth & Banaji, 2019).

The IAT and explicit attitudes of race. The existence of the IAT is largely in response to weak correlations and lack of predictive validity between explicit attitudes and behavior (Nosek et al. 2011). In US society explicit pro-white attitudes have been decreasing for decades and drastically in the last 10 years (Charlesworth & Banaji, 2019). Social norms have become

more equitable, thus, "prejudices seem to have ‘gone underground’, operating covertly and often unconsciously" (Amodio, 2014, p. 670). When a topic is unpopular or socially sensitive "self-report measures may be more susceptible to self-presentation bias" (Dasgupta, McGhee, Greenwald, & Banaji, 2000, p. 317). A robust meta-analysis of 184 independent samples of IAT studies revealed low predictive validity between self-report measures and IAT scores when the topic was socially sensitive. Racial attitude IATs (n=1,589) were weakly correlated with explicit measures of racial attitudes (r = 0.12)(Greenwald, Poehlman, Uhlmann, & Banaji, 2009).

IAT and Internal and External Motivation to Respond without Prejudice Scale. Classic self-report measures of racial attitudes toward Blacks have not correlated with implicit measures. US society has become more egalitarian regarding race and the validity of self-report measures has decreased due to self-presentation strategies to not be perceived as racist. Constructs of racial attitudes and socially sensitive topics have continued to evolve in sophistication. Plant and Devine (1998) detoured from classic direct measures of explicit attitudes and sought to assess motivations to respond towards Blacks without prejudice. In the construction of the 10-item Internal and External Motivation to Respond without Prejudice Scale (IMS and EMS), factor analysis revealed two independent constructs: internal motivation and external motivation to respond without prejudice. Each construct had acceptable alpha levels, from .76 to .85, in three samples. Internal test-retest reliability at nine weeks was also acceptable (IMS r = .77; EMS r = .60). The IMS correlates with the Attitude Toward Blacks Scale (r=.79 p<.01) and the Modern Racism Scale (r=-.57 p<.05). The EMS also correlates with these measures, however, there is a weaker relationship.

Devine et al. (2002) studied the relationship between the IMS and EMS and score of implicit racial bias on the IAT. In three studies, IMS scores moderated explicit racial bias and implicit racial bias was moderated by the interaction of IMS and EMS. The lowest implicit racial

bias was among participants with high IMS and low EMS scores (Devine et al. 2002). In a follow up study to Devine et al. (2002), Gonsalkorale et al. (2011) replicated the results that high IMS and low EMS participants exhibit lower levels of implicit racial bias.

Implicit Racial Attitudes, the IAT, and Neuroscience

The amygdala is the most studied and cited brain structure in the understanding of implicit racial attitudes. Although the amygdala has a multitude of functions, fear is the most cited function associated with racial bias (Amodio, 2014). Multiple regions and neural networks other than the amygdala are associated with implicit racial bias, yet to date, the foundational studies involved amygdala activation and the IAT (Kubota, Banaji, & Phelps, 2012; Amodio, 2014; Amodio, 2018).

Phelps et al. (2000) studied amygdala activity via fMRI and startle eye-blink response in white subjects when viewing unfamiliar black and white faces. The race IAT was used as an indirect measure and the Modern Racism Scale (MRS)(1986) as a direct measure of racial bias. IAT results indicated a pro-white bias. Eye-blink responses were significantly more activated when viewing black faces compared to white faces. MRS scores were very low indicating an explicit pro-black belief. The magnitude of amygdala activation was significantly correlated with IAT scores ($r = .52$, $p < .08$) and startle eye-blink ($r = .54$, $p < .07$),. There was no relationship with IAT scores and MRS scores (explicit racial attitudes) (Phelps et al., 2000).

Focusing on other neural regions, Brosch, Bar-David, and Phelps (2013) used blood oxygenation level dependent (BOLD) patterns to measure the activation of the occipital visual cortex, occipital face area, and fusiform face area when subjects (n=19) viewed photos of black and white faces. Subjects viewed photos and completed the race IAT. Viewing a white face produced a different pattern of brain activation than when viewing a black face. BOLD patterns of the occipital visual cortex, occipital face area, and fusiform face area, successfully predicted the race of

the photo the subjects viewed. Activation patterns of the fusiform face in subjects with high pro-white preference on the IAT predicted the race of the person in the photo. These findings suggested neural representations of black and white faces are increasingly dissimilar in subjects with a high, pro-white implicit bias (Brosch et al., 2013).

Predictive Validity of the IAT and Discriminatory Behavior

Studies have examined if judges, juries, police officers, and medical doctors exhibit implicit racial bias, and if it affects their decisions. These types of studies consistently found implicit racial bias among Whites, however, results did not show consistently demonstrate that bias affected decision-making. For example, police officers exhibit implicit racial bias as much as white non-police officers. However, police officers' implicit racial bias did not affect their decision-making to shoot or not shoot black and white people in a threat simulation task. Undergraduates implicit racial bias did affect their decision to shoot or not to shoot in the simulation (Correll et al., 2014). Rachlinski et al. (2008) found implicit racial bias among white judges did not affect their decisions in deciding on vignettes of court cases with black and white offenders.

Essentially the most cited study of implicit racial bias and discriminatory behavior, Green et al. (2007) studied IAT scores of 220 physicians and their treatment decisions. All subjects reported no explicit preference for white versus black patients and that black and white patients do not differ in cooperativeness. All subjects completed the race IAT and stereotypes IAT. Subjects' IAT scores indicated an implicit preference for white versus black. The subjects also exhibited an implicit bias that black patients were less cooperative than white patients with medical procedures, and less cooperative generally. Subjects were given vignettes with either a white or black patient pictured. The case presented a patient with chest pain and subjects rated if it was related to coronary artery disease and if they would treat the patient using thrombolysis. All results were

not related to treatment decisions except for subjects' implicit racial bias score. Physician implicit bias scores predicted if they would treat the patient with thrombolysis. A high implicit preference for white over black was correlated with a "no" decision to treat the patient (Green et al., 2007).

Shortly after the first publication of the IAT, McConnell and Leibold (2001) conducted an experiment to study the relationship between race IAT scores and discriminatory behavior toward Blacks. White undergraduate subjects (n=42) completed ambiguous tasks with a white experimenter and black experimenter, and their behavior and interactions were judged by trained, blinded judges and the experimenters themselves. All subjects completed the race names IAT by Greenwald et al. (1998) and questionnaires of explicit feelings towards Whites and Blacks (an unvalidated measure). Subjects' average IAT scores exhibited a strong pro-white bias (Cohen's d=0.88). Judges' and experimenters' scores of interactions were positive, indicating a bias of more positive behaviors toward the white experimenter than the black experimenter. These positive ratings of pro-white bias were correlated IAT scores (r=0.39, $p < 0.05$) and judges' ratings of interactions ($r = 0.34$ $p < .05$) (McConnell, & Leibold, 2001).

Levinson, Cai, and Young (2010) had juror eligible undergraduate students (n=67) complete a guilty/not guilty IAT, the race IAT, and explicit measures of prejudice toward Blacks. There was no significant relationship between the two IAT, nor the IATs and explicit measures. The implicit measures showed a significant bias towards black and guilty. Subjects judged court case vignettes of perpetrators with dark or light skin. Both IATs were predictive of subjects judging more pieces of evidence as indications of guilt in perpetrators with dark skin.

In a meta-analysis of 32 studies of interracial behavior and IAT scores of implicit racial bias found the IAT scores predicted discriminatory behavior significantly, although as small ef-

fect (r= .24) (Greenwald et al., 2009). Greenwald, Banaji, and Nosek (2015) stated: "correlational effect sizes that were large enough to explain discriminatory impacts that are societally significant either because they can affect many people simultaneously or because they can repeatedly affect single persons" (p. 559).

Malleability of IAT Scores

Dasgupta and Greenwald (2001) demonstrated that a task exposing white participants to famous and well-regarded black people, i.e. Martin Luther King, significantly reduced automatic white preference compared to a control condition immediately after exposure and 1 day after exposure. Terbeck et al. (2015) compared race IAT scores of a placebo control group and a propranolol (beta-blocker) intervention group (40 mg orally). There was a significant reduction in implicit racial bias in the propranolol group (D= 0.37) compared to the control group (D= 0.46). Conditions did not differ in explicit bias, however, using fMRI, the propranolol group exhibited lower whole brain activity in response to black faces than baseline and controls.

Lai et al. (2014) studied 17 interventions designed to reduce implicit racial bias using respondents from Project Implicit (2011), an IAT demonstration. A sample of 17,021 respondents were randomized to 1 of 17 interventions and completed a black versus white IAT and a multicategory IAT, where subjects categorize White and Blacks, as well as Hispanic and Asians. Nine studies did not affect IAT scores and eight interventions reduced an automatic preference for Whites compared to Blacks. Lai et al. (2014) found 8 of the 17 interventions were effective at reducing implicit preferences for Whites compared to Blacks. Interventions that exposed participants to counter-stereotypical examples of black people reduced implicit bias. Evaluative conditioning interventions, pairing positive valence stimuli with black people reduced implicit bias. Also reducing bias, was a strategy to override bias intervention that taught participants how the

IAT worked and was scored and tasked them to hold in their mind, for the entire task, the intention "Black is good”

Lai et al. (2015) summarized the results stating, "the most potent interventions were ones that invoked high self-involvement or linked black people with positivity and White people with negativity. No intervention consistently reduced explicit racial preferences" (p. 2) There was no test of duration of effects of all interventions, however, in a follow up study of 6,321 subjects, Lai et al. (2016) tested eight interventions and one sham intervention to reduce IAT scores. All nine interventions produced immediate reduction effects however none were effective after a few hours.

Ito et al. (2015) predicted executive functioning scores of 485 undergraduate participants would moderate implicit racial bias scores. Participants completed a multitude of executive functioning measures, explicit bias measures, and 3 implicit bias measures: the Weapon Identification Task (categorize weapons and tools) (Payne, 2001), First-Person Shooter Task (shoot / no shoot task)(Correll et al., 2002), and the race IAT. As predicted, measures of executive functioning predicted a reduction in implicit bias and higher levels of executive functioning was related with increased reduction in implicit bias. There was no correlation between IAT scores, Weapon Identification Task scores, and First-Person Shooter Task scores.

Marini, Banaji, and Pascual-Leone, (2018) reviewed 10 studies of non-invasive brain stimulation effects on IAT scores. Two studies used IATs involving race. Gallate et al. (2011) used repetitive transcranial magnetic stimulation on the anterior temporal lobe and subjects exhibited lower implicit racial bias in an Arabs versus Terrorists IAT than sham and control conditions. Sellaro et al. (2015) randomized 60 Dutch undergraduate students to either transcranial direct current stimulation on the medial prefrontal cortex, a control condition, or sham condition

and found the stimulation condition exhibited reduced implicit racial bias compared to control and sham conditions.

Mindfulness

In recent decades, ancient Buddhist contemplative practices have been secularized, robustly researched, and applied clinically to mental and physical ailments, as well as being integrated into mainstream culture as a path to happiness and well-being. The term mindfulness is a translation of the word *sati,* from the Pali language used during the time of the Buddha in Nepal. There is not a consensus on the English translation of *sati*, however, attention, awareness, retention, and discernment are terms scholars have used (Davidson & Kaszniak, 2015). Operational definitions of mindfulness in the scientific literature vary, however, they share two common features: to fuse one's awareness or attention with the present moment, and to experience an attitude of openness, non-judgement, and acceptance (Creswell, 2017). Davidson stated: "mindfulness is commonly defined as paying attention to present-moment experience, on purpose, with an attitude of acceptance or non-judgment" (Hirshber et al., 2018, p. 2). Kabat-Zinn (2003) defined mindfulness as: "the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment" (p. 145). The most cited definition in the literature is Bishop et al.'s (2004) operational definition:

> We propose a two-component model of mindfulness. The first component involves the self-regulation of attention so that it is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment. The second component involves adopting a particular orientation toward one’s experiences in the present moment, an orientation that is characterized by curiosity, openness and acceptance (p. 32).

Mindfulness as a psychological construct is measured via self-report as a state and a/or a trait. The most studied and validated self-report measures are the Five Facet Mindfulness Questionnaire (Baer et al. 2008), the Toronto Mindfulness Scale (Lau et al., 2006), and the Mindful Attention Awareness Scale (Brown & Ryan, 2004). Mindfulness self-report measures are correlated with well-being and attentional control, however, do not necessarily correlate with experience of mindfulness mediation training (Wielgosz et al., 2019).

Mindfulness-Based Interventions. Mindfulness is cultivated by the practice of contemplation methods or mental exercises. Types of methods or practices vary widely in the literature and the largest body of evidence is the study of mindfulness-based interventions (MBI). MBIs are derivatives of the Mindfulness-Based Stress Reduction program (MBSR), one of the most studied interventions to date (Kabat-Zinn, 1982; Creswell, 2017). MBSR interventions are practices derived from Buddhist and Yogic traditions that fit into five categories: awareness of the breath, awareness of bodily sensations, walking meditation, mindful movement, and lovingkindness practice (Hirshberg et al., 2018).

MBIs are administered in a variety of methods. The most well studied is the group course over several weeks, modeled after MBSR program. Participants meet weekly for approximately 2 hours to learn MBIs from a certified instructor and complete home practice of MBIs daily throughout the course. MBSR was originally designed for chronic pain patients and the model has been adapted for depression and relapse prevention for substance abuse (Creswell, 2017). Other group and individual psychotherapies have integrated MBIs into treatment with much success. Acceptance and Commitment Therapy (Hayes et al., 2002), Dialectical Behavioral Therapy (Linehan et al., 2006) and Mindfulness-Based Cognitive Therapy (Segal, Williams, & Teasdale, 2018) are evidence-based psychotherapies with integrated mindfulness-based interventions and skills.

A second major method of MBIs is mindfulness retreats and long-term meditators. These lengthier interventions most closely resemble monastic Buddhist practice, where participants learn and practice MBIs, mostly meditation, for one day up to three months. Retreats are rich opportunities for research and have been well-studied, since the interventions are practiced for days at a time. Typically, all participants are prescribed the same schedule and any time outside of the intervention is programmed, thus increasing controls of other variables. The study of meditators at long-term retreats and long-term meditators provide benchmarks for the research on the effects of prolonged interventions (Davidson & Kaszniak, 2015).

Thirdly, laboratory studies of brief MBIs last a few minutes to a few hours and are paired with a combination of self-report measures, cognitive/behavior tasks, or physiological measures. For example, participants complete a 10-minute body scan meditation and complete a stress questionnaire (Davidson & Kaszniak, 2015).

A recent, yet, unstudied delivery of MBIs has been through technology, such as smartphone apps and online courses. Although there is much enthusiasm for this method, there is insufficient research on the efficacy of these programs, and possible risks, however, the sheer number of users of these technologies is very large (Fish, Brimson, & Lynch, 2016; Creswell, 2017).

Evidence for Mindfulness-Based Interventions. Multiple randomized control trials have produced abundant evidence of MBIs reducing stress, chronic pain, depression, anxiety, as well as, increasing well-being, acceptance, non-judgement, and physical and mental health (Cresley, 2017). MBIs have demonstrated positive effects on physiology, neurobiology, immunity, and cognition (Davidson et al., 2003; Hölzel et al., 2011; Zeidan, Johnson, Diamond, David, & Goolkasian, 2010; Davidson & Kaszniak, 2015; Kabat-Zinn, 2003; Wielgosz et al., 2019).

MBSR has repeatedly demonstrated improvements in symptomatology of chronic pain, fibromyalgia, and psoriasis, and in some cases outperformed other evidence-based such as Cognitive behavioral therapy (Cresley, 2017). Mindfulness-Based Cognitive Therapy has shown to prevent depression relapse 60 weeks after treatment in chronically depressed patients and has successfully treated a current depressive episode compared to wait-list conditions in 10 studies (Wielgosz et al., 2019). For treating substance use disorders, Li et al. (2017) evaluated 34 randomized control trials and found MBIs outperformed controls and treatment as usual conditions in substance use frequency and cravings. Although there is not yet multiple RCTs, MBIs show potential for treating ADHD, PTSD, serious mental illness, and eating disorders (Wielgosz et al., 2019).

Body scan meditation. Body scan meditation is a mindfulness meditation intervention and the introductory MBI in the 8-week MBSR program. The basic instructions are to sit or lie down and focus on the experience of breathing, while simultaneously noticing body sensations. The instructor will draw attention to the whole body and individual parts of the body. There are prompts to shape one's attitude toward acceptance and non-judgement of the experience and to not have any goals, such as, relaxation or pain reduction (Kabat Zinn 2003).

Dahl, Lutz, and Davidson (2019) categorized body scan meditation as an attentional meditation that emphasizes meta-awareness and experiential fusion. The body scan meditation is derived from many traditional Buddhist and Yogic practices, most notably, Hatha Yoga meditation and Vipassana meditation taught by S.N. Goenka (Dreeben, Mamberg, & Salmon, 2013).

Although a multitude of large studies on MBSR demonstrated significant benefits, there are few studies that have examined the effects of body scan meditation exclusively. Ditto, Eclache, and Goldman (2006) compared a condition of 20-minute body scan meditation to a 20-minute progressive muscle relaxation and control condition. Participants were assessed after the

20-minute intervention and after 4 weeks of daily practice and found on measures of parasympathetic activity, the body scan condition scored significantly greater than the progressive muscle relaxation and control conditions. In a randomized trial comparing three 1-hour sessions of body scan meditation, mindful yoga, and sitting meditation, all participants reported positive changes from pre to post-intervention in measures of well-being, self-compassion, and rumination. The body scan condition was outperformed in effectiveness by mindful yoga and sitting meditation (Sauer-Zavala, Walsh, Eisenlohr-Moul, & Lykins, 2013). In a smoking cessation study, listening to a 10-minute recording of body scan meditation significantly reduced cravings to smoke compared to a control condition (Cropley, Ussher, & Charitou, & 2007).

Lovingkindness meditation. Lovingkindness meditation (LKM) is a sitting mindfulness meditation that aims to cultivate warm and kind feelings toward one's self and others, and in some practices one's enemies and even everyone on earth. The practice utilizes imagery to evoke love and compassion within one's self and to then transmit love and compassion to others. Phrases such as "may I be loved, safe, happy, and well" are repeated, followed by directing phrases to others: "may he / she be loved, safe, and happy" (Dahl, Lutz, & Davidson, 2015; Fredrickson et al., 2008).

Hirshberg, et al. (2018) found a 12-minute LKM significantly lowered levels of implicit negative affect compared to controls. LKM participants exhibited more stabilized affect compared to a gratitude training condition after a stress inoculation (cold pressor test). After the completion of the study and subjects were dismissed, subjects were given an opportunity to volunteer. The LKM condition donated significantly more time than other conditions, providing ecological validity of the intervention.

Frederickson et al. (2008) conducted a study at a large company in Detroit Michigan. They randomized 139 employees to either a 7-week LKM practice group or a waitlist control.

The participants assigned to the LKM condition exhibited significantly more positive emotions than controls that resulted in increases in measures of mindfulness, life purpose, social support, and decreased illness symptoms. Positive emotions in the LKM condition predicted increase in measures of life satisfaction and a reduction in depressive symptoms. Increases in mindfulness, purpose in life, social support, and decreased illness symptoms predicted increased life satisfaction and reduced depressive symptom.

Mindfulness Meditation and Implicit Racial Bias

In a study on LKM and implicit and explicit measures, Hutcherson, Seppala, & Gross (2008) randomized 93 undergraduates to either a 7-minute LKM intervention or a control condition. In the LKM, participants were asked to close their eyes, focus on the breath, sit still, and imagine two people that loved them, standing on each side, sending them love for four minutes. Then, for three minutes, participants were shown a picture of a neutral stranger on a computer screen and asked to wish them health, happiness, and well-being. The participants in the control condition were asked to close their eyes, focus on the breath, sit still, and imagine two acquaintances they had neutral feelings for four minutes. Then, for three minutes they were presented a neutral stranger on screen and asked to only notice the physical characteristics of the stranger.

All participants completed mood measures, reported feelings of social connectedness toward the stranger in the picture, and an affective priming task as an implicit measure of stronger positive or negative evaluations of others. Compared to controls, the LKM condition significantly exhibited more social connectedness and implicit and explicit positivity towards strangers. Although this study did not include any dimensions of race, it was the first example of testing the effects of very brief LKM on social evaluations.

Using a much lengthier LKM intervention, Kang, Gray, and Dovidio (2014) randomized 101 undergraduate students (61% white) to either a 6-week LKM training with LKM practice, a

6-week LKM discussion group with no LKM practice (active control, or a waitlist control condition. The 6-week LKM with practice condition exhibited essentially no implicit bias toward Blacks or Whites at pre-intervention (*D* = -0.012). Post-intervention, the LKM with practice condition exhibited a slight pro-black bias (*D* = -0.163). Compared to the LKM discussion group (*D* = 0.05) and control group (*D* = 0.096), the LKM with practice conditions' (*D* = -0.163) reduction in IAT score was significant. The median age of the sample was 25 and conditions did not differ in perceived stress or cognitive control.

Lueke and Gibson (2015) randomized 72 white undergraduate students to a 10-minute audio intervention of either body scan meditation (BSM) or the same narrator reading about local history. The recordings were the same used in the Cropley et al., (2007) smoking cessation study where the BSM recording reduced cravings to smoke. All participants completed the race and age IATs and the Internal and External Motivation to Respond without Prejudice Scale (IMS and EMS) (Plant & Devine, 1998). The BSM condition exhibited significantly less implicit racial bias (*D*=0.45) compared to the control condition (*D*=0.62) and conditions did not differ on IMS and EMS scores. The BSM condition also exhibited significantly less age bias than controls. The sample was 71% female and ages ranged from 18 to 23. An additional method of analysis of IAT scores was used, called the Quad model. It attempts to separate automatic components from controlled components of responding (Conrey et al., 2005; Sherman et al., 2008). The results of the Quad model indicated lower activation of black=bad automatic associations in the BSM condition.

Replicating the 7-minute LKM intervention by Hutcherson et al. (2008), Stell and Farsides (2016) randomized 69 white undergraduate students to either a 7-minute LKM intervention or a 7-minute imagery intervention as a control. The mean age of the sample was 23.7. In the LKM condition participants were asked to close their eyes, relax, breathe deeply, and imagine

people who deeply cared for them sending them love for four minutes. Then, for three minutes they were instructed to redirect love to a picture of a gender matched black person. The control condition was also instructed to close their eyes, relax, breathe deeply, and imagine two acquaintances' physical characteristics for four minutes. Then, for three minutes they were instructed to notice the physical characteristics of a gender matched black person in a photo. All participants completed the race IAT and the modified Differential Emotions Sub-scale to asses explicit, self-reported positive emotion toward others (Fredrickson et al., 2003). Participants in the LKM condition (D=0.33) exhibited significantly less implicit racial bias than the imagery condition (D =0.57) on the IAT. The LKM condition also reported more positive s towards others compared to the control condition.

Issues in Mindfulness Research. Wielgosz et al. (2019) stated that the current enthusiasm for mindfulness is ahead of the empirical support in what they call "mindfulness hype." In a systematic review of 142 studies of MBIs for psychiatric disorders by Goldberg et al. (2018), none of the studies investigated "sample size, length of follow-up, use of active control comparison conditions, assessment of instructor training, assessment of treatment fidelity, use of intention-to-treat analyses" (Wielgosz et al., 2019, p. 21). Davidson & Kaszniak (2015) warned against making assumptions that levels of mindfulness actually being measured by making inferences from self-reports, performance on cognitive tasks, electrophysiological measures, and neural imaging. Levinson et al. (2014) has proposed a breath counting task as a behavioral measure of mindfulness. Experienced, long-term meditators complete the task more accurately than novice or less experienced meditators.

A major methodological issue is comparing MBI conditions to controls such as wait-list controls. The subject in the meditation condition knows they are in a meditation experiment and

the wait-listed subject knows they are not receiving an intervention. Some controls in in the literature could potentially be having an adverse or confounding effect on measures. Davidson and Kaszniak (2015) recommended that active controls receive evidence-based treatments, studies utilize dual-blind designs, and experimental conditions are compared to more than one control. Finally, interventions vary widely and are not replicated in multiple studies. There are questions about the length of interventions, the appropriateness for age, ability, and culture, and the potential of adverse effects.

Chapter III

Methods

Choice of Method

This experiment used a 3x2 between-subjects design with three categories of audio interventions (control, BSM, LKM), and two orderings of race IATs. The goal was to determine if a 6-minute BSM and/or a 6-minute LKM intervention would yield significantly lower measurable implicit racial bias than a control condition. Eighty-two white, non-Hispanic participants were randomly assigned to one of six conditions: either one of two meditation interventions or a control audio recording with no meditation instructions, and each with 2 stimulus ordering conditions (i.e., 3 X 2 between-subjects factorial design).

To test Hypotheses 1 through 3, implicit racial bias (the dependent variable) was recorded using a standard scale that ranged from positive values (pro-White/anti-Black bias) to negative values (pro-Black/anti-White bias). To test Hypotheses 4 and 5, implicit racial bias values used for Hypotheses 1 through 3 were converted to absolute values. In other words, all values were treated as deviations from zero, with positive and negative signs removed. Thus, in this two-part analysis, the implicit racial bias measures used for the first three hypotheses are denoted by D, whereas the absolute values (fourth and fifth hypotheses) are denoted by $/D/$.

For each of the three main conditions (i.e., control, BSM, LKM), two versions of the IAT were administered. To counterbalance the order of conditions comprising the IAT, two stimulus ordering conditions were used. In the first, odd-numbered participants (i.e., the first, third, fifth, etc. assigned to a condition) were presented first with instructions to sort stimuli into "white/good" and "black/bad" categories. In the second, even-numbered participants (i.e., the second, fourth, sixth, etc. assigned to a condition) were presented first with instructions to sort stimuli into "white/bad" and "black/good" categories.

Participants

This study used a convenience sample of 82 white, non-Hispanic participants. Following recruitment (see below), exactly 300 individuals initiated participation in the study by clicking a button. Of these, 109 participants completed the study. Twenty-seven of the 109 completers self-identified as other than White, non-Hispanic, and so were not included in the analyses reported here (i.e., they identified as non-white, or Hispanic, or who listed their race and ethnicity as "other.". The remaining 191 individuals dropped out at the launch page or prior to completing the study.

An unknown number of the 191 were Android smartphone users. Android users were unable to continue past the launch page since Inquisit Web was not designed for Android smartphones. A notification was added to the launch page on the second day of the study to explicitly state the study would not work on Android smartphones. Included in the final sample were 82 participants who identified themselves as white, non-Hispanic. Ages ranged from 20 to 70 years, with a mean age of 42.58. The gender of the participants in the final sample was 46 females (56%), 34 males (41%), 1 other (gender) (1%), and 1 gender nonconforming (1%).

In the control condition (n=25), the mean age was 43.5 and the gender of participants was 48% female, 48% male, and 1 gender non-conforming. Sixty percent of participants endorsed no meditation practice, 0.04% meditated once per month, 20% meditated once per week, and 12% mediated once per day.

In the BSM condition (n=25), the mean age was 40.0 and the gender of participants was 64% female, 32% male, and 1 identified as other. Eighty-four percent of participants endorsed no meditation practice, 8% meditate once per month, 4% meditate once per week, and 4% (1 participant) mediate once per day.

In the LKM condition (n=32), the mean age was 43.84 and the gender of participants was

56% female, 44% male, and 1 identified as other. Sixty-five percent of participants endorsed no meditation practice, 6% (one participant) meditated once per month, 19% meditated once per week, and 9% mediated once per day.

Recruitment

Participants were recruited from this author's social media accounts and email contacts. A social media post and email message advertised a study on mindfulness and racial bias and provided a link to participate. Also, snowball sampling was used for recruitment; the link to the study included an invitation to share the recruitment message with others (See Appendix B for recruitment materials). Adults aged 18 years and over were invited to participate and there was no mention of race, ethnicity, or gender as inclusion criteria. The recruitment message stated that would be anonymous. Participants were told that they would listen to 6 minutes of audio, and then complete an online task measuring racial bias (the IAT), and then answer questions about the study and provide individual demographic information. They were informed that participation would require approximately 21 minutes of their time. The informed consent provided at the start of the study stated there would be no compensation for participating, with contact information for this author and the IRB were provided (see Appendix C for informed consent). No identifying information was collected from participants.

Recruitment began October 25, 2018 and ended on December 4, 2018. An additional request was made to the IRB on November 5, 2018 to post a short recruitment video on social media and was approved and posted to social media on November 8, 2018 (Korsmo, 2019).

Power analysis. A power analysis was calculated using the anticipated means for each group based on the comparable means and standard deviations obtained by Lueke and Gibson (2015) and by Stell & Farsides (2016). The sample size was calculated using an alpha value of 0.05 and a power of 0.8, resulting in 21 participants per condition for a total of 63

participants required across 3 conditions.

Materials and Instruments

Inquisit web. The experiment was hosted and administered using Inquisit Web, a provider of online psychological testing software. Inquisit Web provided an application to participants for iPhone, iPad, Mac and PC devices (Inquisit 5, 2016). Participants downloaded the Inquisit Web application from the launch page and the application did not collect confidential or personal data. Instructions were provided to uninstall the application upon completing or dropping out of the study. All data were collected through the Inquisit Web application.

Audio recording interventions. All audio interventions were 6-minute recordings of the same narrator. Using GarageBand audio software (GarageBand, 2018), all recordings were edited to 6 minutes in length. Some original recordings were modified to improve pacing of the instructions and to enhance clarity of the narrator, as described below. The recordings were pilot tested with professors (the dissertation chair and reader) and peers with experience and training in meditation, with modifications made based on several rounds of feedback. The final recordings were uploaded to the Inquisit Web platform. See Appendix D transcripts of the recordings.

Control recording. As with the control recording in the Lueke and Gibson (2015) study, the control recording included no instructions to meditate or be mindful. A 6-minute excerpt from a lecture at Google Inc. by Kabat-Zinn (2011) on October 11, 2007. The entire lecture is one-hour and twelve minutes. This excerpt began at minute 2:37 and ended at minute 8:41. Topics included work-life balance in the digital age and using mindfulness to optimize one's living (see Appendix D for a transcript of the recording). The control recording used in Lueke and Gibson (2015) discussed the geographical and natural history of a suburb of London (See Appendix D for transcript). It was judged as boring during pilot sessions with various listeners and thought

to have potential spurious effects. This study's control recording was designed to match the experimental conditions in topicality (i.e., mindfulness), voice tone and speed, and interestingness. These qualities were judged by the first author and dissertation chair, without more extensive ratings.

Body scan recording. The body scan recording was a meditation recording that accompanied the book by Williams, Teasdale, Segal, and Kabat-Zinn (2007). It was edited into a 6-minute version with instructions to pay attention to one's breathing while scanning with one's attention, the abdomen, upper body, and the head and face (see Appendix D for a transcript of recording). Body scan meditation is often introduced near the beginning of formal meditation training used in Mindfulness-Based Stress Reduction (MBSR) programs (Kabat-Zinn, 2003).

Lovingkindness recording. The lovingkindness recording was from an audio meditation series by Kabat-Zinn (2012) and was edited into six minutes. The recording instructed participants to pay attention to their breath and visualize receiving unconditional love from someone who loved them. Next, instructions were to visualize being a source of unconditional love. Then, instructions were to visualize sending unconditional love to another person who the participant felt neutral about (see Appendix D for a transcript of the recording). This LKM had instructions that were like those used in other LKM studies (Stell & Farsides, 2016; Seppala et al., 2008).

Implicit association test. Implicit racial bias was measured using the standard race IAT used by Project Implicit (2011) , Kang et al. (2014), and Lueke and Gibson (2015). The stimuli used are shown in Figure 2. These were the same used by Project Implicit (2011) and consisted of eight positive and eight negative attributes and photos of six White Americans and six Black Americans (Nosek et al., 2007). The IAT was administered using the Inquisit Web application that was downloaded to participants' own devices. Participants' IAT scores were not disclosed to

participants during the study.

Administration. On a keyboard or touch screen, the positive attributes "good" and White American faces are assigned to the left key "e" and the negative attributes "bad" and Black Americans are assigned to the right key "i." Stimuli are presented on the screen one at a time, randomly without replacement. The time it takes the participant to categorize the stimuli correctly using the "e" or "i" key produces a reaction time referred to as a latency. Latencies represent the strength of the association between the attribute and face. For example, a reaction time to choose black=good that is twice as long as it takes to choose white=good would indicate a preference for white over black. Each presentation of stimuli is referred to as a trial. Trials of white = good and black = bad are called compatible trials and trials of black = good and white = bad are incompatible trials. The order of compatible and incompatible trials is counterbalanced in each condition and it is well established there is not meaningful order effects (Greenwald, & Banaji, 2005).

Scoring. As with participants in Lueke and Gibson (2015), each participant completed 180 trials divided into seven blocks. Three blocks were only for practice and not used for calculating scores. Two compatible blocks and two incompatible blocks are used to calculate the final score, represented as *D*. *D* was calculated by the mean difference between incompatible blocks and compatible blocks, divided by the standard deviation of test block latencies, producing a score between -2.00 and 2.00. *D* scores greater than 0 indicate a preference, or association, for White Americans versus Black Americans and a score less than 0 indicates a preference for Black Americans versus White Americans.

The improved scoring algorithm by Greenwald, Nosek, & Banaji (2003) was used to calculate final *D* scores using SPSS (2018) and an SPSS script that was provided by Inquisit Web (Inquisit 5, 2016). The improved scoring algorithm was found to improve internal consistency

and correlations with self-report measures (Greenwald, Nosek, & Banaji, 2003). The algorithm removes latencies less than 300 ms and greater than 10,000 ms. Further, it eliminates subjects with more than 10% of incorrect trials in each block. It replaces any incorrect trial with the mean of correct latencies for that block and adds 600 ms to the mean.

Absolute values of implicit bias (/*D*/), which were used to test Hypotheses 3 and 4, were created by changing any negative values of *D* to positive values.

Validity and reliability. Cronbach's α for the IAT was reported as α = 0.77 in two studies of reliability (Asendorpf, Banse, & Mucke, 2002; Teige, Schnabel, Banse, & Asendorpf, 2004). Estimates of internal consistency, split-half correlations or alphas, are reported to range from .7 to .9 (Greenwald & Nosek, 2001; Schmukle & Egloff, 2004; Nosek, Greenwald, & Banaji, 2007). Schmukle and Egloff (2004) reported that the IAT for race has satisfactory test–retest reliability (median r = .56). Further, the time between tests reportedly does not affect reliability (Nosek, Greenwald, & Banaji, 2007, p. 274).

Internal and external motivation to respond without prejudice scale. The 10-item Internal and External Motivation to Respond Without Prejudice Scale (IMS and EMS) is a self-report questionnaire using Likert scales ranging from 1-9. It was used to measure internal (self) and external (from others) motivations to respond without prejudice towards Blacks. It is used as a measure of explicit prejudicial attitudes.

Using factor analysis, Plant and Devine (1998) identified two distinct constructs within the overall scale. These include internal motivations and external motivations to not be prejudiced. From three samples, the IMS and EMS had alpha levels ranging from .76 to .85. After a 9-week interval, test-retest reliabilities for the IMS (r=0.77) and EMS (r=0.60) were deemed acceptable. In particular, the IMS was strongly related to measures of explicit prejudiced attitudes. IMS and EMS are weakly slightly but significantly correlated (r= -.15, p=.05) (Plant &

Devine, 1998).

Procedure

Participants clicked the study link from a social media post or email message that opened the landing page with a brief description of the study. It described the time required, provided instructions for downloading Inquisit Web, and showed a start button. After participants downloaded the application, they clicked on the start button which loaded the study onto the participant's electronic device. Participants were provided a button which enabled them to quit the study at any time. Using block randomization, Inquisit Web assigned participants to one of six conditions. The informed consent form corresponded to one of these six conditions. Participants were not informed of other conditions than the one to which they were assigned. By clicking the "agree to participate" button on the informed consent page, one of the three audio interventions were introduced and loaded to the participants' device.

During the audio intervention, participants had an onscreen option to quit at any time. A timer counted down the remaining time of the audio. At the end of the audio, the application loaded one of two IATs: a white/good and black/bad pairing as the first categorization task, or a black/good and white/bad pairing as the first categorization task.

All participants were asked the number of IATs they completed prior to this experiment, the frequency that they meditated, and a demographic questionnaire. To perform a manipulation, check participants rated on a scale from 0-9 how well they followed along with the audio recording. Manipulation checks in prior studies used Likert scales for participants to rate the level of engagement in the intervention (Hafenbrack, Kinias, & Barsade, 2014). Participants answered a demographic questionnaire regarding their age, race, ethnicity, and gender.

Participants completed the Internal and External Motivation to Respond Without Prejudice Scale (IMS and EMS), a 10-item explicit measure of prejudice towards Black

Americans, to test if conditions differed by explicit racial bias and whether explicit racial bias affected IAT scores (Plant & Devine, 1998). During data collection, block randomization was stopped for three days to assign participants to conditions with, initially, a higher dropout rate. Upon obtaining an equal number of participants in each condition, block randomization was resumed. This study was submitted to the IRB on October 12, 2018 and approved on October 16, 2018. Data collection began on October 25, 2018 and ended on December 4, 2018.

Figure 2. Stimuli for Implicit Association Test for race from Project Implicit (2011). Pictured above are neutral the black and white faces used in the IAT. Attributes used for positive categorization were: marvelous, superb, pleasure, beautiful, joyful, glorious, lovely, and wonderful. Attributes used for negative categorization were: tragic, horrible, agony, painful, terrible, awful, humiliate, and nasty (Nosek et al., 2007).

Chapter IV

Results

Hypothesis Testing

Hypothesis 1. First, it was hypothesized (**Hypothesis 1**) that 70% to 80% of white participants would exhibit pro-white/anti-black implicit racial bias, and that this bias would, on average deviate significantly from zero. Although the bias measured in this study is at the low end of the typical range, the hypothesis was generally supported, as shown in Table 1 and Figure 3. Table 1 shows the number and percentage of participants demonstrating implicit racial bias, using 'slight' ($D \geq 0.15$), 'moderate' ($D \geq 0.35$), and 'strong' ($D \geq 0.65$) thresholds for bias (Greenwald et al., 2003). Of the 82 white participants, 69.5% exhibited at least slight implicit bias. Furthermore, the population mean for these participants was significantly greater than zero, as confirmed by a one-tailed single sample *t*-test, $t(81)=5.611$, $p<.0.0001$. Figure 3 (lower panel) shows the *D* scores for all individuals for each of the three conditions, thereby showing the scores underlying the summary scores in Table 1.

In the control condition alone, 68% of the 25 white participants exhibited at least slight bias. The population mean for control participants was in the predicted direction, but not quite significantly greater than zero, as confirmed by a one-tailed single sample *t*-test, $t(24)=1.497$, $p=.074$. In the BSM condition alone, 72% of the 25 white participants exhibited at least slight bias. The population mean for the BSM participants was significantly greater than zero, as confirmed by a one-tailed single sample *t*-test, $t(24)=4.457$, $p<.0.0001$. In the LKM condition, 68.8% of the 32 white participants exhibited at least slight bias. The population mean for LKM participants was significantly greater than zero, as confirmed by a one-tailed single sample *t*-test, $t(31)=5.139$, $p<.0.0001$.

Table 1

Number and percentage of participants demonstrating implicit racial bias

		Participants Per range	Cumulative	
All participants (*n*=82)				
+White / -Black bias	.15 to .34 (slight)	15/82	**57/82**	**69.5%**
	.35 to .64 (moderate)	23/82	42/82	51.2%
	>.65 (strong)	19/82	19/82	23.2%
+Black / -White bias	-.15 to -.34 (slight)	6/82	14/82	17.1%
	-.35 to -.64 (moderate)	3/82	8/82	9.8%
	< -.65 (strong)	5/82	5/82	6.1%
Control (*n*=25)				
+White / -Black bias	15 to.34 (slight)	4/25	**17/25**	**68.0%**
	.35 to .64 (moderate)	9/26	13/25	52.0%
	>.65 (strong)	4/25	4/25	16.0%
+Black / -White bias	-.15 to -.34 (slight)	0/25	6/25	24.0%
	-.35 to -.64 (moderate)	2/25	6/25	24.0 %
	< -.65 (strong)	4/25	4/25	16.0%
Body Scan (*n*=25)				
+White / -Black bias	.15 to .34 (slight)	4/25	**18/25**	**72.0%**
	.35 to .64 (moderate)	6/25	14/25	56.0%
	>.65 strong (strong)	8/2	58/25	32.0%
+Black / -White bias	-.15 to -.34 (slight)	0/25	2/25	8.0%
	-.35 to -.64 (moderate)	1/25	2/25	8.0 %
	< -.65 (strong)	1/25	1/25	4.0%
Lovingkindness (*n*=32)				
+White / -Black bias	.15 to .34 (slight)	6/32	**22/32**	**68.8%**
	.35 to .64 (moderate)	9/32	16/32	50.0%
	>.65 (strong)	7/32	7/32	21.9%
+Black / -White bias	-.15 to -.34 (slight)	6/32	6/32	18.8%
	-.35 to -.64 (moderate)	0/32	0/32	0.0 %
	< -.65 (strong)	0/32	0/32	0.0%

Note. Effect sizes of "slight," "moderate," and "strong" for IAT *D* scores were put forth by Greenwald, Nosek, and Banaji (2003).

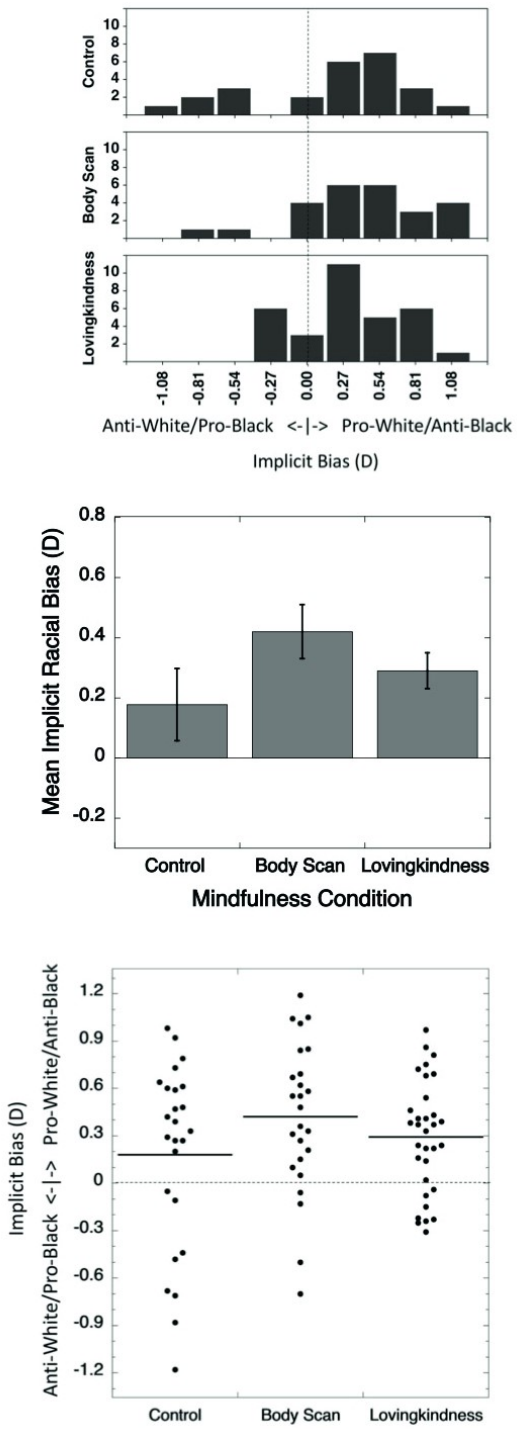


Figure 3. Summary of implicit racial bias scores (*D*) from the Implicit Association Test (IAT) for individuals assigned to either a control condition, a body scan meditation condition, or a lovingkindness meditation condition. Top panel: frequency histograms. Middle panel: Means with bars denoting + 1 *SE*. (Compare to previous studies in Figure 1). Lower panel: Dot plot showing individual scores. Horizontal bars denote means. In all panels, positive values denote a detection bias against blacks and favoring Whites, whereas negative values denote a bias against Whites and favoring Blacks. In all panels, positive values denote a detection bias against Blacks and favoring Whites, whereas negative values denote a bias against Whites and favoring Blacks. There was *n*=25 participants in the control and body scan meditation conditions and *n*=32 participants in the lovingkindness condition.

Table 1 provides additional information showing the number and percentages of participants showing moderate and strong bias. It also shows comparable numbers and percentages of participants showing slight, moderate and strong bias. Of note is that individual variability was considerable, with a significant minority of white participants showing even strong pro-black/anti-white bias.

Further, it is noteworthy that this sample (n=82) of white participants exhibited a level of implicit racial bias that was significantly lower than a large national sample of white participants studied online at the site "Project Implicit" (Nosek et al., 2002); mean D=0.83, n=103,316, $t(81)$= -10.14, p<0.0001.

Hypotheses 2 and 3. The primary results of the first analysis are shown in Figure 3, which includes frequency histograms, a bar chart, and a dot plot, and in Table 2, which summarizes the results of a 3x2 between-subjects ANOVA (i.e., 3 mindfulness conditions X 2 IAT stimulus orders, with D scores as the dependent variable). The IAT order variable revealed no significant differences between counterbalanced stimulus orders, with nearly identical means, and so only main effects of the mindfulness conditions are reported here.

Both BSM and LKM did not reduce IAT scores significantly when compared to the control presentation (Figure 3), $F(2, 76)$=1.6, p=0.2086. The prediction that BSM would reduce implicit racial bias compared to the control (**Hypothesis 2**) was not supported. In fact, implicit bias scores were higher (though not significantly higher) in the BSM condition compared to the control. Similarly, the prediction that LKM would reduce implicit racial bias compared to the control (**Hypothesis 3**) was not supported. Again, implicit bias scores were higher (though not significantly higher) in the LKM condition compared to the control. Because trends were in the opposite direction of those predicted, and because the omnibus F test was not significant, specific comparison tests were unnecessary.

Table 2.

Source Table for 3x2 Mixed ANOVA (3 Mindfulness Conditions x 2 Orders of IAT)

Source	SS	*df*	MS	*F*	*p*
A: Mindfulness Condition (Control, BSM, LKM)	0.74	2	0.37	1.6	0.2086
B: Order of IAT (1st trial Black/Good, White/Bad versus 1st trial White/Good, Black/Bad)	0.02	1	0.02	0.09	0.765
A x B	0.15	2	0.08	0.32	0.7271
Error	17.55	76	0.23		
Total	18.46	81			

Hypothesis 4 and 5. The primary results for the second analysis, i.e., the absolute values of IAT scores (/*D*/), are shown in Figure 4, which includes frequency histograms, a bar chart, and a dot plot, and in Table 3, which summarizes the results of a 3x2 between-subjects ANOVA (i.e., 3 mindfulness conditions X 2 IAT stimulus orders, with */D/* scores as the dependent variable). /*D*/ is a measure of total implicit bias regardless of white or black bias because the + or – sign of *D* is deleted. The IAT order variable revealed no significant differences between counterbalanced stimulus orders, with nearly identical means, and so only main effects of the absolute value of /*D*/ in mindfulness conditions are reported here.

The prediction that BSM and LKM would reduce total implicit racial bias compared to the control was not supported, as revealed by the F statistic for the main effect, $F(2, 76)=2.6$, $p=0.0809$. Regarding **Hypothesis 4**, implicit bias scores in the BSM condition were virtually equal to those for the control, and thus not significant. The prediction that LKM would reduce total implicit racial bias compared to the control (**Hypothesis 5**) was significant, as revealed by a specific comparison, $t(55)=2.2$, $p< 0.016$. That is, implicit bias scores were significantly *closer to zero* in the LKM condition compared to the control.

Additional Analyses

Explicit racial biases (IMS and EMS). To test whether conditions differed by explicit racial bias and to determine if explicit racial bias affected IAT scores, the motivation to respond measures (IMS & EMS) were completed by all participants. As shown in Figure 5, there were large individual differences in IMS and EMS scores. As expected, there were not significant differences among groups randomized across the three conditions for either IMS or EMS scores, revealed by one-way ANOVAs (IMS, $F(2,79)=0.83$, $p=0.44$; EMS, $F(2,79)=0.28$, $p=0.77$). Following block randomization, the three experimental groups were well matched for explicit bias as measured using the IMS and EMS scales.

Table 3.

Source Table for 3x2 Mixed ANOVA of Absolute Values of D scores (3 Mindfulness Conditions x 2 Orders of IAT)

Source	SS	*df*	MS	*F*	*p*
A: Mindfulness Condition (Control, BSM, LKM)	0.44	2	0.22	2.6	0.0809
B: Order of IAT (1st trial Black/Good, White/Bad versus 1st trial White/Good, Black/Bad)	0	1	0	0	1
A x B	0.1	2	0.05	0.59	0.5568
Error	6.42	76	0.08		
Total	6.96	81			

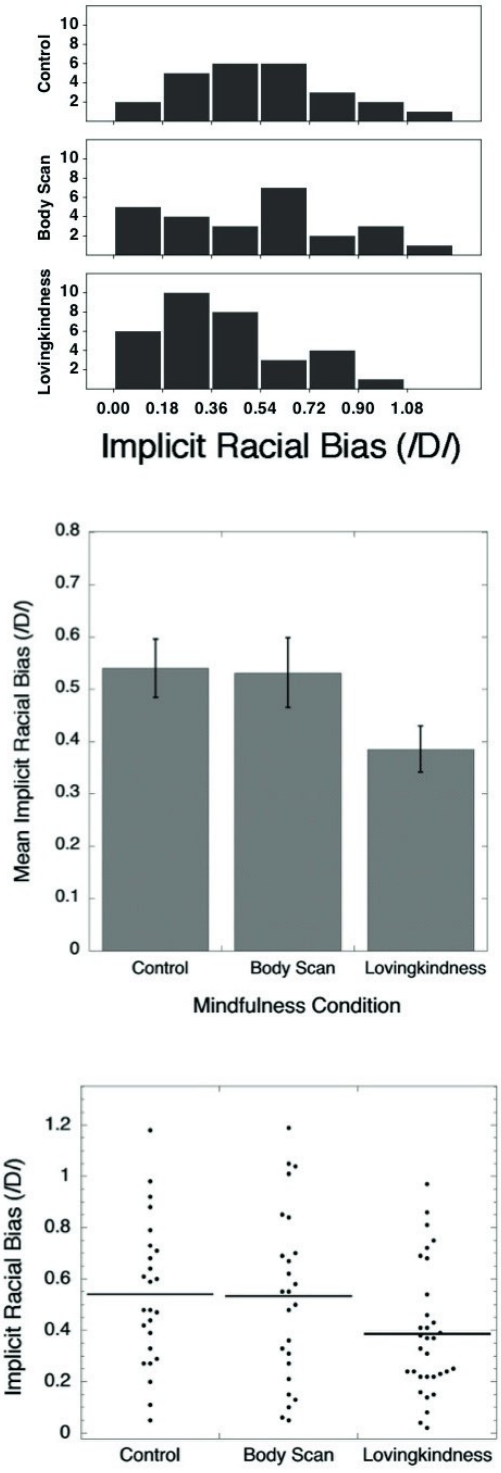


Figure 4. Summary of the absolute values of implicit racial bias scores (/*D*/) from the Implicit Association Test (IAT) for individuals assigned to either a control condition, a body scan meditation condition, or a lovingkindness meditation condition. Top panel: frequency histograms. Middle panel: Means with bars denoting + 1 *SE*. Lower panel: Dot plot showing individual scores. Horizontal bars denote means. In all panels, all values denote a detection bias against Blacks and favoring Whites and a bias against Whites and favoring Blacks. There was *n*=25 participants in the control and body scan meditation conditions and *n*=32 participants in the lovingkindness condition.

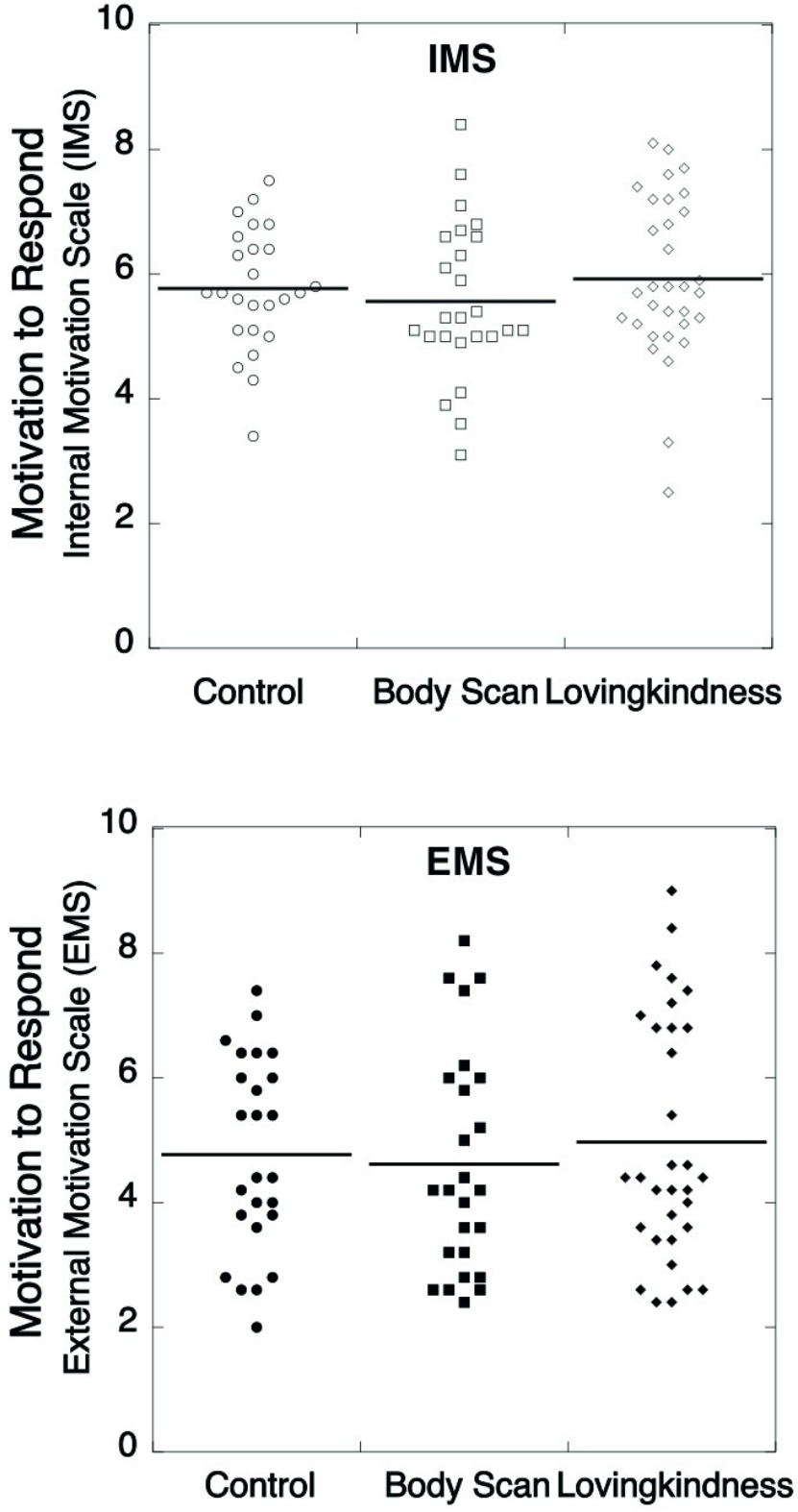


Figure 5. Explicit racial attitudes, as measured by the Internal and External Motivation to Respond Scale (IMS and EMS) shown for the three experimental conditions. Horizontal bars denote means.

The validation studies of the IMS and EMS by Plant and Devine (1998) found a significant correlation between IMS and EMS scores from a sample of 247 subjects (r= -.15, p=.05). As shown in Figure 6, the present study found a significant correlation between mean IMS and EMS scores (r(80)=0.34, p=0.0018, [two-tailed]). The correlation between IMS and EMS scores was consistent with previous research.

In previous studies, subjects with high EMS scores explicitly espoused non-prejudiced attitudes, however, exhibited significant implicit racial bias (Plant & Devine, 1998; Devine, Plant, Amodio, Harmon-Jones, & Vance, 2002). Consistent with previous research, the relationship between EMS mean scores and D was significantly correlated (r(80)=0.23, p= 0.0407, [two-tailed])(Figure 6). The relationship between IMS means scores and D was not significantly correlated (r(80)= -0.05, p= 0.6325, [two-tailed])(Figure 6). Figure 7 shows that the correlation between IMS and EMS scores, the correlation between D and EMS, and the correlation between D and IMS was consistent across conditions.

Manipulation check by mindfulness condition. Figure 8 shows analyses of the manipulation check which had participants rate their engagement on a scale from 0 (no engagement) to 9 (maximum engagement) with the 6-minute audio passages. Figure 8 (upper panel) shows that participants in the three conditions responded differently to the audio passages. Compared to participants in the control condition, participants in the BSM and LKM conditions were somewhat less engaged, with LKM yielding the lowest scores. Moreover, Figure 8 (3 lower panels) shows that in the control and BSM conditions, racial bias tended to decrease toward zero with increased engagement, though this trend was not significant. However, in the LKM condition, racial bias trended to increase (i.e., more pro-white/anti-black) steadily with engagement. A post hoc nonparametric rank-order correlation test (Spearman's ρ [rho]) revealed that the correlation in the LKM condition was significant, ρ(30)=0.354, p=0.047 (two-tailed),

albeit without correcting for the post hoc nature of the test. (Any post hoc penalty would render this result to be statistically insignificant).

IAT scores by device type. Participants completed the study using either a Mac, PC, or iOS (iPhone/iPad) device. Figure 9 (upper panel) shows IAT scores by device type and (lower panel) IAT scores in each condition by device type. Of the 82 participants, 34 used iOS, 16 used Mac, and 32 used Windows. There were no significant differences in implicit racial bias (*D*) among the three device types, as confirmed by a one-way ANOVA, $F(2, 79)=.354$, $p=.047$ (two-tailed test), and specific comparison *t*-tests.

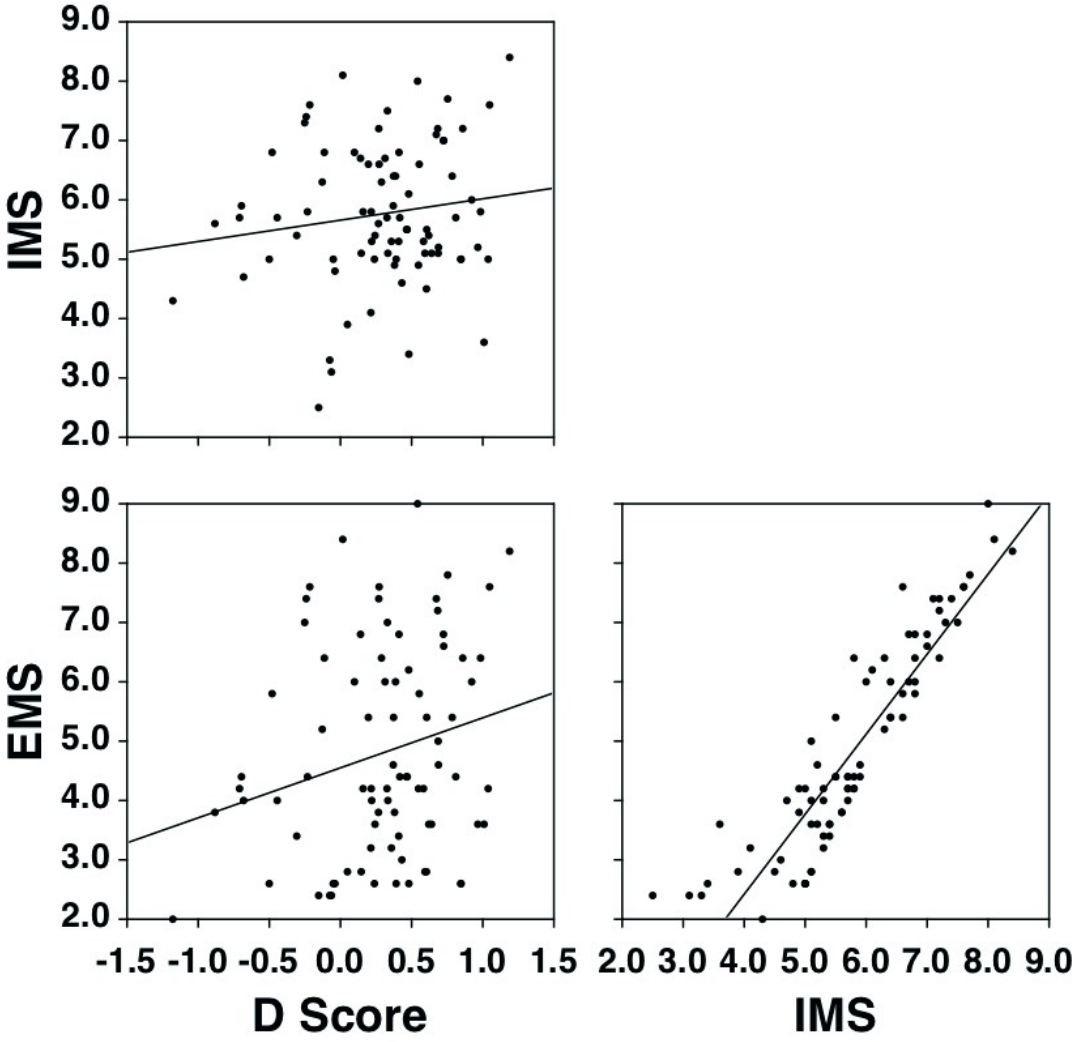


Figure 6. Scatterplot matrix showing interrelationships among measures of implicit and explicit racial bias, including scores obtained from the IAT (*D*), and the Internal and External Motivation to Respond Without Prejudice Scales (IMS and EMS), for all participants (*n*=82). Lines denote best fitting lines.

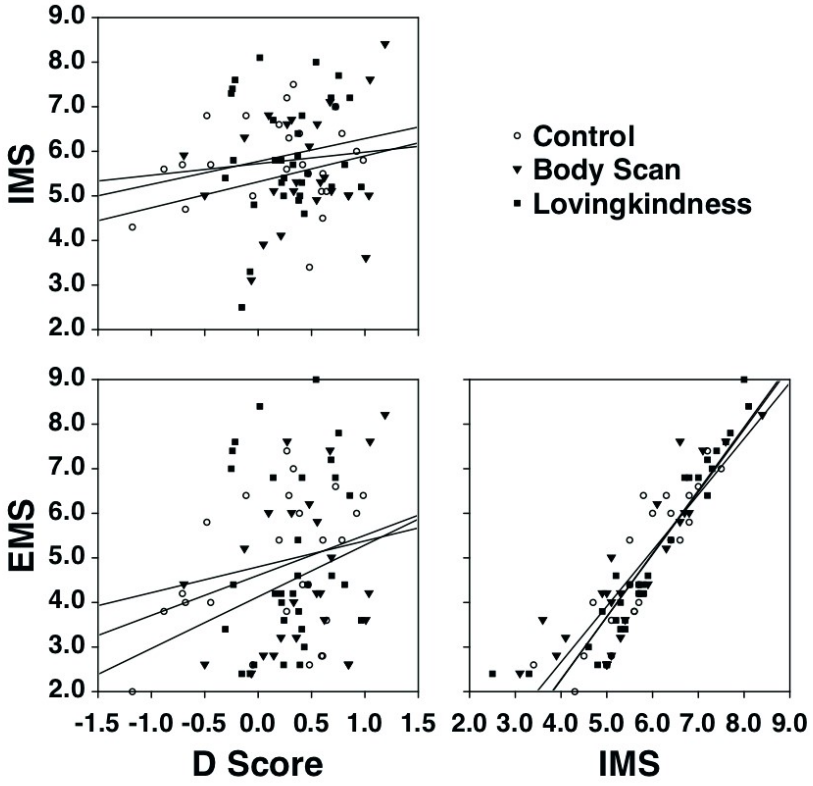


Figure 7. Scatterplot matrix showing data from Figure 6 with three lines in each scatterplot to show best-fitting lines for each of the three mindfulness conditions.

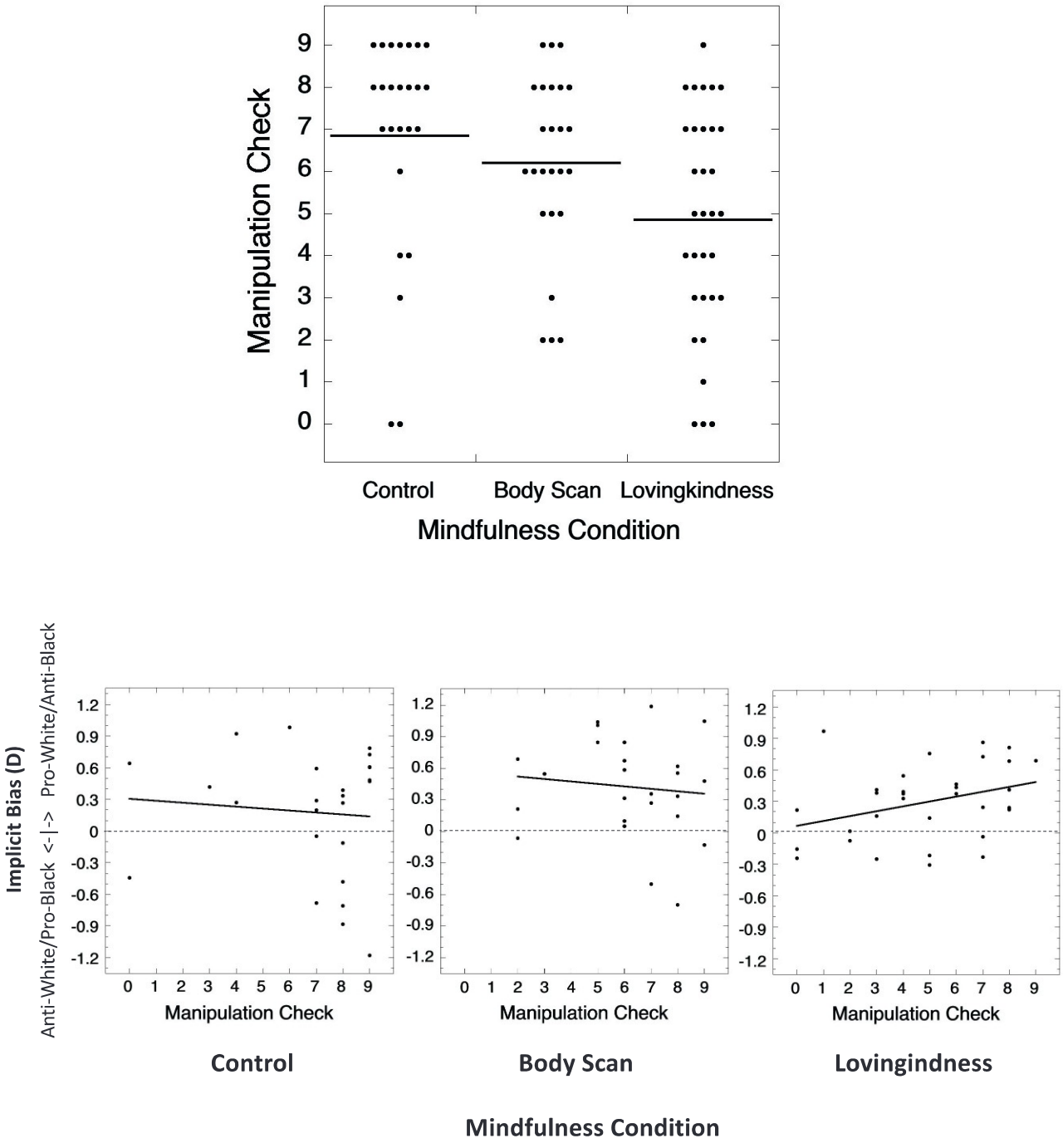


Figure 8. Manipulation check ratings of engagement in the audio recording as a function of mindfulness condition (upper panel) and mindfulness condition X implicit racial bias (*D*) (lower panel). Upper panel: Participants rated on a scale from 0-9 how engaged they were with the audio recording. Horizontal bars indicate mean rating per condition. Lower panel: best fitting lines were fit using a least squares method.

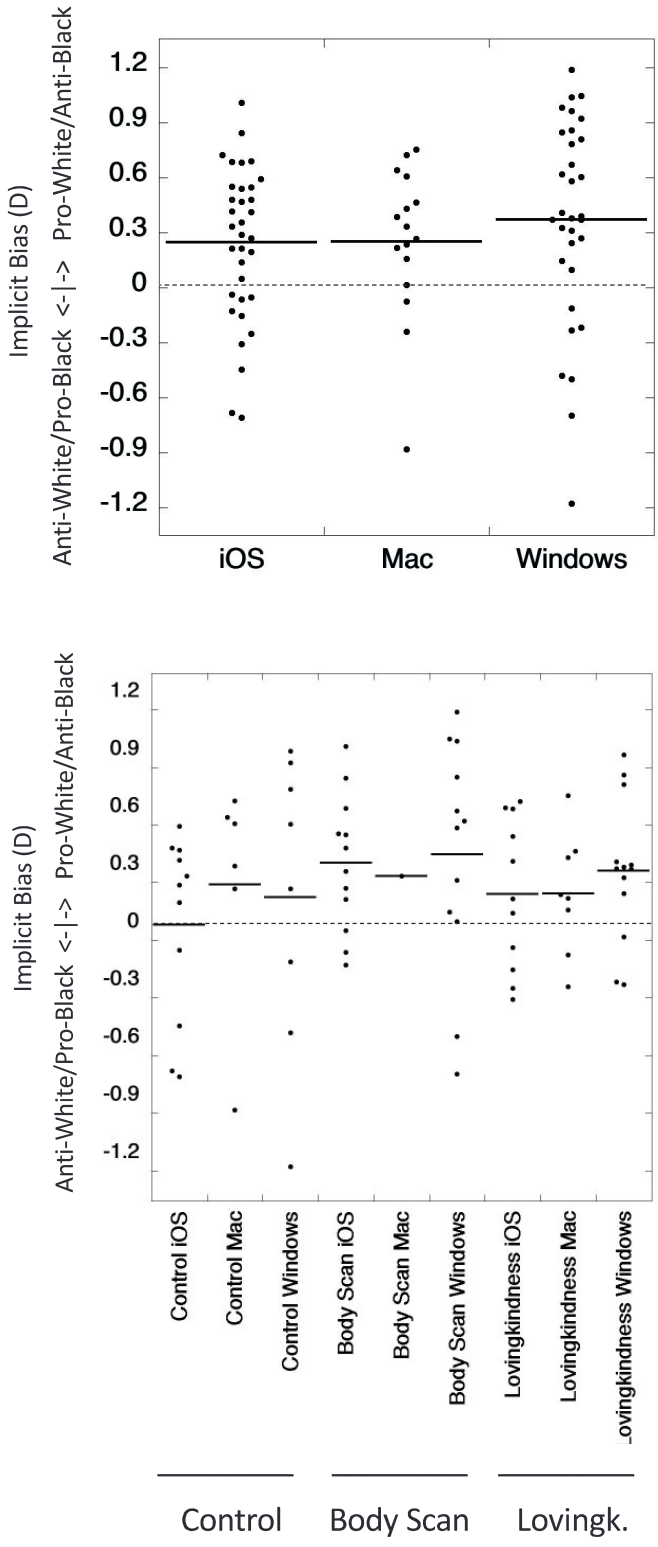


Figure 9. Implicit racial bias (*D*) as a function of device type (upper panel) and device type X mindfulness condition (lower panel) of mindfulness condition (upper panel) and mindfulness condition X implicit racial bias (*D*) (lower panel). Horizontal bars indicate means.

Chapter V

Discussion

This study was designed to replicate and extend the results of prior studies that indicated body scan meditation and lovingkindness meditation reduced implicit racial bias in white adults (Lueke & Gibson, 2015; Stell & Farsides, 2016; Kang et al., 2014). The study randomized 82 white, non-Hispanic adults into either an active control condition (i.e., a 6-minute lecture on mindfulness), a 6-minute BSM condition, or a 6-minute LKM condition. It was predicted that both meditation conditions would yield less implicit racial bias on the implicit association test than the control.

Of white participants, 69.5% exhibited a pro-white implicit bias, consistent with **Hypothesis 1**. Although the sample exhibited, on average, significant pro-white implicit racial bias, the sample mean *D* score was significantly lower than a national sample of white participants (Nosek et al., 2002). The sample *D* was also lower than the controls and mindfulness conditions in the Lueke and Gibson (2015) and Stell and Farsides (2016) studies, although not significant. Contrary to predictions (**Hypothesis 2 and 3**), both the BSM and LKM conditions exhibited a tendency (albeit not a statistically-significant one) to show *more* racial bias than controls. Thus, Hypothesis 2 and Hypothesis 3 were not supported.

The absolute values of IAT scores were used to analyze total bias (distance from zero) regardless of a white or black bias. Contrary to predictions, the BSM condition did not exhibit less total implicit racial bias than the control condition and /*D*/ scores of each were close to being equal to each other (**Hypothesis 4**). As predicted, the LKM condition exhibited significantly less total bias than the control condition (**Hypothesis 5**) ($t[55]=2.2$, $p< 0.016$). Total bias reduction is a promising target of intervention and there was not a total bias analyses in prior studies.

Arguably, total bias reduction is a superior target of intervention than simply a reduction of pro-white bias.

Findings Consistent with Previous Research

The study sample and two meditation conditions exhibited significant implicit racial bias. The control exhibited racial bias however not significantly greater than zero. The sample exhibited far less racial bias than a national sample (Nosek et al., 2002) and previous meditation / IAT studies mentioned, with the exception of Kang et al. (2014). Charlesworth and Banaji (2018) calculated IAT scores are trending toward zero, significantly since 2012. It is possible this sample is an example of the downward trend or the fact that this sample was adults ages 20 to 70, whereas other comparable studies used much younger undergraduates.

As with previous research, IAT scores correlated, significantly, however, weakly with explicit measures of prejudice. This study found a significant relationship between IAT scores and EMS scores. There was no relationship between IMS scores and *D* scores.

The results were not explained by participant age, gender, participant meditation experience, manipulation check ratings, or device platform. Consistent with Greenwald et al. (1998), there were no order effects by counterbalanced IATs according to the ANOVAs for white participants. Also consistent with earlier literature, the age of participants did not affect IAT scores. This study had a much wider range of ages (20 - 70) than comparable studies with undergraduate students (ages 18-25) (Kang et al, 2014; Stell & Farsides, 2016; Lueke & Gibson, 2015).

Findings of Interest

The analysis of absolute values revealed the LKM condition exhibited significantly lower total implicit racial bias, revealed by a specific comparisons *t*-test. This is an attractive

intervention target since Kang et al. (2014) reduced a condition of meditators from roughly zero bias to an increased pro-black bias post-intervention.

Participants used multiple devices to complete the study online. *D* scores did not differ significantly by type of device. This study will be a benchmark for the convenience and validity of online data collection.

Implications

This study failed to replicate the results of prior studies. BSM and LKM both did not reduce implicit racial bias compared to the control condition. The control condition exhibited lower implicit bias than both meditation conditions in this study and all conditions in Lueke and Gibson (2015) and Stell and Farsides (2016). The effects of the control audio intervention are unknown, and it calls into question the efficacy of the meditation interventions and control interventions in this study and prior studies. It also brings up the conundrums and methodological issues put forth by Davidson and Kaszniak (2015). That is, multiple mindfulness studies compare meditation interventions to active controls that potentially produce spurious effects. One solution is using evidence-based treatments as controls or "sham" mindfulness conditions. Sham conditions are equivalent in all the same elements of the meditation condition, however, alter the instructions into vague, mindful sounding prompts, that are not derived from mindfulness-based interventions. Another potential solution is to measure each participant's baseline IAT scores (*D*) before administering any of the 6 minute controls or interventions. This would have the advantage of more accurately targeting changes specific to each intervention.

To compare interventions of prior studies with this studies interventions, Figure 10 displays the hypothesized results of this study compared to the control condition intervention from Lueke and Gibson (2015). Potentially, this study's control condition affects implicit racial

bias compared to the control from Lueke and Gibson (2015) (an audio intervention thought to produce spurious effects by this author, as discussed in previous sections).

The meditation interventions did not produce the predicted effect in a sample of mostly non-meditators. There is a question to whether there are risks or adverse effects of meditation. For example, is asking a non-meditator to meditate equivalent to asking a non-religious person to

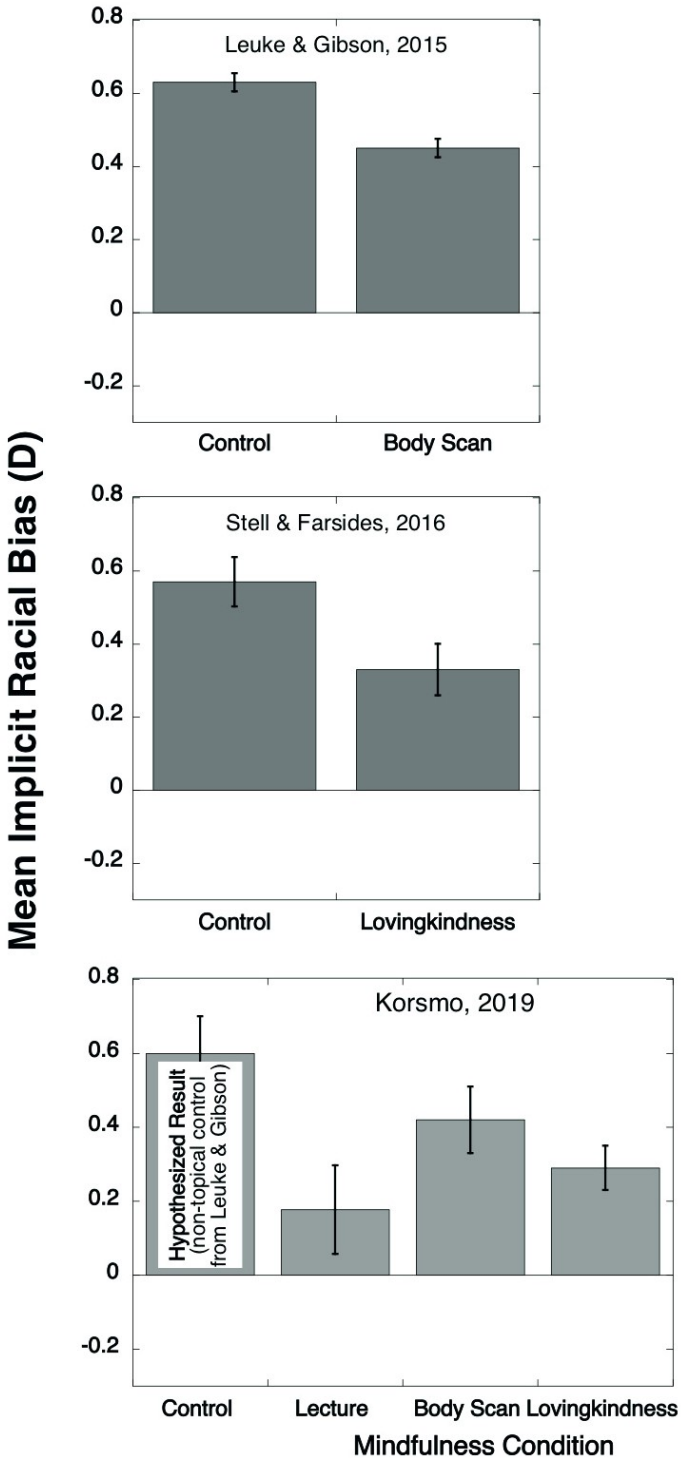


Figure 10. Hypothesized outcome for a modified control condition compared to current study and two previous studies. Mean implicit racial bias scores (*D*) from the Implicit Association Test (IAT) for individuals assigned to either a control condition or "mindfulness meditation" conditions from three studies. Bars denote + 1 *SE*. Positive values denote a detection bias against Blacks and favoring Whites, whereas negative values denote a bias against Whites and favoring Blacks and it is unknown if predictive validity is altered when implicit bias is altered. Although the waitlist control and active control (lovingkindness discussion group) had a very low White bias, both exhibited less total bias (results nearer to 0) than the LKM condition**.**

pray? Further studies could capture qualitative data regarding audio meditation interventions. Additionally, more piloting of meditation interventions is warranted.

Limitations, Confounds, and Further Study

The present study had multiple dimensions that could be expanded to better understand meditation and implicit racial bias. Experimental conditions were compared to an active control, however, there was no pure control, such as a waitlist control, to compare results too. For example, there could have been a condition that had participants complete the IAT and IMS and EMS only, without any intervention. Two other helpful comparisons could have been a condition where participants were administered the same audio interventions, however, in-person, and another where the meditation intervention was in-person and instructor led. These additional conditions could illuminate if there are differences between groups across technology or in-person delivered meditation.

Testing multiple interventions of various lengths and delivery methods could expand the study immensely. The effects on IAT scores from other mind-body and mindfulness interventions have yet to be compared. Breathing exercises, basic yoga, lengthier body scan and lovingkindness meditations, and classic behavioral interventions such as progressive muscle relaxation could be used in multiple design configurations. Multiple interventions would provide the opportunity to test a plethora of combinations of type and length of intervention that would give an opportunity for deeper analysis. Additionally, this study and others administered the IAT post-intervention without follow up. The duration of effects on implicit racial bias from meditation are unknown and an important dimension for further study.

Adding self-report measures of state and trait mindfulness, interoceptive awareness, explicit racial bias, cognitive factors, and perceived stress could deepen understanding of the effects of meditation on IAT scores. The measures would include: the Five Facet Mindfulness

Questionnaire (Baer et al., 2008) to assess mindfulness, the multidimensional assessment of interoceptive awareness (MAIA) to assess interoceptive awareness, (Mehling et al., 2012), the Color-Blind Racial Attitudes Scale (CoBRAS)(Neville, Lilly, Duran, Lee,& Browne, 2000) a measure of cognitive aspects of racial attitudes, the Perceived stress scale (Cohen, Kamarck, & Mermelstein, 1983) a measure stress and valid proxy for salivary cortisol levels (Filaire, Rouveix, Alix, & Le Scanff, 2007), and the Multi-Source Interference Task (Bush & Shin, 2006) to measure cognitive control, a construct thought to influence the reduction of bias through executive functioning (Monteith, Arthur, & Flynn, 2010).

Additional implicit measures administered with the IAT can evaluate how the IAT relates to other implicit measures after a meditation intervention. Stereotype and guilty/not guilty IATs could be completed along with the race IAT. Also, the Police Officer's Dilemma, a first-person simulated shooting task has been researched with police officer's and undergraduates (Correll et al., 2014), and has been proposed as an alternative to using the race IAT in meditation studies (Dorian, Korsmo, Humphery & Korsmo, 2017). It is also an implicit measure yet the effects of meditation on scores are unknown.

As mentioned in the limitations section, adding additional measures and interventions would further this body of research. Theoretically, with the use of technology, a study could be designed that continuously gathers data, like Project Implicit (2011). All the measures mentioned in the limitations section are available for Inquisit Web, the application used for this study.

Control of spurious or unknown effects in active control manipulations and meditation interventions need to further tighten. Increases in fidelity of interventions across studies will rule out doubts and spurious effects of the interventions.

There has yet to be a study involving psychophysiological measures, meditation, and the IAT. Although expensive and time intensive, psychophysiological measures could provide an

entire dimension of analysis that would greatly illuminate the nuances of individual differences and implicit racial bias.

There are many issues in mindfulness literature, specifically, “how do we know if mindfulness is actually happening in an individual?” Hadash and Bernstein (2018) and Levinson et al. (2018) have proposed behavioral measures of mindfulness. Self-report of mindfulness measures does not necessarily correlate with mindfulness practices. For example, post meditation intervention, subjects complete a breath counting task. Accuracy on the task is associated with advanced meditators and state mindfulness. Hadash and Bernstein (2018) call for IATs as measures of attitude changing effects of mindfulness.

Similarly, are studies like these are to influence future real-world interventions, then there is a need to more strongly establish if implicit bias, as measured by the IAT, predicts racially biased behavior in real world situations, AND to establish if modifying the individuals’ IAT results in a reduction of racially-biased behaviors. Since this author began this study, there has been a renewed controversy over the predictive validity of the IAT (Forscher, Lai, Axt, Ebersole, Herman, Devine & Nosek, 2018). Forscher et al. conducted a meta-analysis of 494 studies of implicit bias, and concluded that when participants reduce their IAT bias, this results in at best trivial changes in racially-biased behavior. These findings are in contrast to those of Greenwald et al. (2009), and have led to considerable debate and disagreement (Bartlett, 2017).

Conclusion

This study randomized 82 white, non-Hispanic adult participants, ages 20-70, to either a control condition that listened to 6 minutes of audio with no meditation instruction, a body scan meditation condition that listened to 6 minutes of meditation instructions, or a lovingkindness meditation condition that listened to 6 minutes of meditation instruction. All participants completed the race IAT and the IMS and EMS, a measure of explicit prejudice. It was predicted

that both meditation conditions would exhibit less racial bias than the control condition, however, the control condition exhibited less racial bias than both medication conditions. Thus, this study failed to replicate earlier results from other meditation and implicit racial bias studies that found meditation reduced implicit racial bias. By taking the absolute values of implicit bias scores, it was discovered that the lovingkindness meditation condition significantly exhibited the least total bias of all conditions. This study could provide a benchmark of the online delivery of future studies since results were not affected by device type. These results call into question flaws in earlier studies and incite the need for further research into the effects of meditation on implicit racial bias.

References

Amodio, D. M. (2014). The neuroscience of prejudice and stereotyping. *Nature Reviews Neuroscience*, 15(10), 670.

Amodio, D. M. (2018). Social Cognition 2.0: An Interactive Memory Systems Account. *Trends in cognitive sciences and social psychology*, 83, 380–393.

Asendorpf, J. B., Banse, R., & Mücke, D. (2002). Double dissociation between implicit and explicit personality self-concept: The case of shy behavior. *Journal of personality and social psychology*, 83(2), 380.

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., ... & Williams, J. M. G. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment*, 15(3), 329-342.

Banaji, M. R., Hardin, C., & Rothman, A. J. (1993). Implicit stereotyping in person judgment. *Journal of personality and Social Psychology*, *65*(2), 272.

Bargh, J. A., & Pietromonaco, P. (1982). Automatic information processing and social perception: The influence of trait information presented outside of conscious awareness on impression formation. *Journal of personality and Social psychology*, 43(3), 437.

Bartlett, T. (2017). Can we really measure implicit bias? Maybe not. The Chronicle of Higher Education, *63* (21),

Bennett, M. W., Carbado, D. W., Casey, P., Dasgupta, N., Faigman, D. L., Godsil, R. D., Greenwald, A. G. , Levinson, J. D., & Mnookin, J. L. (2012). Implicit bias in the courtroom. *UCLA Law Review*, *59*, 1124–1186

Berger, R., Brenick, A., & Tarrasch, R. (2018). Reducing Israeli-Jewish pupils' outgroup prejudice with a mindfulness and compassion-based social-emotional program. *Mindfulness*, 1-12.

Boysen, G. A., Vogel, D. L., & Madon, S. (2006). A public versus private administration of the implicit association test. *European Journal of Social Psychology*, 36(6), 845-856.

Brosch, T., Bar-David, E., & Phelps, E. A. (2013). Implicit race bias decreases the similarity of neural representations of black and white faces. *Psychological science*, 24(2), 160-166.

Brown, K. W., & Ryan, R. M. (2004). Perils and promise in defining and measuring mindfulness: Observations from experience. *Clinical Psychology: Science and Practice*, 11(3), 242-248.

Bush, G., & Shin, L. M. (2006). The Multi-Source Interference Task: an fMRI task that reliably activates the cingulo-frontal-parietal cognitive/attention network. *Nature protocols*, 1(1), 308.

Charlesworth, T. E., & Banaji, M. R. (2019). Patterns of implicit and explicit attitudes: I. Long-term change and stability from 2007 to 2016. *Psychological science*, 0956797618813087.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of health and social behavior*, 385-396.

Conrey, F. R., Sherman, J. W., Gawaronski, B., Hugenberg, K., & Groom, C. J. (2005). Separating multiple processes in implicit social cognition: The quad model of implicit task performance. *Journal of Personality and Social Psychology*, 89, 469–487.

Correll, J., Hudson, S. M., Guillermo, S., & Ma, D. S. (2014). The police officer's dilemma: A decade of research on racial bias in the decision to shoot. *Social and Personality Psychology Compass*, 8(5), 201-213.

Correll, J., Park, B., Judd, C. M., & Wittenbrink, B. (2002). The police officer's dilemma: Using ethnicity to disambiguate potentially threatening individuals. *Journal of personality and social psychology*, 83(6), 1314.

Correll, J., Park, B., Judd, C. M., Wittenbrink, B., Sadler, M. S., & Keesee, T. (2007). Across the thin blue line: police officers and racial bias in the decision to shoot. *Journal of personality and social psychology*, 92(6), 1006.

Creswell, J. D. (2017). Mindfulness interventions. *Annual review of psychology*, 68, 491-516.

Cropley, M., Ussher, M., & Charitou, E. (2007). Acute effects of a guided relaxation routine (body scan) on tobacco withdrawal symptoms and cravings in abstinent smokers. *Addiction*, 102(6), 989-993.

Cunningham, W. A., Raye, C. L., & Johnson, M. K. (2004). Implicit and explicit evaluation: fmri correlates of valence, emotional intensity, and control in the processing of attitudes. *Journal of Cognitive Neuroscience*, 16(10), 1717–1729. https://doi-org.ncc1701.libprox.jfku.edu:2443/10.1162/0898929042947919

Dahl, C. J., Lutz, A., & Davidson, R. J. (2015). Reconstructing and deconstructing the self: cognitive mechanisms in meditation practice. *Trends in cognitive sciences*, 19(9), 515-523.

Dasgupta, N. (2009). 13 Mechanisms Underlying the Malleability of Implicit Prejudice and Stereotypes. *Handbook of prejudice, stereotyping, and discrimination*, 267.

Dasgupta, N., McGhee, D. E., Greenwald, A. G., & Banaji, M. R. (2000). Automatic preference for white Americans: Eliminating the familiarity explanation. *Journal of Experimental Social Psychology*, 36, 316–328. doi:10.1006/jesp.1999.14

Davidson, R. J., & Dahl, C. J. (2018). Outstanding challenges in scientific research on mindfulness and meditation. *Perspectives on Psychological Science*, 13(1), 62-65.

Davidson, R. J., & Kaszniak, A. W. (2015). Conceptual and methodological issues in research on mindfulness and meditation. *American Psychologist*, 70(7), 581.

Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S. F., ... & Sheridan, J. F. (2003). Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic medicine*, 65(4), 564-570.

Devine, P. G., Plant, E. A., Amodio, D. M., Harmon-Jones, E., & Vance, S. L. (2002). The regulation of explicit and implicit race bias: The role of motivations to respond without prejudice. *Journal of personality and social psychology*, 82(5), 835.

Ditto, B., Eclache, M., & Goldman, N. (2006). Short-term autonomic and cardiovascular effects of mindfulness body scan meditation. *Annals of Behavioral Medicine*, 32(3), 227-234.

Dorian, M., Humphery, R., Korsmo, B. & Peterzell, D.H. (2017). *The role of mindfulness in reducing implicit racial bias and bias related incidents*. 22nd annual International Conference on Violence, Abuse & Trauma, San Diego, Sept 2017.

Dorian, M., Sharp, S., Ashokar, J., & Abbott, J., Caspi, H., Henry, L., Yokoyama, K. & Peterzell, D.H. (2016). *Can mindfulness reduce implicit racial bias?: The role of signal detection accuracy and bias in high stakes situations*. 19th Annual American Association of Behavioral and Social Sciences Conference, Las Vegas, Nevada (USA), February 1, 2016.

Dovidio, J. F., Evans, N., & Tyler, R. B. (1986). Racial stereotypes: The contents of their cognitive representations. *Journal of Experimental Social Psychology*, 22(1), 22-37

Dovidio, J. F., Kawakami, K., & Gaertner, S. L. (2002). Implicit and explicit prejudice and interracial interaction. *Journal of Personality and Social Psychology*, 82, 62–68.

Dreeben, S. J., Mamberg, M. H., & Salmon, P. (2013). The MBSR body scan in clinical practice. *Mindfulness*, 4(4), 394-401.

Fazio, R. H., Sanbonmatsu, D. M., Powell, M. C., & Kardes, F. R. (1986). On the automatic activation of attitudes. *Journal of personality and social psychology*, 50(2), 229.

Filaire, E., Rouveix, M., Alix, D., & Le Scanff, C. (2007). Motivation, stress, anxiety, and cortisol responses in elite paragliders. *Perceptual and Motor Skills*, 104, 1271-1281.

Fish, J., Brimson, J., & Lynch, S. (2016). Mindfulness interventions delivered by technology without facilitator involvement: What research exists and what are the clinical outcomes? *Mindfulness*, 7(5), 1011–1023.

Forscher, P. S., Lai, C. K., Axt, J., Ebersole, C. R., Herman, M., Devine, P. G., & Nosek, B. A. (2018, in press). A meta-analysis of procedures to change implicit measures. *Open Science Framework.* https://doi.org/10.31234/osf.io/dv8tu

Fredrickson, B. L., Cohn, M. A., Coffey, K. A., Pek, J., & Finkel, S. M. (2008). Open hearts build lives: Positive emotions, induced through loving-kindness meditation, build consequential personal resources. *Journal of Personality and Social Psychology*, 95(5), 1045–1062. https://doi-org.ncc1701.libprox.jfku.edu:2443/10.1037/a0013262

Fredrickson, B. L., Tugade, M. M., Waugh, C. E., & Larkin, G. R. (2003). What good are positive emotions in crisis? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *Journal of Personality and Social Psychology,* 84(2), 365–376. doi:10. 1037/0022-3514.84.2.365.

Garageband [Computer software]. (2018). Retrieved from https://www.apple.com/mac/garageband/

Gilbert, S. J., Swencionis, J. K., & Amodio, D. M. (2012). Evaluative vs. trait representation in intergroup social judgments: Distinct roles of anterior temporal lobe and prefrontal cortex. *Neuropsychologia*, 50(14), 3600-3611.

Goldberg S., Tucker R., Greene P., Davidson R., Wampold B. (2018). Mindfulness-based interventions for psychiatric disorders: a systematic review and meta-analysis. *Clinical Psychology*. Rev. 59:52–60

Graf, P., & Schacter, D. L. (1985). Implicit and explicit memory for new associations in normal and amnesic subjects. *Journal of Experimental Psychology: Learning, memory, and cognition*, 11(3), 501.

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: 4–27.

Greenwald, A. G. (1992). New Look 3: Reclaiming unconscious cognition. *American Psychologist*, 47, 766-779

Greenwald, A. G., & Banaji, M. R. (2017). The implicit revolution: Reconceiving the relation between conscious and unconscious. *American Psychologist*, 72(9), 861.

Greenwald, A. G., & De Houwer, J. (2017). Unconscious conditioning: Demonstration of existence and difference from conscious conditioning. *Journal of Experimental Psychology: General*, 146(12), 1705.

Greenwald, A. G., & Krieger, L. H. (2006). Implicit bias: Scientific foundations. *California Law Review*, 94(4), 945-967.

Greenwald, A. G., Banaji, M. R., & Nosek, B. A. (2015). Statistically small effects of the implicit association test can have societally large effects. *Journal of Personality and Social Psychology*, 108(4), 553-561. doi:10.1037/pspa0000016

Greenwald, A. G., Banaji, M. R., Rudman, L. A., Farnham, S. D., Nosek, B. A., & Mellott, D. S. (2002). A unified theory of implicit attitudes, stereotypes, self-esteem, and self-concept. *Psychological Review*, 109, 3-25.

Greenwald, A. G., McGhee, D. E., & Schwartz, J. K. L. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology*, 74, 1464-1480.

Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the implicit association test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology*, 85, 197-216

Greenwald, A. G., Poehlman, T. A., Uhlmann, E., & Banaji, M. R. (2009). Understanding and using the Implicit Association Test: III. Meta-analysis of predictive validity. *Journal of Personality and Social Psychology*, 97, 17–41.

Hadash, Y., & Bernstein, A. (2018). *Behavioral assessment of mindfulness: Defining features, organizing framework, and emerging methods*. Manuscript submitted for publication.

Hafenbrack, A. C., Kinias, Z., & Barsade, S. G. (2014). Debiasing the mind through meditation: Mindfulness and the sunk-cost bias. *Psychological Science*, *25*(2), 369-376.

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2002). Review of *Acceptance and Commitment Therapy: An Experiential Approach to Behavior Change.*

Hehman, E., Flake, J. K., & Calanchini, J. (2018). Disproportionate use of lethal force in policing is associated with regional racial biases of residents. *Social psychological and personality science*, 9(4), 393-401.

Hilgard, J., Bartholow, B. D., Dickter, C. L., & Blanton, H. (2014). Characterizing switching and congruency effects in the Implicit Association Test as reactive and proactive cognitive control. *Social cognitive and affective neuroscience*, *10*(3), 381-388.

Hirshberg M.J., Goldberg S.B., Schaefer S.M., Flook L., Findley D., & Davidson R.J. (2018). Divergent effects of brief contemplative practices in response to an acute stressor: A randomized controlled trial of brief breath awareness, loving-kindness, gratitude or an attention control practice. *PLoS ONE,* 13 (12): e0207765. https://doi.org/10.1371/journal.pone.0207765

Hölzel, B. K., Carmody, J., Vangel, M., Congleton, C., Yerramsetti, S. M., Gard, T., & Lazar, S. W. (2011). Mindfulness practice leads to increases in regional brain gray matter density. *Psychiatry Research: Neuroimaging*, 191(1), 36-43.

Hutcherson, C. A., Seppala, E. M., & Gross, J. J. (2008). Loving-kindness meditation increases social connectedness. *Emotion,* 8(5), 720–724.

IBM Corp. Released 2017. IBM SPSS Statistics for Mac, Version 25.0. Armonk, NY: IBM Corp.

Inquisit 5 [Computer software]. (2016). Retrieved from https://www.millisecond.com

Ito, T. A., Friedman, N. P., Bartholow, B. D., Correll, J., Loersch, C., Altamirano, L. J., & Miyake, A. (2015). Toward a comprehensive understanding of executive cognitive function in implicit racial bias. *Journal of Personality and Social Psychology*, 108(2), 187.

Kabat-Zinn J. (1982). An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: theoretical considerations and preliminary results. *General Hospital Psychiatry* 4(1):33–47

Kabat-Zinn, J. (2012). Lovingkindness / Heartscape. On Guided Mindfulness Practices with Jon Kabat-Zinn- Series 3. [CD]. Sounds True.

Kabat-Zinn, J. [Google]. (2011, October 11). Mindfulness by Jon Kabat-Zinn [Video file]. Retrieved from https://youtu.be/3nwwKbM_vJc

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: past, present, and future. *Clinical psychology: Science and practice*, 10(2), 144-156.

Kang, Y., Gray, J. R., & Dovidio, J. F. (2014). The nondiscriminating heart: Lovingkindness meditation training decreases implicit intergroup bias. *Journal of Experimental Psychology: General*, 143(3), 1306.

Kemper, K. J. (2017). Brief online mindfulness training: Immediate impact. *Journal of Evidence-Based Complementary & Alternative Medicine*, 22(1), 75–80. https://doi-org.ncc1701.libprox.jfku.edu:2443/10.1177/2156587216639199

Kemper, K. J., & Rao, N. (2017). Brief online focused attention meditation training: Immediate impact. *Journal of Evidence-Based Complementary & Alternative Medicine*, 22(3), 395–400. https://doi-org.ncc1701.libprox.jfku.edu:2443/10.1177/2156587216663565

Kemper, K. J., Rao, N., Gascon, G., & Mahan, J. D. (2017). Online training in mind-body therapies: Different doses, long-term outcomes. *Journal of Evidence-Based Complementary & Alternative Medicine*, 22(4), 696–702. https://doi-org.ncc1701.libprox.jfku.edu:2443/10.1177/2156587217701857

Korsmo, B (2019, January 19). *Recruitment video for dissertation research 2018.* Retrieved from https://youtu.be/UjqDeEofc0w

Korsmo, B. (2019, January 18). *Can mindfulness meditation reduce implicit racial bias? Dissertation audio recordings.* Retrieved from https://soundcloud.com/benjamin-korsmo

Kubota, J. T., Banaji, M. R., & Phelps, E. A. (2012). The neuroscience of race. *Nature neuroscience*, 15(7), 940.

Lai, C. K., Marini, M., Lehr, S. A., Cerruti, C., Shin, J.-E. L., Joy-Gaba, J. A., et al. (2014). Reducing implicit racial preferences: I. A comparative investigation of 17 interventions. *Journal of Experimental Psychology: General*, 143(4), 1765–1785.

Lai, C. K., Skinner, A. L., Cooley, E., Murrar, S., Brauer, M., Devos, T., ... & Simon, S. (2016). Reducing implicit racial preferences: II. Intervention effectiveness across time. *Journal of Experimental Psychology: General*, 145(8), 1001.

Lane, K. A., Banaji, M. R., Nosek, B. A., & Greenwald, A. G. (2007). Understanding and using the implicit association test: iv. what we know (so far) (Pp. 59–102). In B. Wittenbrink & N. S. Schwarz (Eds.). *Implicit measures of attitudes: Procedures and controversies.* New York: Guilford Press.

Lau, M. A., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., ... & Devins, G. (2006). The Toronto mindfulness scale: Development and validation. *Journal of clinical psychology*, 62(12), 1445-1467.

Legault, L., Gutsell, J. N., & Inzlicht, M. (2011). Ironic effects of antiprejudice messages: How motivational interventions can reduce (but also increase) prejudice. *Psychological Science*, 22(12), 1472-1477.

Levinson, D. B., Stoll, E. L., Kindy, S. D., Merry, H. L., & Davidson, R. J. (2014). A mind you can count on: validating breath counting as a behavioral measure of mindfulness. *Frontiers in psychology*, 5, 1202.

Levinson, J. D., Cai, H., & Young, D. (2010). Guilty by implicit racial bias: The guilty/not guilty Implicit Association Test. *Ohio St. J. Crim. L.*, 8, 187.

Li, W., Howard, M. O., Garland, E. L., McGovern, P., & Lazar, M. (2017). Mindfulness treatment for substance misuse: A systematic review and meta-analysis. *Journal of Substance Abuse Treatment,* 75, 62-96.

Linehan, M. M., Comtois, K. A., Murray, A. M., Brown, M. Z., Gallop, R. J., Heard, H. L., ... & Lindenboim, N. (2006). Two-year randomized controlled trial and follow-up of dialectical behavior therapy vs therapy by experts for suicidal behaviors and borderline personality disorder. *Archives of general psychiatry*, 63(7), 757-766.

Lueke, A., & Gibson, B. (2015). Mindfulness meditation reduces implicit age and race bias: The role of reduced automaticity of responding. *Social Psychological and Personality Science*, 6(3), 284-291.

Lueke, A., & Gibson, B. (2016). Brief mindfulness meditation reduces discrimination. *Psychology of Consciousness: Theory, Research, and Practice*, 3(1), 34.

Lutz, A., Slagter, H. A., Dunne, J. D., & Davidson, R. J. (2008). Attention regulation and monitoring in meditation. *Trends in cognitive sciences*, 12(4), 163-169.

Marini, M., Banaji, M. R., & Pascual-Leone, A. (2018). Studying Implicit Social Cognition with Noninvasive Brain Stimulation. *Trends in cognitive sciences.*

McConahay, J. B. (1986). *Modern racism, ambivalence, and the modern racism scale.*

McConnell, A. R., & Leibold, J. M. (2001). Relations among the Implicit Association Test, discriminatory behavior, and explicit measures of racial attitudes. *Journal of Experimental Social Psychology*, 37(5), 435–442. https://doi-org.ncc1701.libprox.jfku.edu:2443/10.1006/jesp.2000.1470

Mehling, W. E., Price, C., Daubenmier, J. J., Acree, M., Bartmess, E., & Stewart, A. (2012). The multidimensional assessment of interoceptive awareness (MAIA). *PLOS One*, 7(11), e48230.

Metcalfe, C., & Chiricos, T. (2018). Race, plea, and charge reduction: An assessment of racial disparities in the plea process. *Justice Quarterly*, 35(2), 223-253.

Monteith, M. J., Arthur, S. A., & Flynn, S. M. (2010). Self-regulation and bias. In J. F. Dovidio, M. Hewstone, P. Glick, & V. M. Esses (Eds.), *Sage handbook of prejudice, stereotyping,*

and discrimination, (pp. 493– 507). London, United Kingdom: Sage. doi:10.4135/9781446200919.n30

Neville, H. A., Lilly, R. L., Duran, G., Lee, R. M., & Browne, L. (2000). Construction and initial validation of the color-blind racial attitudes scale (CoBRAS). *Journal of Counseling Psychology*, 47(1), 59.

Nosek, B. A., & Smyth, F. L. (2007). A multitrait-multimethod validation of the implicit association test. *Experimental psychology*, 54(1), 14-29.

Nosek, B. A., Banaji, M. R., & Greenwald, A. G. (2002). Harvesting implicit group attitudes and beliefs from a demonstration web site. *Group Dynamics: Theory, Research, and Practice*, 6(1), 101.

Nosek, B. A., Greenwald, A. G., & Banaji, M. R. (2005). Understanding and using the Implicit Association Test: II. Method variables and construct validity. *Personality and Social Psychology Bulletin*, 31, 166–180

Nosek, B. A., Greenwald, A. G., & Banaji, M. R. (2007). The Implicit Association Test at age 7: A methodological and conceptual review (Pp. 265–292). In J. A. Bargh (Ed.), *Automatic processes in social thinking and behavior*. Psychology Press.

Nosek, B. A., Hawkins, C. B., & Frazier, R. S. (2011). Implicit social cognition: From measures to mechanisms. *Trends in cognitive sciences*, 15(4), 152-159.

Nosek, B. A., Smyth, F. L., Hansen, J. J., Devos, T., Lindner, N. M., Ratliff (Ranganath), K. A., Smith, C. T., Olson, K. R., Chugh, D., Greenwald, A. G., & Banaji, M. R. (2007). Pervasiveness and correlates of implicit attitudes and stereotypes. *European Review of Social Psychology*, 18, 36-88.

Oswald, F.L., Mitchell, G., Blanton, H., Jaccard, J.; Tetlock, P.E. (2013). "Predicting ethnic and racial discrimination: A meta-analysis of IAT criterion studies". *Journal of Personality and Social Psychology*. *105*: 171–192.

Oswald, F.L., Mitchell, G., Blanton, H., Jaccard, J.; Tetlock, P.E. (2013). "Predicting ethnic and racial discrimination: A meta-analysis of IAT criterion studies". *Journal of Personality and Social Psychology*. *105*: 171–192.

Ottmar V. Lipp, Kimberley M. Mallan, Frances H. Martin, Deborah J. Terry, Joanne R. Smith; Electro-cortical implicit race bias does not vary with participants' race or sex, *Social Cognitive and Affective Neuroscience*, Volume 6, Issue 5, 1 October 2011, Pages 591–601, https://doi.org/10.1093/scan/nsq089

Paola Sessa, Silvia Tomelleri, Roy Luria, Luigi Castelli, Michael Reynolds, Roberto Dell'Acqua; Look out for strangers! Sustained neural activity during visual working memory maintenance of other-race faces is modulated by implicit racial prejudice, *Social Cognitive and Affective Neuroscience*, Volume 7, Issue 3, 1 March 2012, Pages 314–321, https://doi.org/10.1093/scan/nsr011

Parks, S., Birtel, M. D., & Crisp, R. J. (2014). Evidence that a brief meditation exercise can reduce prejudice toward homeless people. *Social Psychology*.

Phelps, E. A., O'Connor, K. J., Cunningham, W. A., Funayama, E. S., Gatenby, J. C., Gore, J. C., & Banaji, M. R. (2000). Performance on indirect measures of race evaluation predicts amygdala activation. *Journal of Cognitive Neuroscience*, 12(5), 729-738.

Plant, E. A., & Devine, P. G. (1998). Internal and external motivation to respond without prejudice. *Journal of personality and social psychology*, 75(3), 811.

Project Implicit. (2011). Retrieved from http://www.projectimplicit.net

Rachlinski, J. J., Johnson, S. L., Wistrich, A. J., & Guthrie, C. (2008). Does unconscious racial bias affect trial judges. *Notre Dame L. Rev.*, 84, 1195.

Rao, N., & Kemper, K. J. (2017). Online training in specific meditation practices improves gratitude, well-being, self-compassion, and confidence in providing compassionate care among health professionals. *Journal of Evidence-Based Complementary & Alternative Medicine*, 22(2), 237–241.

Sabin, J. A., & Greenwald, A. G. (2012). The influence of implicit bias on treatment recommendations for 4 common pediatric conditions: pain, urinary tract infection, attention deficit hyperactivity disorder, and asthma. *American journal of public health*, 102(5), 988-995.

Sacheli, L. M., Christensen, A., Giese, M. A., Taubert, N., Pavone, E. F., Aglioti, S. M., & Candidi, M. (2015). Prejudiced interactions: Implicit racial bias reduces predictive simulation during joint action with an out-group avatar. *Scientific reports*, 5, 8507.

Sauer-Zavala, S. E., Walsh, E. C., Eisenlohr-Moul, T. A., & Lykins, E. L. (2013). Comparing mindfulness-based intervention strategies: differential effects of sitting meditation, body scan, and mindful yoga. *Mindfulness*, 4(4), 383-388.

Schmukle, S. C., & Egloff, B. (2004). Does the Implicit Association Test for assessing anxiety measure trait and state variance? *European Journal of Personality*, 18(6), 483-494.

Segal, Z. V., Williams, M., & Teasdale, J. (2018). *Mindfulness-based cognitive therapy for depression*. Guilford Publications.

Sellaro, R., Derks, B., Nitsche, M. A., Hommel, B., van den Wildenberg, W. P., van Dam, K., & Colzato, L. S. (2015). Reducing prejudice through brain stimulation. *Brain stimulation*, 8(5), 891-897.

Sherman, J. W., Gawronski, B., Gonsalkorale, K., Hugenberg, K., Allen, T. J., & Groom, C. J. (2008). The self-regulation of automatic associations and behavioral impulses. *Psychological Review*, 115, 314–335.

Siegel, E. F., Dougherty, M. R., & Huber, D. E. (2012). Manipulating the role of cognitive control while taking the implicit association test. *Journal of Experimental Social Psychology*, 48(5), 1057–1068. https://doi-org.ncc1701.libprox.jfku.edu:2443/10.1016/j.jesp.2012.04.011

Snyder, M., Tanke, E. D., & Berscheid, E. (1977). Social perception and interpersonal behavior: On the self-fulfilling nature of social stereotypes. *Journal of Personality and social Psychology*, 35(9), 656.

Stanovich, K. E., West, R. F., & Toplak, M. E. (2014). Rationality, intelligence, and the defining features of Type 1 and Type 2 processing. *Dual-process theories of the social mind*, 80-91.

Stell, A. J., & Farsides, T. (2016). Brief loving-kindness meditation reduces racial bias, mediated by positive other-regarding emotions. *Motivation and Emotion*, 40(1), 140-147.

Teige, S., Schnabel, K., Banse, R., & Asendorpf, J. B. (2004). Assessment of multiple implicit self-concept dimensions using the Extrinsic Affective Simon Task (EAST). *European Journal of Personality*, 18(6), 495-520.

Terbeck, S., Kahane, G., McTavish, S., Savulescu, J., Cowen, P. J., & Hewstone, M. (2012). Propranolol reduces implicit negative racial bias. *Psychopharmacology*, 222, 419–424. doi:10.1007/s00213-012-2657-5.

Wielgosz, J., Goldberg, S. B., Kral, T. R. A., Dunne, J. D., & Davidson, R. J. (2019). Mindfulness meditation and psychopathology. *Annual Review of Clinical Psychology*, 15. doi:10.1146/annurev-clinpsy-021815-093423

Williams, J. K., & Themanson, J. R. (2010). Neural correlates of the implicit association test: evidence for semantic and emotional processing. *Social cognitive and affective neuroscience*, 6(4), 468-476.

Williams, M., Teasdale, J., Segal, Z., & Kabat-Zinn, J. (2007). *The mindful way through depression: Freeing yourself from chronic unhappiness*. New York, NY, US: Guilford Press.

Zeidan, F., Johnson, S. K., Diamond, B. J., David, Z., & Goolkasian, P. (2010). Mindfulness meditation improves cognition: Evidence of brief mental training. *Consciousness and Cognition*, 19(2), 597-605.

Appendix A

Internal and External Motivation to Respond Without Prejudice Scale (Plant & Devin, 1998).

Internal Motivation to Respond Without Prejudice Scale (IMS) and External Motivation to Respond Without Prejudice Scale (EMS) Items

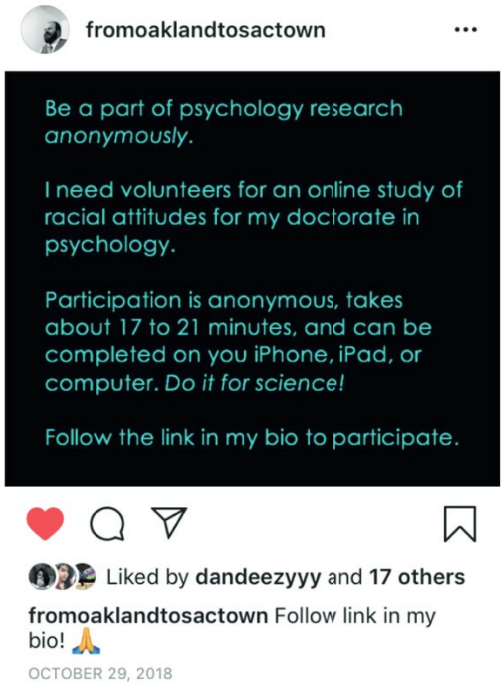
Instructions: The following questions concern various reasons or motivations people might have for trying to respond in nonprejudiced ways toward Black people. Some of the reasons reflect internal–personal motivations whereas others reflect more external–social motivations. Of course, people may be motivated for both internal and external reasons; we want to emphasize that neither type of motivation is by definition better than the other. In addition, we want to be clear that we are not evaluating you or your individual responses. All your responses will be completely confidential. We are simply trying to get an idea of the types of motivations that students in general have for responding in nonprejudiced ways. If we are to learn anything useful, it is important that you respond to each of the questions openly and honestly. Please give your response according to the scale below.

	Factor loadings	
Scale item	Factor 1: IMS	Factor 2: EMS
External motivation items		
Because of today's PC (politically correct) standards I try to appear nonprejudiced toward Black people.	.05	.73
I try to hide any negative thoughts about Black people in order to avoid negative reactions from others.	−.003	.78
If I acted prejudiced toward Black people, I would be concerned that others would be angry with me.	.22	.67
I attempt to appear nonprejudiced toward Black people in order to avoid disapproval from others.	−.16	.83
I try to act nonprejudiced toward Black people because of pressure from others.	−.22	.69
Internal motivation items		
I attempt to act in nonprejudiced ways toward Black people because it is personally important to me.	.76	.15
According to my personal values, using stereotypes about Black people is OK. (R)	.71	−.16
I am personally motivated by my beliefs to be nonprejudiced toward Black people.	.77	−.08
Because of my personal values, I believe that using stereotypes about Black people is wrong.	.77	−.05
Being nonprejudiced toward Black people is important to my self-concept.	.74	−.08

Note. (R) indicates reverse coded item. Participants rated 10 items on a scale ranging from 1 (*strongly disagree*) to 9 (*strongly agree*). When participants complete the scales, the IMS and EMS items are intermixed. The factor loadings are from an exploratory factor analysis.

Appendix B

Recruitment Email and Social Media Posts



Email message:
Hello friends and colleagues,

I am conducting a study on attitudes about race for my doctorate in psychology and need volunteers for an online experiment. Participation is anonymous and takes about 17 to 21 minutes to listen to an audio recording, complete an on-screen task, and answer questions about demographics and attitudes.

This study is voluntary, and your participation will be anonymous. I will not even know who has taken the survey. Your decision to participate or not will in no way impact our personal relationship, especially, since I will not know the identity of participants.

If you would like to be part of my study, please click on the following link https://mili2nd.co/rnkb

If you know anyone who would be interested in this research, feel free to forward it to them.

Sincerely,

Ben

Appendix C

Informed Consent

How to Participate in My Research Study

Thank you for checking out my study! I am Benjamin Korsmo, a doctoral student in clinical psychology at John F. Kennedy University in Pleasant Hill, CA. I am conducting a study on attitudes about race and prejudice. Participation is anonymous and I will not know the identity of anyone participating.

Preliminary Information

So, what will you be asked to do? You'll need about 20 minutes to complete the study. I will ask you (optionally) to listen to 6 minutes of audio, complete an on-screen task called the Implicit Association Test (IAT) that measures racial attitudes (5-7 minutes), report your reasons to not be prejudiced, and provide some general information about yourself (2-3 minutes). Also, I would like to compare possible differences among groups in their performance of the Implicit Association Test (IAT).

The IAT measures the strength of mental associations between white people and evaluations of good and bad, and black people and evaluations of good and bad. When doing an IAT you are asked to quickly sort words and pictures into categories. This IAT requires the ability to distinguish faces of European and African origin. In addition to the IAT, there are some survey questions about your beliefs, attitudes, and opinions, and some standard demographic questions.

Participation Requirements

1. To qualify for this study, you must be over the age of 18 and participate from within the United States.

2. It takes 17 to 21 minutes to complete the study.

3. You will need a computer, iPhone, or iPad, connected to the internet, and headphones.

[*participants only saw the version of #4 they were assigned to.*]

4. [*control only*] You will be asked to listen to an audio recording on your headphones for 6 minutes. The recording will be described clearly and thoroughly before you decide to listen. It is an excerpt from a lecture at Google about mindfulness. Again, you will have the option to quit the study at any time, even if you decide to start the audio recording and wish to quit, you may.

4. [*body scan meditation* only] You will be asked to meditate for 6 minutes by listening to step-by-step meditation instructions on your headphones. The instructions are for a body scan meditation which is used to increase awareness of the body by paying attention to your breath and using all of your senses to focus on different areas of your body. A thorough description of the meditation instructions will be presented before you decide whether or not to participate in the meditation. It is absolutely okay if you have never meditated before and also just fine if you have meditation experience. Again, you will have the option to quit the study at any time, even if you decide to start the meditation recording and wish to quit.

4. [*Lovingkindness meditation only*] You will be asked to meditate for 6 minutes by listening to step-by-step meditation instructions on your headphones. The instructions are for a lovingkindness meditation which is used to increase compassion for yourself and others by visualizing loving and kind feelings directed toward yourself and others. A thorough description of the meditation will be presented before you decide whether or not to participate in the meditation. It is absolutely okay if you have never meditated before and also just fine if you have meditation experience. Again, you will have the option to quit the study at any time, even if you decide to start the meditation recording and wish to quit.

5. You will complete the Implicit Association Test, an onscreen task that measures attitudes about race by sorting pictures and words into groups as fast as you can (it takes 5-7 minutes). Your performance on the task will not be revealed to you, nor will I know any individual, identifiable scores.

6. Finally, you will fill out an anonymous survey on demographics, feedback about the study, meditation, and reasons to not be prejudiced (approximately 2-3 minutes).

Your participation in this study is voluntary and there is no compensation. If you decide to participate, your responses will be anonymous. If you have any questions regarding this survey, please contact me at bkorsmo@email.jfku.edu or (915) 491-6087.

If you have any questions regarding your rights as a human subject and participant in this study, or to report research-related problems, you may call the Institutional Review Board at NU for information, at (858) 642-8384, or irb@nu.edu. ***GO TO NEXT PAGE***

I do NOT agree to participate

I AGREE to participate

Appendix D

Audio Transcripts

Control Condition Transcript

Have you noticed there's no end to the work day at Google? There's no end to the work day. I mean you guys define it because the campus is structured so that you know you'll never have to go home and have a real life if you want. A separate life and that kind of way. But it's actually you know even before there was Google you know the digital revolution is actually de-localizing everything so that you know there's no like workplace anymore really because you can work anywhere.

There's no work week anymore because I mean there's no work day. So all the boundaries of being confused but we still really saddled with a Stone Age mind and you know in the digital age world. And that Stone Age mind unless it has a certain kind of.....Unless it engages in a certain kind of self-education can really wind up getting stuck in some realms of serious confusion suffering being lost and in fact maybe even, and I just throw this out as a possibility, impeding creativity, imagination, real thoughtfulness, real breakthrough type leadership sensibilities, because we're not running on all cylinders or to use even, I think, a better metaphor and one that I like a lot is that you know that we're living in a multi-dimensional universe and if you listen to the cosmologists and the string physicist and the vacuum energy physicists, I mean, we're living in the universe that's not even four dimensional it's more like 11 or 26 or whatever it is.

And you know we still haven't really crocked Einstein's contribution of space time. It's like four dimensions. So if we are not in touch with the multiple dimensions of our own being and there are many hidden dimensions to being embodied in a human lifetime for unbelievably short period of time. Then, in fact we're we're kind of in some way. Trying to get somewhere and get all this doing done without tuning the apparatus. It would be like the Philadelphia Philharmonic or some

great orchestra, the San Francisco Philharmonic or symphony orchestra, playing Beethoven, without tuning first. And no matter what they get the greatest musicians with the greatest instruments in the world and they still tune first. To themselves and to each other.

And so in a sense I say you know that meditation is in some sense you could say it's like tuning your instrument before you take it out on the road. And tuning it in the morning can make a difference in how the whole day goes just on a kind of mundane level never mind all the hidden dimensions of possibility, imagination.

And yet it does seem really in some sense outside of the common norms of of our culture and so whether it's in the Bay Area or sort of less charged places like that very easy to kind of accrete a kind of feeling on the part of other people that there's something weird about stillness or about silence or about self-reflection about non- doing. And I want to say it is nothing weird or anti-American about this at all or un- American about this at all. It's just it's it's in some sense a recognition of sanity. And the doing and being have always been intimately interrelated and without some kind of deep reflection.

Well, where do you think scientific breakthroughs or engineering breakthroughs come from? They all come out of the human mind and very often they come serendipitously in the middle of the night or in dreams or whatever and there have been Nobel prizes that have come just from like a dream like a snake eating its tail and voila you've got the benzene ring and all the molecular orbitals. And there's lots of, lots of instances like that.

In science it's not what you know it's what you are willing to know you don't know. And to linger at that sometimes is very uncomfortable place of having banged your head and banged your head and banged your head come through a lot of different kinds of solutions none of which actually lead to any kind of solution and all of a sudden you're just like. OK.

And you don't try to force anything more. And just. Open. And you go, in some sense beyond thinking. You go beyond thinking. It's not like you're discounting thought. But in some sense you're giving yourself over to something that's just much bigger.

That we never get educated around never hardly ever mention. Sometimes it might be called intuition. Sometimes it might be called creativity. I call it awareness (Kabat-Zinn, 2011).

Body Scan Meditation Transcript

In practicing the body scan. Use the instructions for guidance as best you can. Let's begin now by bringing your attention to a sense of your body as a whole lying here. However, it is in this moment feeling the rhythmic waves of the breath as it moves in and out. An awareness of the body as a whole breathing.

Now when you feel ready to let's let go of the body as a whole and moving into the region of the belly and the sides of the lower torso. Right up to the bottom of the rib cage. All around feeling the belly rising with each breath and falling back towards to the spine with each exhale. And now when you're ready taking a slow deep more intentional breath, feeling it fill the entirety of the abdomen and sides, cradling it for a moment and just letting it out.

And then as the breath dissolves into the air allowing the entirety of this region of the body to dissolve in the mind's eye as we now bring our awareness to the region of the upper torso and rib cage in the chest, the chest wall and breasts, the upper back. The shoulders. And when you're ready taking in a long slow and more intentional breath cradling it here for a moment to the lungs feeling the rib cage expanding all around in back as well as in front and on the side and now letting the breath release and as the breath lets go, noticing what happens as the mind lets go of this region of the body as well.

Letting them dissolve as we move into the region of the head and face allowing it to be at rest as it is sensing perhaps the breath moving in and now past the gateways of the nostrils. And

the cheeks and the ears the eyelids the eyebrows and the space between the eyebrows the forehead the temple the entirety of the scalp and cranium taking in a long slow and more intentional breath and now letting the breath release and as the breath go noticing what happens as the mind lets go of this region of the body as well.

And so as this practice comes to its natural conclusion you might want to take a moment to congratulate yourself for having made that time to nurture yourself in this way (Williams, Teasdale, Segal, & Kabat-Zinn, 2007).

Lovingkindness Meditation Transcript

Lovingkindness. In a dignified sitting posture or lying down. Bringing your awareness to the breath and the body as a whole breathing moment to moment awareness. Riding on the waves of breath. Resting with the flowing of your breathing in this way picturing in your mind's eye someone in your life who loves you and giving yourself over to feeling the qualities of the selfless love and kindness they accord you. Breathing with these feelings, bathing in them, resting in the warmth and radiance of their heartfelt embrace of you just as you are.

Now as you feel ready, seeing if you can become the source as well as the object of the same feelings. Just basking in feelings of loving kindness. Basking in feelings of lovingkindness akin to the all loving embrace of a mother for her child. Where you are simultaneously both the mother and the child.

In resting here in this field of lovingkindness whisper to yourself inwardly the following phrases: may I be safe and protected and free from inner and outer harm. May I be happy and contented. May I be healthy and whole to whatever degree possible. May I experience ease of well-being. So if you are open to expanding the field of lovingkindness out from your own heart and your own body and your own being you can invite into the field to the loving heart. Those for whom your relationship is more neutral.

Or even people you don't know at all or who you have only heard of secondhand wishing them well. May she, he, or they be safe and protected and free from inner and outer harm. May she, he, or they be happy and contented. May she, he, or they be healthy and whole to whatever degree possible. May she, he, or they experience ease of well-being. So in the final moments of our time together. May you walk in beauty. May you and all beings, near and far, walk in beauty (Kabat-Zinn, 2007).

Appendix E

Audio Control Condition from Lueke and Gibson (2015)

(Transcribed with transcription software and contains errors). The parish of sell born lies in the extreme eastern corner of the county of Hampshire bordering on the county of Sussex and not far from the county of Surrey. It's about 50 miles southwest of London in latitude 51 and near midway between the towns of Alton and Peter's fields being very large and extensive. At about some 12 parishes two of which are in Sussex Totten and row gates. If you begin from the south and proceed westward the adjacent parishes are m shot. Newton Vallance Farringdon Hartley Moore do it. Great Wardle AHAM Kingsley Hedley Bram shot Torsten row gate bliss and Grantham. The souls of this district are almost as various and diversified as the fuse and aspects the high part to the southwest consists of a vast Hill of chalk rising three hundred feet above the village and is divided into a sheep down the High Wood and a long hanging Wood called the hanger.

The covet of this Eminence is altogether Beech the most lovely of all forest trees. Whether we consider it smooth rind or bark it's glossy foliage or graceful pendulum spouse the down or sheep book is a pleasing park like spot of about one mile by half that space jutting out on the verge of the hill country where it begins to break down into the plains and commanding a very engaging view being in the Assemblies of Hildale woodlands Heath and water. The prospect is bounded to the southeast and east by the vast range of mountains called the Sussex Downs by Gill down and by the downs around talking and ride gate in Surrey to the north east which all together with the country beyond Alton and Farnham former noble and extensive outlying

At the foot of this hill one stage or step from the uplands lies the village which consists of one single straggling street. Three quarters of a mile in length in a sheltered fail and running parallel with the hanger. The houses are divided from the hill by a vein of stiff Clay good wheat land yet stand on a rock of white stone little and the parents removed from chalk but seem so far from being cancerous that it enjoys extreme heat.

Yes that the free Stones still preserve somewhat that his analogies to chalk is plain from the beaches which descend as low as those rocks extend and no farther and thrive on them as well where the ground is steep as on the Chalks at each end of the village which runs from south-east to northwest arises a small rivulet that at the north west and frequently fails but the other end is a fine perennial spring little influenced by drought or wet seasons. Caldwell Hans. This breaks out of some high grounds joining to nor Hill a noble chalk promontory remarkable for sending forth two streams into two different seas. The one to the south becomes a branch of the Arran running to Arundel and say falling into the British Channel. The other to the north the southern stream makes one branch of the way and meeting the black downstream. HEADLEE And the Alton Farnham stream at Telford bridge swells into a considerable river navigable at God humming from whence it passes to Guilford and so into the Thames that way bridge and thus at the north into the German Ocean are whales at an average run to about sixty three feet and when sunk to that depth seldom fail but produce a fine limpid water soft to the taste and much commended by those who drink the pure element but which does not lather well with soap. As the parish still inclines down towards warmer forest at the juncture of the clay and sand so becomes a wet sandy loam. Remarkable for tender and infamous for raids the oaks of Temple and Blackmore stand high in the estimation of purveyors and have furnished much navel timber

While the trees on the free stone grow large. But to what workman calls shaky and so brittle is often to fall to pieces and sawing. Beyond the sandy low in the soil becomes a hungry

lean sound till it mingles with the forest and will produce little without the assistance of lime and turnips in the center of the village and near the church is a square piece of ground surrounded by houses and vulgarly called the plaster in the midst of this spot stood in old times a vast oak with a short squat body and huge horizontal arms extending almost to the extremity of the area this venerable tree surrounded with stone steps and seats above them with the delights of old and young. And a place of much resort in summer evenings where the former sat in grave debate while the latter frolicked and danced before them long might it have stirred had not the amazing tempest in 1783 overturned it at once. To the infinite regrets of the inhabitants and the vicar who bestowed several pounds in setting it in its place again but all his care could not avail. The trees sprouted for a time then withered and died.

Among the singularities of this place the two rocky hollow lines the one to Alton and the other to the forest deserve our attention. These roads running through the mountains are by the traffic of ages and the fretting of water worn down through the first stratum of our free stone and partly through the second so that they look more like water courses than roads and the bedded with naked rag for furlongs together. In many places they reduced 16 or 18 feet beneath the level of the fields and after floods and in frosts exhibit very grotesque and wild appearances from the tangled roots that are twisted among the strata and from the torrents rushing down their broken sides. And especially when those cascades are frozen into icicles hanging in all the fanciful shapes of frost work these rugged gloomy scenes of fright the ladies when they peep down into them from the palace above. And make timid horsemen shudder while they ride along them that delight the naturalist with their various botany and particularly with their curious ferns with which they are bound

The manner of Selden. Was it strictly looked after with its kind the aspects and all its sloping Kovacs would swarm with game even now has partridges and pheasants abound and in

old days would cocks were as plentiful. There are a few quails because they more affect open fields than enclosures after harvest some few landfills are seen the parishes Sullivan by taking in so much of the forest is a vast district. Those who tread the bounds are employed part of three days in the business and are of the opinion that the outline in all its curves and in denting does not comprise less than 30 miles the village stands in a sheltered spot secured by the hanger from the strong westerly winds. The air is soft but rather moist from the air flow of the air of so many trees yet perfectly healthy and free from argues

The inhabitants enjoy a good share of health and longevity and the parish swarms with children. Should I meant to describe with some exactness the forest of Walmart of which three fifths perhaps lie in this parish my account of sell them were very imperfect as it is a district abounding with many curious productions both animal and vegetable and has often afforded me much entertainment both as a sportsman and as a naturalist.